Volume I

TRANSCRIPT OF RECORD

SUPREME COURT OF THE UNITED STATES

October Term, 1963

No. 284

UNITED STATES, APPELLANT,

vs.

ALUMINUM COMPANY OF AMERICA, ET AL.

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF NEW YORK

FILED JUNE 11, 1963

PROBABLE JURISDICTION NOTED OCTOBER 14, 1963

SUPREME COURT OF THE UNITED STATES

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No. 204

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APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF NEW YORK

Volume I

INDEX

	Original	Print
Record from the United States District Court for the Northern District of New York		
Complaint	a	1
Answer	k	8
Transcript of hearing, February 5, 1962	1	12
Appearances	2	12
Opening statement on behalf of Government by Mr. Melchior	4	13
Transcript of hearing, February 6, 1962	48	35
Offers in evidence	51	35
Testimony of Kenneth B. Higbie—direct	61	40
Albert D. McMahon—direct	73	48
John G. Detwiler—direct	84	54
—cross	117	72
—redirect	128	79
David Dale Martin—direct	133	82

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
Transcript of hearing, February 7, 1962	209	123
Testimony of David Dale Martin (resumed)		
—direct	211	123
—cross	239	138
A. Jackson Reeves—direct	276	158
—cross	287	164
The Court	290	165
Testimony of Robert Latane Ware—direct	291	167
William R. Johnson—direct	314	179
—cross	328	187
David Dale Martin (resumed)—cross	329	188
Transcript of hearing, February 8, 1962	363	205
Testimony of William A. Hickson, Jr.—direct	365	205
—cross	380	213
The Court	388	217
Testimony of William A. Hickson, Jr.—redirect	389	218
Walter F. Probst—direct	392	219
—cross	405	226
—redirect	413	231
—recross	416	233
Edward J. Simmons—direct	418	234
—cross	446	249
—redirect	453	253
—recross	454	253
—redirect	455	254
David Dale Martin (resumed)—cross	456	255
Testimony of Holt A. Murray—direct	486	270
—cross	503	279
Offers in evidence	511	283
Transcript of hearing, February 9, 1962	532	294
Offers in evidence	534	294
Testimony of Minot H. Pratt—direct	537	295
—cross	545	300
Offers in evidence	549	302
Testimony of Ellery R. Fosdick—direct	554	305
Offers in evidence	560	308
The Court	567	312
Testimony of Ellery R. Fosdick—cross	569	313
Transcript of hearing, February 13, 1962	595	327
Testimony of Doniel G. Aymes—direct	597	327
—cross	651	355
—redirect	663	361
—recross	666	363
The Court	666	363
Testimony of Paul A. Nehring—direct	681	371
Offers in evidence	684	372

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
Transcript of hearing, February 13, 1962—Continued		
Testimony of Paul A. Nehring—cross	697	379
—redirect	701	381
Roger J. Schoerner—direct	701	382
—cross	744	404
—redirect	762	414
—recross	765	416
Testimony of Robert Charles Moeller, Jr.—direct	766	416
—cross	786	427
The Court	787	427
Transcript of hearing, February 14, 1962	793	431
Testimony of Robert Macomber Akin, Jr.—direct	795	431
—cross	808	439
Lyle William McNair—direct	810	440
—cross	839	455
—redirect	853	463
Lawrence A. Harvey—direct	854	463
—cross	912	493
—redirect	918	496
William Louis Hendrix—direct	920	497
—cross	939	508
—redirect	946	511
—recross	947	512
Harry Resnick—direct	948	513
—cross	974	527
—redirect	981	531
Transcript of hearing, February 15, 1962	988	535
Testimony of William H. Morley—direct	990	535
—cross	1011	546
Testimony of William H. Morley—redirect	1023	553
The Court	1026	554
Offers in evidence	1028	555
The Government rests	1077	577
Defendants motion to dismiss complaint	1078	577
The Court's statement	1078	577
Colloquy between Court and counsel	1084	580
Argument on behalf of defendants by Mr. Bergson	1090	582
Colloquy between Court and counsel	1138	602
Argument on behalf of Government by Mr. Melchior	1141	604
Transcript of hearing, February 19, 1962	1190	627
Testimony of Rudolph A. Schatzel—direct	1192	629
Offers in evidence	1203	633
Testimony of Rudolph A. Schatzel—cross	1262	664
Leslie H. Hemeter—direct	1283	676
Offers in evidence	1289	679
Testimony of Leslie H. Hemeter—cross	1299	684
—redirect	1313	692

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
Transcript of hearing, February 19, 1962—Continued		
Offers in evidence	1314	692
Testimony of Charles H. Ellis—direct	1317	694
—cross	1335	704
Testimony of Constantine Xenis—direct	1340	705
Offers in evidence	1342	706
Testimony of Constantine Xenis—cross	1356	713
Robert F. Isenhart—direct	1367	719
—cross	1373	722
Glenn Koger—direct	1380	726
—cross	1400	736
Glenn Rolston—direct	1419	745
Leland D. McCormac—direct	1425	748
—cross	1430	751
—redirect	1432	752
Testimony of Glenn Rolston (resumed)—direct	1433	752
Offers in evidence	1450	762
Testimony of Glenn Rolston—cross	1485	780
—redirect	1499	787
—recross	1500	787
Testimony of Joseph L. Healy—direct	1501	788
Offers in evidence	1506	791
Transcript of hearing, February 21, 1962	1522	799
Testimony of Charles A. Brandow—direct	1524	799
—cross	1528	802
—redirect	1532	804
The Court	1532	804
Testimony of James J. Coleman—direct	1534	805
—cross	1538	807
Testimony of Maurice C. Buckley—direct	1542	809
Offers in evidence	1545	811
Testimony of Maurice C. Buckley—cross	1549	812
John W. Hood—direct	1551	814
Offers in evidence	1553	815
John W. Hood—cross	1559	818
Testimony of Joseph L. Healy (resumed)—direct	1561	819
Offers in evidence	1570	825
Testimony of Joseph L. Healy—cross	1608	843
—redirect	1638	859
—recross	1641	860
Testimony of George Day—direct	1644	862
Offers in evidence	1645	863
Transcript of hearing, February 22, 1962	1689	884
Testimony of John Hopkinson—direct	1691	884
—cross	1698	888
John L. Blank—direct	1701	889
Bruce S. Corby—direct	1710	894
—cross	1716	898

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
Transcript of hearing, February 22, 1962—Continued		
Testimony of George Day (resumed)—direct	1722	901
Offers in evidence	1725	903
Testimony of George Day—cross	1738	909
—redirect	1768	925
—recross	1769	925
Testimony of A. D. Ross Fraser—direct	1772	927
Offers in evidence	1804	944
Testimony of A. D. Ross Fraser—cross	1835	960
Volume II		
Transcript of hearing, February 27, 1962	1864	977
Colloquy between court and counsel	1866	977
Testimony of James R. MacDonald—direct	1875	981
—cross	1894	990
Testimony of Anthony J. Nesti—direct	1920	1004
Offers in evidence	1922	1005
Testimony of Anthony J. Nesti—cross	1938	1013
—redirect	1978	1034
—recross	1984	1036
Colloquy between court and counsel	1984	1036
Testimony of Frank L. Magee—direct	2001	1044
Offers in evidence	2004	1046
Testimony of Frank L. Magee—cross	2043	1066
Testimony of Ralph V. Davies—direct	2062	1076
Offers in evidence	2080	1085
Testimony of Ralph V. Davies—cross	2099	1096
—redirect	2112	1103
Kemp W. Reece—direct	2113	1103
Leon E. Hickman—direct	2121	1107
Theodore H. Kefry—direct	2130	1112
—cross	2143	1118
Thomas L. Gilbert—direct	2147	1121
—cross	2162	1128
—redirect	2170	1132
Testimony of John S. Pendorf—direct	2171	1133
Offers in evidence	2172	1134
Testimony of John S. Pendorf—cross	2175	1135
—redirect	2177	1136
Offers in evidence	2187	1141
Defendants rest	2187	1141
Colloquy between court and counsel	2187	1141
Transcript of hearing, March 1, 1962	2206	1150
Rebuttal argument	2209	1150
Testimony of Leo V. Finn—direct	2209	1151
Offers in evidence	2211	1152

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
Transcript of hearing, March 1, 1962—Continued	2213	1153
Testimony of Leo V. Finn—cross	2226	1160
—redirect	2227	1160
Testimony of Bernard P. Bernsten—direct	2228	1161
Offers in evidence	2245	1169
Testimony of Bernard P. Bernsten—cross	2280	1187
—redirect	2282	1188
—recross	2282	1188
The Court	2283	1188
Offers in evidence and colloquy thereon	2290	1192
Both sides rest	2291	1192
Motion for a judgment for the defendants	2291	1192
Colloquy between court and counsel	3367	1195
Plaintiff's interrogatories and defendants' answers thereto	3404	1195
Nos. 6, 7, and 9	3455	1199
No. 16	3467	1209
No. 18	3562	1215
Nos. 47 and 48	3569	1221
No. 50	3728	1225
No. 61	3741	1236
No. 63	3826	1239
No. 69	3835	1245
Defendants' answers to plaintiff's interrogatories	3835	1245
Table II	3850	1261
Table III	3864	1270
Table V	3874	1277
Table VII	4437	1283
Findings of fact	4459	1305
Opinion, Brennan, J.		
Letter of Judge Brennan dated February 21, 1963, re additional findings of fact to supplement the findings already filed	4499a	1334
Additional findings of fact	4500	1336
Notice of appeal to the Supreme Court of the United States	4502	1337
Clerk's certificate (omitted in printing)	4504	
PLAINTIFF'S EXHIBITS		
3—Letter from Leon E. Hickman, Vice President and General Counsel of Alcoa to Victor R. Hansen, Assistant Attorney General, Antitrust Division, dated April 2, 1959	4505	1339
5—Letter from Frank L. Magee, President, Alcoa to Rome Cable Corporation, dated January 21, 1959	4507	1340

Record from the United States District Court for the Northern District of New York—Continued

	Original	Print
PLAINTIFF'S EXHIBITS—Continued		
6—Letter from Frank L. Magee, President, Alcoa to A. D. Ross Fraser, President, Rome Cable Corporation, dated January 21, 1959	4509	1342
7—Telegram from Rome Cable Corporation to J. R. Leedham, New York Stock Exchange, Dow Jones & Co., Pacific Coast Stock Exchange and T. P. Phelan, Pacific Coast Stock Exchange, dated January 22, 1959 announcing plans to affiliate with Alcoa	4512	1345
8—Memorandum of Telephone Statement given by A. D. R. Fraser to Paul Windels, Jr., Securities and Exchange Commission, dated January 23, 1959	4514	1348
9—Rome Proxy and Proxy Statement, dated March 3, 1959	4515	1349
Volume III		
10—New York Stock Exchange Listing Fee Agreement—Form A with Alcoa, dated March 13, 1959	4570	1455
16—Alcoa Annual Report for the year ending December 31, 1958	4572	1457
17—Rome Cable Corporation Annual Report to Stockholders as of March 31, 1953 (excerpts)	4606	1491
22—Rome Cable Corporation 22nd Annual Report to Stockholders as of March 31, 1958	4609	1494
23—(Excerpts) Written answers to questions 6, 11, 18, contained in Antitrust Division letter dated February 2, 1959	4625	1511
27—(Excerpts) Written answers by Rome to questions 3, 13, 14, 15, 16, 17 contained in Antitrust Division letter dated August 18, 1959	4646	1529
28—Memorandum re Arrangement between Rome Cable Corporation and Aluminum Company of America, initialed March 7, 1952	4656	1536
30—Letter from Philip T. Coffin, Alcoa to Glenn Rolston, Rome Cable Corporation, dated November 21, 1955	4658	1538
31—Letter from A. D. R. Fraser, Rome Cable Corporation to Ralph V. Davies, Vice President, Alcoa, dated December 16, 1955	4659	1539

Record from the United States District Court for the Northern District of New York—Continued

	Original	Print
Plaintiff's Exhibits—Continued		
32—The Rome Cable Corporation—Manual of Technical Information, Second Edition (excerpt)—Table showing Properties of Metals at 20 C and statement showing Galvanic Series of Industrial Alloys in Sea Water	4664	1542
33—Written answers by Alcoa to questions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15 contained in Antitrust Division letter dated August 19, 1959	4668	1547
41—Memorandum from Leon E. Hickman to Alcoa Managerial Personnel, dated January 18, 1960 with letter from Leon E. Hickman to Samuel A. Rea, dated January 15, 1960 attached	4691	1567
42—Memorandum from Sam Rea to employees of Rea Magnet Wire Company, Inc., dated January 19, 1960	4695	1571
44—Written answers by Rea and Alcoa to questions: A, B, C, and D contained in Antitrust Division telegram	4696	1572
47—Rome Cable Corporation Report to Stockholders as of March 31, 1937	4700	1574
48—Alcoa Annual Report for the year ending December 31, 1959	4706	1582
49—Alcoa Annual Report for the year ending December 31, 1960	4738	1587
50—Report entitled, "The Electrical Applications of Aluminum in The Building Industry", prepared for The Aluminum Company of America by the firm of Edward E. Ashley, dated July 18, 1957 (excerpts)	4778	1627
52—Booklet published by Rome entitled "An Address by A. D. R. Fraser, President, Rome Cable Corporation, to the members of the Rochester Society of Investment Analysts." January 16, 1957	4893	1739
53—Minutes of Meeting of the Executive Committee of Rome Cable Corporation, November 6, 1950	4913	1759
54—Rome memorandum from R. A. Schatzel to A. D. R. Fraser; Subject: "Aluminum", dated March 28, 1951	4915	1761

Record from the United States District Court for the Northern District of New York—Continued	Original	Print
PLAINTIFF'S EXHIBITS—Continued		
55—Rome memorandum from R. A. Schatzel to J. R. Woods; Subject: "Consumers Power Power Corp., Self-Supporting SD", dated April 26, 1951	4916	1762
56—Minutes of Meeting of the Board of Directors of Rome Cable Corporation, May 18, 1951	4918	1764
57—Rome memorandum from R. A. Schatzel to A. D. R. Fraser and H. T. Dyett; Subject: "Aluminum", dated July 5, 1951	4926	1773
60—Rome memorandum from R. M. Fraser to C. H. Ellis; Subject: "Aluminum Project", dated October 2, 1951	4930	1776
61—Speech by R. A. Schatzel at Rome Cable Corporation Engineering and Research Conference, October 4, 1951	4932	1779
63—Rome memorandum from G. E. Rolston to F. S. Marks; Subject: "Westinghouse Electric Corporation, Sharon Plant", dated October 17, 1951	4937	1785
67—Minutes of Rome Cable Corporation "Aluminum Meeting", November 29, 1951	4939	1787
68—Minutes of Rome Cable Corporation "Aluminum Meeting", January 4, 1952	4947	1794
69—Minutes of Rome Cable Corporation "Aluminum and General Meeting", January 15, 1952	4950	1796
70—Minutes of Meeting on Aluminum Program for Rome Cable Corporation, January 30, 1952	4955	1801
71—Alcoa memorandum by J. C. Glascock and W. W. Wheater; Subject: "Inspection trip to Rome Cable Company", dated March 3, 1952	4965	1810
72—Letter from J. Carlton Ward, Jr., of Rome to H. T. Dyett, dated February 16, 1952 with enclosed four page memorandum regarding visit of Alcoa representatives to Rome, N.Y., dated February 16, 1952	4996	1841
74—Minutes of Rome Cable Corporation "Aluminum Meeting", March 3, 1952	5001	1848
75—Minutes of Rome Cable Corporation "Aluminum Meeting", March 10, 1952	5005	1852
76—Alcoa memorandum from P. T. Coffin to all District Sales Managers, subject: "Covered (Weather-Resistant) Conductors", dated March 14, 1952	5009	1854

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
77—Rome memorandum from G. E. Rolston to All Salesmen, subject: "Expanded Activity in Aluminum", dated March 14, 1952	5012	1857
78—Alcoa memorandum from Philip T. Coffin to J. W. Hood, subject: "Weather Resistant Covered Aluminum Wire and Cable", dated November 11, 1952	5014	1859
79—Minutes of "Meeting on Aluminum Program for Rome Cable Corporation", dated April 3, 1952	5015	1860
80—Rome memorandum from F. S. Marks to All Salesmen, subject: "Covered Aluminum Orders and Inquiries", dated June 5, 1952	5025	1867
81—Minutes of Meeting of Rome Cable Corporation executives headed "Whither goest thou?", January 24 and 25, 1953	5026	1868
82—Letter from A. D. R. Fraser to R. V. Davies, dated April 7, 1953	5040	1881
83—Rome memorandum by R. A. Schatzel; subject: "1952—Research and Engineering", dated May 4, 1953	5042	1883
84—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting on September 2, 1953	5046	1889
85—A portion of the Minutes of the 1953 Rome Sales Conference referring to a speech by G. E. Rolston entitled, "Our Future in Aluminum"	5056	1899
86—Speech by E. Mark Wolf at the 1953 Rome Sales Conference entitled "Aluminum (Bare) and Magnet Wire Developments"	5058	1901
88—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corp., at their meeting on March 3, 1954	5061	1905
90—Rome memorandum dated June 7, 1954, from R. A. Schatzel to H. T. Dyett, subject: "Engineering—Research and Development"	5073	1917
91—Minutes of meeting of Rome Cable Corporation executives headed "Whither Goest Thou"—continued, July 7, 1954	5076	1920
92—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting on September 8, 1954	5082	1927

Record from the United States District Court for the Northern District of New York—Continued

PLAINTIFF'S EXHIBITS—Continued	Original	Print
93—Rome memorandum by H. T. Dyett; Subject: "Conversation at my home with Ralph Davies, R. Murray Willard ("Jess"), J. H. Dyett and Myself", dated September 13, 1954	5090	1935
95—Rome memorandum from E. Mark Wolf to R. A. Gray, Subject: "R. E. Uptegraff Mfg. Co.", dated March 17, 1955	5092	1937
96—Minutes of meeting of Rome Cable Corporation executives held May 3, 1955, subject: "Aluminum"	5093	1938
97—Rome memorandum from R. A. Schatzel to A. D. R. Fraser, Subject: "1954", dated May 3, 1955	5095	1941
98—Rome memorandum from R. M. Fraser to C. H. Ellis, Subject: "Aluminum", dated August 16, 1955	5097	1943
99—Minutes of meeting of the Executive Committee of Rome Cable Corporation August 17, 1955	5099	1944
102—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting September 7, 1955 with two attached statements by H. T. Dyett dated September 7 and 8, 1955	5102	1949
103—Speech by E. Mark Wolf at Rome Cable Corporation 1955 Sales Conference	5113	1961
104—Speech entitled "Our Industry and Us" by A. D. R. Fraser at Rome Cable Corporation 1955 Sales Conference	5116	1965
105—Rome memorandum dated December 7, 1955 from G. E. Rolston to W. A. Miller	5123	1976
106—Rome memorandum from R. A. Schatzel to A. D. R. Fraser, subject: "1955 Developments", dated December 8, 1955	5125	1978
107—Rome memorandum from J. H. Dyett to H. T. Dyett, A. D. R. Fraser, G. E. Rolston and S. O. Williams, Subject: "Alcoa Pig", dated August 18, 1955	5128	1981
108—Unsigned Rome document dated October 5, 1955, bearing handwritten initials of H. T. D., subject: "Notes on Visit of Messrs. Ralph Davies and Phil Coffin to Rome on October 4, 1955"	5129	1982
109—Letter from A. D. R. Fraser to R. V. Davies, dated October 5, 1955 with handwritten notations by P. T. Coffin	5133	1986

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
110—Letter from R. V. Davies to A. D. R. Fraser, dated October 12, 1955	5136	1989
111—Letter from A. D. R. Fraser to R. V. Davies, dated October 14, 1955	5138	1990
112—Letter from J. H. Dyett to W. S. Stout, Alcoa, dated October 21, 1955	5139	1991
113—Rome memorandum from J. H. Dyett to A. D. R. Fraser, R. A. Schatzel, and S. O. Williams, Subject: "Aluminum", dated October 21, 1955	5140	1992
Volume IV		
114—Letter from J. H. Dyett to Clarence Glass of the Anaconda Company, dated October 21, 1955	5141	1993
115—Letter from J. H. Dyett to R. M. Willard of Alcoa, dated November 18, 1955	5142	1994
116—Rome memorandum from J. H. Dyett to A. D. R. Fraser, subject: "Kaiser Aluminum", dated November 22, 1955	5144	1995
117—Letter from J. H. Dyett to John L. Loeb of Carl M. Loeb, Rhoades & Co., dated December 2, 1955	5145	1996
118—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting December 13, 1955	5146	1999
119—Rome memorandum from J. H. Dyett to A. D. R. Fraser, Subject: "Aluminum", dated February 24, 1956	5159	2013
122—Rome memorandum from J. H. Dyett to A. D. R. Fraser, Subject: "Aluminum", dated May 15, 1956	5160	2013
124—Rome memorandum from J. H. Dyett to A. D. R. Fraser, G. E. Rolston and S. O. Williams, Subject: "Alcoa", dated June 15, 1956	5161	2015
126—Speech entitled, "Products" by G. E. Rolston at 1956 Rome Cable Corporation Sales Conference	5162	2016
127—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting on November 29, 1956	5166	2023
128—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting on March 7, 1957	5177	2034

Record from the United States District Court for the Northern District of New York—Continued

	Original	Print
PLAINTIFF'S EXHIBITS—Continued		
129—Rome memorandum dated March 11, 1957 from J. H. Dyett to A. D. R. Fraser and H. T. Dyett, Subject: "Revere"	5189	2047
130—Rome memorandum dated March 29, 1957 from D. H. Thayer to All Salesmen, Subject: "T. J. Cope, Inc."	5190	2048
132—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting on March 4, 1958	5191	2051
133—Speech by R. A. Schatzel at the 1958 Rome Cable Corporation Sales Meeting Engineering Session	5205	2065
134—Rome memorandum from C. J. McMurry to J. R. Woods, Subject: "Knoxville Utilities Board, Knoxville, Tennessee", dated December 5, 1958	5218	2074
135—Rome memorandum from J. R. Woods to C. J. McMurry, Subject: "Knoxville Utilities Board", dated December 10, 1958	5219	2076
136—Letter from C. J. McMurry to Harry H. Hicks of the Tennessee Valley Authority, dated January 19, 1959 with note from McMurry to J. R. Woods	5220	2077
137—Rome memorandum from J. R. Woods to R. R. Davis, Subject: "Iowa Power and Light Co., Des Moines, Iowa", dated December 24, 1958	5221	2078
138—Alcoa Electrical Conductor Division Newsletter, dated May 11, 1955 with attached entitled "Covered Conductor Shipments"	5223	2080
139—Alcoa memorandum from P. T. Coffin to J. P. Haight, Subject: "Polyethylene Covered Conductors", dated February 23, 1955	5230	2087
140—Alcoa memorandum from P. T. Coffin to R. V. Davies, Subject: "Covered Conductors—Proposal for Alcoa to do its own Polyethylene Covering", dated July 11, 1955	5234	2090
141—Alcoa memorandum from P. T. Coffin to J. L. Patterson, Subject: "Covered Conductors", dated July 29, 1955	5237	2092
142—Alcoa memorandum from P. T. Coffin to R. V. Davies, Subject: "Rome Cable Corporation", dated January 4, 1957	5240	2095

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
Plaintiff's Exhibits—Continued		
145—Alcoa memorandum from Earl B. Cox to P. T. Coffin; Subject: "Electrical Conductor Sales Meetings", dated December 6, 1956	5241	2096
146—Alcoa News Release dated February 27, 1957	5243	2097
149—Minutes of Meeting of Alcoa Sub-Committee on Electrical Conductors, September 11-12, 1957	5245	2099
150—Alcoa memorandum dated October 11, 1957 from C. A. Appel to E. P. Burton, Subject: "Electrical Conductor-Covered"	5282	2127
151—Alcoa memorandum dated November 22, 1957 from E. B. Cox to P. T. Coffin, Subject: "Electrical Conductor Sales Meeting", December 9, 10, 11, 1957	5284	2129
153—Alcoa memorandum dated August 21, 1958, from T. L. Gilbert to P. T. Coffin, Subject: "Facilities for Neoprene and Rubber"	5286	2131
154—Minutes of Meeting of Alcoa Subcommittee on Electrical Conductors, September 10-11, 1958	5288	2132
155—Alcoa request for authorization Number M-2520, dated November 14, 1958, with covering memorandum dated July 27, 1959 from D. R. Little to O. R. Pellegrino	5328	2164
156—Alcoa memorandum dated January 13, 1959, by T. I. S. Boak, Jr., Subject: "Capital Expenditure Committee Meeting Notes", January 8, 1959	5334	2168
158—Alcoa memorandum dated July 8, 1957 from P. T. Coffin to R. V. Davies, Subject: "Rome Cable Corporation"	5336	2171
159—Alcoa memorandum dated July 11, 1957 from E. L. Magee to I. W. Wilson, Subject: "Rome Wire and Cable Company"	5340	2176
161—Alcoa memorandum dated August 14, 1957 from P. T. Coffin to W. K. Unverzagt; Subject: "Rome Cable Corporation"	5344	2179
162—Alcoa memorandum dated August 16, 1957 from P. T. Coffin to F. L. Magee, Subject: "Rome Cable Corporation"	5352	2185
163—Alcoa memorandum dated September 20, 1957 from T. H. Kerry to S. T. Gustina, Subject: "Rome Cable Corporation"	5354	2187
164—Alcoa memorandum dated September 26, 1957 from T. H. Kerry to S. T. Gustina, Subject: "Rome Cable Corporation"	5357	2189

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
165—Letter from H. T. Dyett to John L. Loeb of Loeb, Rhoades and Company dated October 2, 1957	5359	2190
166—Alcoa memorandum dated October 14, 1957 from R. V. Davies ot F. L. Magee, with handwritten note by Magee, dated October 15	5360	2191
167—Alcoa memorandum dated October 15, 1957 from F. L. Magee to R. V. Davies, Subject: "Rome Cable Corporation"	5361	2192
168—Alcoa memorandum dated October 3, 1958 from F. L. Magee to R. V. Davies, Subject: "Ebasco Services, Inc."	5362	2193
169—Alcoa memorandum from F. L. Magree to D. Wilmot, I. W. Wilson, and H. C. Erskine; Subject: "Ebasco Services, Inc.," dated October 16, 1958	5364	2195
170—Alcoa memorandum from T. L. Gilbert and R. H. Knapp to E. D. Mairs; Subject: "Preliminary Report, Covered and Insulated Wire and Cable", dated November 21, 1958	5365	2195
171—Alcoa memorandum from T. L. Gilbert to N. B. Lane, Subject: "Covered Conductor-Overall Program", dated December 2, 1958	5367	2197
172—Alcoa memorandum from T. L. Gilbert to E. D. Mairs, Subject: "Interim Report—Covered and Insulated Wire and Cable", dated December 22, 1958	5370	2199
173—Alcoa memorandum from T. L. Gilbert to L. T. Guess, Subject: "Insulated Wire and Cable Survey", December 26, 1958	5374	2203
175—Alcoa memorandum from T. L. Gilbert to E. D. Mairs, Subject: "Insulated Wire and Cable Survey", dated January 2, 1959	5380	2206
178—Alcoa memorandum from P. T. Coffin to F. J. Close, Subject: "Insulated Conductors", dated January 12, 1959	5382	2208
179—Alcoa report by T. Allen Johnston entitled, "The Market for Insulated Copper Conductor", dated January 17, 1959	5383	2210
180—Alcoa News release dated January 22, 1959	5395	2221
181—Alcoa News release dated June 15, 1959	5398	2223
183—Rome memorandum from C. J. McMurry to J. R. Woods, Subject: "Tennessee Valley Authority, Chattanooga, Tennessee", dated April 2, 1959	5401	2225

Record from the United States District Court for the Northern District of New York—Continued

	Original	Print
PLAINTIFF'S EXHIBITS—Continued		
184—Rome memorandum from J. R. Woods to C. J. McMurry, Subject: "Tennessee Valley Authority", dated April 7, 1959	5402	2226
185—Alcoa telegram from L. M. Hall to H. H. Rodee, dated April 14, 1960	5403	2226
186—Alcoa telegram from H. H. Rodee to L. M. Hall, dated April 14, 1960	5404	2227
187—Rome memorandum from T. D. Bylin to A. D. R. Fraser, C. H. Ellis, G. W. Commerford, L. D. Fitler, and F. P. Baumler, Subject: "Aluminum Capacities", dated July 10, 1959	5405	2227
189—Alcoa memorandum from J. L. Healy, Alcoa Accounting Department, Cost Division, to P. T. Coffin, Subject: "Cable Prices", dated February 8, 1956	5406	2229
191—Alcoa memorandum from T. H. Kerry, Alcoa Accounting Department, Cost Division to D. Wilmot, Subject: "Electrical Conductor Cable and Redraw rod prices", dated February 20, 1956	5407	2231
192—Alcoa memorandum from W. B. Howard to R. B. McKee, Subject: "Central Cable Company", dated August 26, 1957	5412	2235
193—Alcoa memorandum from L. P. Favorite to R. C. Erickson, Subject: "Central Cable Corporation", dated September 24, 1957	5418	2241
194—Alcoa memorandum from J. L. Healy to P. T. Coffin, Subject: "Spread in Schedule Base Price Between E. C. Redraw Rod and Bare Cable", dated October 11, 1957 with attached Table I and Table II.	5421	2243
195—Alcoa memorandum from Robert P. Miller to D. B. Miller, Subject: "Central Cable Corporation, Jersey Shore, Pa.", dated January 25, 1955	5424	2247
196—Alcoa memorandum from Robert P. Miller to D. B. Miller, Subject: "Central Cable Corporation, Jersey Shore, Pa.", dated January 27, 1955	5425	2248
197—Alcoa memorandum from L. C. Fisher to David B. Miller, Subject: "Central Cable Corporation", dated February 23, 1955	5426	2249
198—Letter from J. H. Dyett to R. Murray Willard of Alcoa dated August 5, 1955	5429	2251

Record from the United States District Court for the Northern District of New York—Continued

	Original	Print
Plaintiff's Exhibits—Continued		
199—Alcoa memorandum from J. L. Healy to D. B. Miller, Subject: "Electrical Conductor Cable and Redraw Rod Prices", dated February 6, 1957	5430	2252
200—Alcoa memorandum from R. C. Erickson to L. P. Favorite, Subject: "Central Cable Corporation", dated September 19, 1957	5431	2253
201—Alcoa memorandum from Alfred R. Gneiser to D. B. Miller, Subject: "Central Cable Corporation, Jersey Shore, Penna", dated October 15, 1959	5432	2254
202—Alcoa memorandum from David B. Miller to A. R. Gneiser, Subject: "Central Cable Corporation, Jersey Shore, Pennsylvania", dated October 20, 1959	5434	2256
203—Alcoa memorandum from G. V. Craighead of Alcoa to P. T. Coffin, Subject: "Westinghouse Electric Corporation, Buffalo, New York", dated February 7, 1957	5435	2257
210—Alcoa memorandum from P. T. Coffin to R. R. Cope, Subject: "Rea Magnet Wire Company", dated February 20, 1958	5438	2259
221—Alcoa memorandum from R. R. Cope to District Sales Office Managers, Subject: "Alcoa Aluminum Magnet Wire", dated October 1, 1958	5439	2260
223—Alcoa memorandum from P. T. Coffin to R. V. Davies, Subject: "Aluminum Magnet Wire", dated July 30, 1959	5443	2264
224—Alcoa memorandum from F. L. Magee to L. E. Hickman, Subject: "Rea Magnet Wire Company, Inc.", dated January 8, 1960	5447	2267
225—Alcoa memorandum from L. E. Hickman to Officers and salesmen, dated January 18, 1960 with attached letter from L. E. Hickman to Samuel A. Rea, Chairman of the Board of Rea Magnet Wire Company, dated January 15, 1960	5449	2268
227—Letter from F. L. Magee to Philip Sporn, President, American Electric Power Service Corporation, dated January 28, 1960	5453	2272
228—Alcoa Commercial Research Division Report, Subject: "Fine Wire", dated September 16, 1955	5455	2274

Record from the United States District Court for the Northern District of New York—Continued

	Original	Print
PLAINTIFF'S EXHIBITS—Continued		
230—Alcoa Commercial Research Division Report entitled, "Long-Term Forecast of The Demand for Aluminum", dated November 20, 1957 (excerpts)	5463	2281
231—Alcoa memorandum from Richard W. Davis to William W. Knapp, Subject: Product Managers' Five-Year Forecast Cable & E. C. Wire-Cable Accessories", dated July 11, 1960	5473	2293
232—Alcoa document entitled, "Insulated Aluminum Power Cables", undated	5475	2294
233—Alcoa document entitled, "Rome Cable Division of Alcoa, Application for Consigned Stock Approval", undated	5487	2302
234—Letter from T. O. English of Alcoa to A. D. Ross Fraser, dated December 12, 1951	5489	2304
235—Alcoa "Sound Slide Film for Electrical Distributors", First Draft July 1, 1954, Revised July 14, 1954	5491	2307
236—Speech by G. E. Rolston at Rome Cable 1955 Sales Conference, Subject: "Copper or Aluminum"	5517	2333
242—Speech by C. H. Ellis at Rome Cable 1958 Sales Conference, Subject: "Production Highlights and Lowlights"	5519	2335
243—Rome memorandum from R. K. Davis to P. J. Lopushinsky, dated January 31, 1958 with attached letter to H. B. Heitzman, General Electric Supply Co., dated January 31, 1958	5524	2343
245—Rome memorandum from J. R. Woods to C. J. McMurry, Subject: "Townsend Hardware Co., Jackson, Tennessee", dated April 8, 1958	5526	2345
246—Rome memorandum from J. R. Woods to File, Subject: "Aluminum Price Situation", dated April 24, 1958	5527	2346
248—Letter from A. D. R. Fraser to R. S. Keefer, President, The Okonite Company, dated October 15, 1958	5530	2349
249—Alcoa memorandum from L. T. Guess to T. L. Gilbert, Fabricating Division, Massena Works, Subject: "Covered Conductor Forecast", dated November 24, 1958	5531	2350
250—Alcoa memorandum from F. L. Magee to P. T. Coffin, Subject: "Accurate Insulated Wire Corporation", dated January 30, 1959	5534	2352

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
251—Alcoa memorandum from Philip T. Coffin to T. O. English, Subject: "Accurate Insulated Wire Corporation", dated February 2, 1959	5535	2353
253—Alcoa memorandum from Philip T. Coffin to L. P. Favorite, Subject: "J. R. Richards Company, Carnegie, Pennsylvania", dated April 30, 1959	5538	2355
254—Alcoa memorandum from Leon E. Hickman to F. L. Magee, dated May 1, 1959	5540	2357
257—Alcoa memorandum from C. L. Kessler, Metallurgical Dept., Massena Fabricating Works to A. G. Church; Subject: "Copper-Coated Aluminum Wire", dated July 8, 1959	5541	2358
258—Rome memorandum from D. H. Thayer to All Salesman, Subject: "Aluminum Building Wire", dated December 8, 1959	5543	2359
259—Alcoa memorandum from H. J. Fahrney to F. W. Conrade, Subject: "Southwire Corporation", dated September 10, 1959	5545	2361
261—Alcoa memorandum from Leon E. Hickman to A. D. R. Fraser and Samuel A. Rea, Subject: "Surprenant Mfg. Co., Clinton, Massachusetts", dated February 9, 1960	5546	2362
263—Alcoa Request and Authorization, dated April 15, 1960	5547	2363
264—Alcoa memorandum from A. D. R. Fraser to R. McKee, dated March 1, 1960	5557	2373
265—Alcoa memorandum from A. D. R. Fraser to L. E. Hickman, dated April 13, 1960	5558	2374
266—Alcoa memorandum from Leon E. Hickman to Ray E. Palmer, Subject: "Surprenant Manufacturing Co.", dated April 20, 1960	5559	2375
267—Rome memorandum from G. L. McCutchan to R. A. Schatzel, Subject: "SPT Cords With Aluminum Conductors", dated August 22, 1960	5566	2376
268—Alcoa News Release, January 20, 1961	5567	2381
269—Alcoa memorandum from R. W. Knapp to D. R. Little, dated July 31, 1959	5569	2382
270—Rome request for Quotation dated November 7, 1960 from Boston Office with letter dated November 14, 1960 to Boston Edison Company, Req. #135052	5570	2383

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
271—Rome Request for Quotation dated November 7, 1960 from Boston Office with letter dated November 14, 1960 to Boston Edison Company, Req. #134950	5572	2385
272—Rome memorandum from G. A. Brodock to J. S. Scheppach, Subject: "Dow Chemical Corp., Baton Rouge, La.", dated April 19, 1960	5574	2387
273—Letter from C. D. Blair of Rome to Dow Chemical Company, dated April 21, 1960	5579	2393
274—Letter from G. A. Brodock of Rome to Public Service Elec. and Gas Company, dated October 30, 1958	5585	2397
282—Alcoa memorandum from Dixon Lewis to J. B. Holloman, Subject: "Rome Cable Corporation", dated March 23, 1959, attaching a letter from D. T. Thayer to Dixon Lewis, dated March 20, 1959	5587	2399
287—Rome memorandum from R. E. Gates to western sales offices, Subject: "Aluminum rigid conduit", dated May 8, 1959	5590	2401
288—Rome memorandum from R. E. Gates to G. E. Rolston, Jr., Subject: "Atlantic Refining Company-Rigid Conduit", dated May 8, 1959	5591	2403
289—Rome memorandum from R. R. Davis to Stewart Johnston, Subject: "Dutton Lainson Co", Hastings, Nebraska, dated May 20, 1959	5592	2403
290—Alcoa memorandum from P. T. Coffin to All conductor salesmen, district managers, assistant district managers, branch managers, resident managers and chief administrators, Subject: "Sales Organization for the Handling of Alcoa Aluminum and and Steel Conduit", dated June 8, 1959	5593	2404
291—Alcoa News Release dated June 16, 1959	5595	2406
292—Alcoa memorandum from J. E. Perryman to District Sales Office Managers, Subject: "Sales of Aluminum Conduit by Rome Cable Corporation", dated June 25, 1959	5597	2407
308—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting on December 10, 1958	5604	2416
315—Minutes of Rome Cable Corporation, Torrance Sales Conference, March 21 and 22, 1952	5611	2423

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
334—Rome memorandum from J. R. Woods to G. E. Rolston, Subject: "Aluminum Sales Policies", dated May 5, 1959	5623	2437
348—Minutes of Rome Cable Corporation, "Copper Meeting", dated April 20, 1959	5625	2441
349—Minutes of Rome Cable Corporation, "Copper Meeting", dated January 22, 1960	5627	2443
350—Alcoa memorandum by R. R. Cope, Subject: "Edward Ashley Associates—Aluminum Insulated Power and Feeder Cable", dated April 26, 1955	5629	2445
351—Speech by R. A. Schatzel at the 1955 Rome Cable Corporation Sales Conference, Subject: "General Engineering and Research Survey"	5631	2446
353—Alcoa Electrical Conductor Division Newsletter dated February 20, 1956	5642	2461
354—Rome letter "To Our bare, weatherproof and magnet customers", dated April 6, 1956	5647	2465
355—Speech by J. H. Dyett at the 1957 Rome Cable Corporation Sales Conference, Subject: "Materials, Money . . . What They Mean To You."	5648	2467
356—Unsigned undated handwritten memorandum from Rome files entitled "Potential Uses of Aluminum in Insulated Wires and Cables"	5655	2478
357—Unsigned handwritten memorandum from Rome files, dated January 12, 1959, Subject: "Potential Uses of Aluminum in Insulated Wires and Cables"	5661	2481
359—Rome memorandum from J. R. Woods to G. E. Rolston, Subject: "Aluminum", dated May 11, 1959	5669	2485
360—Memorandum from A. D. R. Fraser to L. E. Hickman, dated January 18, 1961	5675	2493
363—Rome memorandum from J. R. Woods to A. D. R. Fraser, Subject: "Pricing—Copper vs. Aluminum", dated September 3, 1957	5677	2495
364—Letter from Margaret Jennings of Rome to H. J. Zeck of Allis-Chalmers Manufacturing Co., dated May 27, 1958	5682	2501
365—Rome memorandum from P. J. Lopushinsky to District and Division Managers, Salesmen and Agents, Subject: "Distributorship Agreement", dated March 21, 1960	5683	2502

Record from the United States District Court for the Northern District of New York—Continued

	Original	Print
PLAINTIFF'S EXHIBITS—Continued		
366—Rome memorandum from J. R. Woods to Alcoa and Rome District Managers, Salesmen, Agents and Administrators, Subject: "Aluminum Substitution", dated June 23, 1960 attaching a speech by J. R. Woods entitled "Economics of Aluminum Substitution, Facts and Fallacies"	5689	2510
367—Rome Electrical Conductor Distributor memorandum No. 3, Subject: "Sale of Overhead T & D Conductors through Distributors", dated September 6, 1960	5699	2518
369—Rome memorandum from J. B. Holloman to A. K. Buckenmaier, Subject: "Fitzpatrick Electric Supply Co.", dated January 9, 1961	5711	2528
370—Rome memorandum from J. B. Holloman to Division Managers, Subject: "Approved Distributor List", dated January 23, 1961	5717	2533
371—Article reprinted from "The Petroleum Engineer" issue of February, 1954, entitled "Pipe Line Application of Wire and Cable" by R. C. Graham	5720	2537
372—Rome memorandum from R. A. Schatzel to A. D. R. Fraser, Subject: "Aluminum vs. Copper", dated January 4, 1955	5724	2541
373—The Alcoa Report to the Building Industry—facts about aluminum in electrical systems (1958)	5726	2543
374—Letter from R. C. Graham of Rome to L. C. Vipond of the Civil Aeronautics Association, dated July 2, 1958	5762	2579
375—Letter from O. O. Stedman, Rome to the Commanding Officer, U. S. Naval Construction Battalion Center, Port Hueneme, California, dated September 17, 1959	5763	2580
377—Letter from R. D. Golly of Rome to Harry Shopp, Chief Electrical Inspector, County of San Diego, dated October 19, 1959	5764	2581
378—Rome memorandum from R. A. Schatzel to G. E. Rolston, Subject: "Applicance Cords with Aluminum Conductors", dated August 24, 1960	5765	2582
379—Letter from R. R. Cope of Alcoa to the Firm of Edward E. Ashley, dated June 17, 1955	5773	2588

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
381—Alcoa memorandum dated May 12, 1959, from Philip T. Coffin to Electrical Conductor Salesmen, District Managers, Asst. District Managers, Branch Managers, Resident Managers, Administrators, Subject: "Confirmation" with attached telegram	5774	2589
382—"Polyethylene Insulated Cables for Primary Distribution and Similar Applications" by R. C. Graham, Chief Engineer, Rome Cable Division of Alcoa, dated April 1, 1960	5776	2591
385—Rome advertisement entitled, "Overhead Cables for Distribution"	5788	2603
Volume V		
387—Minutes of Insulated Wire and Cable Discussion, dated January 28, 1959	5789	2605
388—Memorandum dated September 22, 1959, Subject: "A Plan for the Joint Promotion of Copper and Aluminum In the Electrical Market by Phelps Dodge and Reynolds"	5792	2608
392—Letter from William C. Ridge to John H. Krey, dated February 1, 1961	5798	2613
393—Letter from John H. Krey to William C. Ridge, dated March 1, 1961	5799	2615
396—Letter from J. M. Stuart to D. P. Reynolds, Subject: "Insulated Wire and Cable Program", dated October 4, 1957	5802	2619
398—Memorandum from J. M. Rae to W. C. Huebner, Subject: "MEFA-8285", dated June 4, 1958	5804	2621
399—Letter from Walter C. Huebner to John E. Toulmin, dated June 27, 1958 with attached letter from Mr. Toulmin to Walter C. Huebner, dated June 26, 1958	5806	2623
400—Letter from Walter C. Huebner to Donald P. Horsey, dated July 25, 1958	5808	2624
401—Letter from Walter C. Huebner to Philip T. Coffin of Alcoa, dated August 1, 1958 with attachments:	5810	2626
Memorandum from W. C. Huebner to File, Subject: "The Okonite Company", dated July 17, 1958	5811	2627
Memorandum from W. C. Huebner to File, Subject: "Simplex Wire and Cable Company", dated June 23, 1958	5812	2628

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
Memorandum from W. C. Huebner to File, Subject: "Triangle Conduit & Cable Corporation", dated July 25, 1958	5813	2629
Memorandum from W. C. Huebner to File, Subject: "Walker Bros. of Conshohocken, Pa.", dated July 24, 1958	5815	2632
402—Letter from Walter C. Huebner to Philip T. Coffin of Alcoa, dated August 4, 1958	5816	2633
403—Memorandum dated January 9, 1959 from R. L. Schlesinger to F. C. Gardner, Subject: "Summary of Alcoa Assignment"	5817	2634
405—Memorandum from R. L. Schlesinger to W. C. Huebner, Subject: "MEFA", dated August 12, 1958	5819	2636
406—Memorandum from R. L. Schlesinger to File, Subject: "Triangle Conduit & Cable Co., Inc., dated October 17, 1958	5820	2637
408—Memorandum from R. L. Schlesinger to File, Subject: "Rome Cable Corporation", dated October 29, 1958 (Exhibit 40)	5824	2639
409—United States Department of Commerce, Report Form BDSAF 122	5826	2641
410—United States Department of Commerce, Report Form BDSAF 84	5828	2643
421a—"Mineral Facts and Problems" 1960 Edition, Department of the Interior, Bureau of Mines, Chapter headed "Alumina and Bauxite" by R. C. Wilmot	5831	2646
421b—"Mineral Facts and Problems", 1960 Edition, Department of the Interior, Bureau of Mines, Chapter headed "Aluminum" by R. A. Heindl	5843	2658
421c—"Mineral Facts and Problems", 1960 Edition, Department of the Interior, Bureau of Mines, Chapter headed "Copper" by A. D. McMahon	5859	2674
422—Letter from M. C. Harris, Vice President, Central Cable Corporation to A. R. Gneiser of Alcoa, dated January 26, 1955	5884	2699
423—Letter from L. C. Fisher of Alcoa to M. C. Harris, dated February 14, 1955	5885	2700
424—Letter from Paul A. Nehring, Nehring Electrical Works to C. B. Owen, Alcoa, dated July 1, 1957	5887	2702
425—Alcoa memorandum from C. B. Owen to D. B. Miller, dated July 2, 1957	5888	2703
426—Alcoa memorandum from D. B. Miller to C. B. Owen, dated July 11, 1957	5889	2704

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
427—Letter from C. B. Owen of Alcoa to Paul A. Nehring, dated July 15, 1957	5891	2705
428—Letter from Paul A. Nehring to C. B. Owen of Alcoa, dated July 16, 1957	5893	2706
429—Alcoa memorandum from C. B. Owen to D. B. Miller, dated July 17, 1957	5894	2708
430—Letter from Paul A. Nehring to J. B. Holloman of Alcoa, dated January 28, 1958	5895	2709
431—Letter from Paul A. Nehring to J. B. Holloman, dated February 13, 1958	5896	2710
432—Letter from Paul A. Nehring to Aluminum Company of America, dated February 27, 1958	5897	2711
433—Letter from Paul A. Nehring to J. B. Holloman of Alcoa, dated April 17, 1959	5898	2712
434—Tabulation entitled "Shipments of Aluminum Conductor Wire and Cable, 1955-1959"	5899	2713
435—Tabulation entitled "Shipments of ACSR and Aluminum Cable Bare, 1955-1959"	5901	2715
436—Tabulation entitled "Shipments of Aluminum Wire and Cable, Insulated or Covered, 1955-1959"	5903	2717
438—Tabulation entitled "Concentration of Shipments of Aluminum Conductor Wire and Cable Accounted for by Integrated Producers, 1955-1959"	5905	2719
439—Tabulation entitled "Concentration of Shipments of ACSR and Aluminum Cable, Bare, Accounted for by Integrated Producers, 1955-1959"	5907	2721
440—Tabulation entitled "Concentration of Shipments of Aluminum Wire and Cable, Insulated or Covered, Accounted for by Integrated Producers, 1955-1959"	5909	2723
441—Tabulation entitled "Position of Rome Among Non-Integrated Producers of Aluminum Conductor Wire and Cable, 1955-1958"	5911	2725
442—Tabulation entitled "Companies Listed as Producing Aluminum Conductor Wire and Cable in the U. S. Department of Commerce BDSA Directory of Aluminum Suppliers, dated April 1, 1961, but not Listed in the Directory for June 30, 1955	5912	2727

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
443—Tabulation entitled "Shipments of Aluminum Weather-proof and Service Drop Wire and Cable Compared with Total Shipments of Aluminum Wire and Cable, Insulated or Covered, by Six Companies, 1959"	5913	2728
444—Tabulation entitled "Sales by Domestic Primary Aluminum Producers of E. C. Aluminum Pig and Ingot and E. C. Aluminum Rod and Bar to Nonintegrated Producers of Aluminum Conductor Wire & Cable, and to Other Firms 1956-1959"	5914	2729
450—Tabulation entitled "Value of Shipments of Conductor Wire and Cable, 1958" (Thousands of dollars)	5915	2731
451—Tabulation entitled "Value of Shipments of Wire and Cable, Insulated and Covered, 1958" (Thousands of dollars)	5916	2731
452—Tabulation entitled "Value of Shipments of Conductor Wire and Cable, Bare, 1958" (Thousands of dollars)	5917	2732
454—Tabulation entitled "Value of Shipments of Service Drop Cable, 1958" (Thousands of dollars)	5918	2732
455—Tabulation entitled "Value of Shipments of Conduit in the United States, 1960" (Thousands of dollars)	5919	2733
458—Tabulation entitled "Value of Shipments of Aluminum Conduit, 1960" (Thousands of at the end of 1960"	5921	2733
465—Tabulation entitled "Aluminum Ingot Capacity Existing or Under Construction dollars)	5920	2734
466—Map entitled "Location of Alcoa, Rome, and Rea Plants Producing Aluminum Ingot, and Wire, Cable, or Conduit Products, 1960"	5922	2735
467—Graph entitled "Monthly Average Prices of Electrolytic Copper New York Refinery and Ingot Aluminum of New York, 1940-1960"	5923	2736
468—"Report on the use of Copper and Aluminum Conductor for Overhead Electric Lines and Underground Electric Cable by Electric Utilities in the United States for the Years 1950, 1955 & 1959" by Ellery R. Fosdick, January 1962	5924	2737

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
468a—Schedules prepared by electric utilities showing use of copper and aluminum conductor (used in preparation of Exhibit 468)	5971	2776
Region I Northeastern	5971	2776
Region II Great Lakes	6080	2886
Region III North Central	6141	2946
Region IV Northwestern	6198	3004
Region V Southwestern	6243	3049
Region VI South Central	6302	3107
Region VII Southeastern	6348	3152
469—Highway Map—Norfolk and Princess Anne Counties showing Copper Conductor Area (within 0.5 mile ± of Bay) (within 1.0 mile ± of Ocean)	6399	3205
472—Maps prepared by Long Island Lighting Company showing Copper and Aluminum Areas of Long Island Sound and in Great Neck	6400	3206
502—Tabulation entitled "Alcoa Primary Aluminum Production, Sold to Customers, and Used by Alcoa, years 1950-1960"	6402	3208
DEFENDANTS' EXHIBITS		
4—Chart entitled "Shipments of Wire by Primary Producers or Affiliates (Including Merged Companies) and Other Producers, 1954-1960", from U. S. Department of Commerce, Business and Defense Services Administration, Aluminum and Magnesium Division	6404	3210
5—Directory of Aluminum Suppliers, Revised, April 1, 1961, U. S. Department of Commerce, Business and Defense Services Administration	6405	3211
7—Chart entitled "Primary Aluminum Capacity, Production and Supply", and supporting documents listed thereon	6437	3245
12—Picture entitled "A Typical Electrical System"	6438	3546
13 and 13a—Picture entitled "Transmission Overhead and Subtransmission overhead" and Legend	6440	3248
14 and 14a—Picture entitled "Primary Distribution Overhead" and Legend	6442	3250
15 and 15a—Picture entitled "Secondary Distribution Overhead" and Legend	6444	3252

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
DEFENDANTS' EXHIBITS—Continued		
16 and 16a—Picture entitled "Primary Distribution Underground" and Legend	6445	3253
17 and 17a—Picture entitled "Utilization" and Legend	6447	3255
18 and 18a—Picture entitled "Other Representative Rome Products" and Legend	6449	3257
19 and 19a—Picture entitled "Service Drop Cable" and Legend	6451	3259
20 and 20a—Picture entitled "Alcoa-Rome Overlap Products" and Legend	6453	3261
21—Insulating Materials (list of)	6455	3263
22—Insulating Materials—Thermoplastic (list of)	6456	3264
23—Insulating Materials—Thermosetting (list of)	6457	3265
24—Protective Coverings (list of)	6458	3266
25—American Standard Specification for Weather-Resistant Wire and Cable—Neoprene Type, Approved January 15, 1954	6459	3267
26—American Standard Specification for Weather-Resistant Wire and Cable—Polyethylene Type, Approved August 13, 1957	6468	3282
27—IPCEA-NEMA Standards Publication (excerpts)—Thermoplastic-insulated Wire and Cable for the Transmission and Distribution of Electrical Energy	6483	3305
28—IPCEA-NEMA Standards Publication (excerpts)—Rubber-insulated Wire and Cable for the Transmission and Distribution of Electrical Energy	6494	3322
29a—List showing Lost Business Since April, 1957 (From Potential Business Reports)	6508	3343
30—Rome Product Bulletin WP-2A—Neoprene Covered Weatherproof Wire	6509	3345
31—Rome Product Bulletin RCP-361—Neutral-Supported Secondary and Service Drop Cables with copper or aluminum power conductors	6513	3349
32—Rome Product Bulletin RCP-200—Guide to representative Wire, Cable and Conduit	6521	3357
34—Request for Quotation, Inquiry No. NE-1383, Boston Edison Co., Boston, Mass., January 5, 1959	6525	3361
35—Request for Quotation, Inquiry No. NY-668-C, Public Service Elec. & Gas Co., New York, December 1, 1958	6529	3365
36—Request for Quotation, Inquiry No. NY-667-C, Public Service Electric & Gas Co., New York, December 1, 1958	6537	3373

Record from the United States District Court for the Northern District of New York—Continued	Original	Print
DEFENDANTS' EXHIBITS—Continued		
37—Request for Quotation; Inquiry No. NY-665-C, Public Service Elec. & Gas Company, New York, November 25, 1958	6539	3375
38—Request for Quotation, Inquiry No. NY-639-C, Public Service Elec. & Gas Co., New York, November 5, 1958	6545	3381
39—Request for Quotation, Inquiry No. NY-362-C, Con Edison, January 27, 1958	6552	3388
40—Request for Quotation, Inquiry No. NY-379-C, Long Island Lighting Co., Hicksville, L.I., N.Y., February 21, 1958	6558	3394
41—Rome Cable Division of Alcoa, Sales Order dated November 23, 1960, Boston Edison	6560	3396
42—Rome Cable Corporation, Sales Order dated May 16, 1960, Dow Chemical, Plaquemine, Louisiana	6561	3397
43—Tabulation entitled "Unused Primary Aluminum Capacity"	6562	3398
45—Statement showing "Aluminum Pig, Ingot or Billet To Be Made Available to Non-Integrated Users Under Provisions of GSA Supply Contracts	6563	3399
47—Statement showing "Primary Aluminum Purchased by Rome" (as compared to U. S. and Alcoa primary aluminum sales to non-integrated fabricators, in thousands of dollars)	6564	3401
48—Statement showing "Primary Aluminum Purchased by Rome" (as compared to U. S. and Alcoa primary aluminum sales to non-integrated fabricators, in thousands of pounds)	6565	3402
49—Statement showing "Primary Aluminum Purchased by Rome" (as compared to U. S. and Alcoa primary production in thousands of pounds)	6566	3403
50—Statement showing "Copper and Aluminum Purchased by Rome" (in thousands of dollars)	6567	3404
51—Statement showing "Copper and Aluminum Purchased by Rome" (in thousands of pounds)	6568	3404
52—Statement showing "Copper and Aluminum Wire and Cable Sold by Rome" (in thousands of dollars)	6569	3405
53—Statement showing "Aluminum Wire and Cable Overlap Products Sold by Rome" (in thousands of dollars)	6570	3405

Record from the United States District Court for the Northern District of New York—Continued

	Original	Print
Defendants' Exhibits—Continued		
54—Statement showing "Rome Sales of Weatherproof" (1956-1960) (in thousands of dollars)	6571	3405
55—Statement showing "Rome Sales of Service Drop Cable" (1956-1960) (in thousands of dollars)	6572	3406
56—Statement showing "Rome Sales of Servic Drop and Weatherproof" (1956-1960) (in thousands of dollars)	6573	3406
57—Statement showing "Changes in Base Price of Primary Aluminum, E. C. Redraw Rod and Selected Cable Sizes from July 22, 1946 to date and Comparison of Spread Between These Products During Same Period	6574	3407
58—Statement showing "Alcoa Electrical Conductor Business Reported Lost to all Competitors, April 1957 through March 1959"	6575	3409
59—Statement showing "Shipments of ACSR and Aluminum Cable, Bare By Primary Producers or Affiliates (Including Merged Companies) and Other Producers (1954-1961)	6576	3410
60—Statement showing "Shipments of Aluminum Insulated or Covered Wire and Cable by Primary Producers or Affiliates (Including Merged Companies) and Other Producers (1954-1961)"	6577	3411
61—Statement showing "Shipments of Aluminum Conductor Wire and Cable by Primary Producers or Affiliates (Including Merged Companies) and Other Producers (1954-1961)"	6578	3412
62—Statement showing "Post-Acquisition Growth of Nonintegrated Producers of ACSR and Aluminum Cable, Bare (1958-1961)"	6579	3413
63—Statement showing "Post-Acquisition Growth of Nonintegrated Producers of Aluminum Insulated or Covered Wire and Cable (1958-1961)"	6580	3414
64—Statement showing "Post-Acquisition Growth of Nonintegrated Producers of Aluminum Conductor Wire and Cable (1958-1961)"	6581	3415
65—Statement showing "Copper and Aluminum Utilization in Weatherproof Wire" (in Thousands of Dollars)	6582	3416
66—Statement showing "Copper and Aluminum Utilization in Service Drop Cable" (in Thousands of Dollars)	6583	3417

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
DEFENDANTS' EXHIBITS—Continued		
67—Statement showing "Copper and Aluminum Utilization in Weatherproof and Service Drop Cable" (in Thousands of Dollars)	6584	3418
69—Registration Record of Aluminum Association Alloy Designations and Chemical Composition Limits for Wrought Aluminum Alloys	6585	3419
70—Business and Defense Services Administration Bulletin, April 11, 1961	6589	3423
71—BDSA List of Companies and Plants Producing Copper Wire and Cable, July 10, 1958	6591	3425
73—Wire and Wire Products Buyers' Guide and Yearbook of the Wire Association, 1961 Edition	6604	3439
74—Standard Industrial Classification Manual, Bureau of the Budget, 1957	6616	3451
75—Mineral Market Survey No. 3349 entitled "Aluminum and Bauxite in 1961" (Preliminary Annual Data), U. S. Bureau of Mines	6627	3466
76—Economic Study—Use of Aluminum and Copper Conductors on Consolidated Edison System, dated February 5, 1959	6630	3470
77—Letter from F. C. Gardner, Ebasco Services to R. V. Davies, Alcoa, dated April 3, 1958	6663	3503
78—Memorandum from W. C. Huebner to H. Richter, Re: Cable Companies Study, dated June 16, 1958	6664	3504
81—Table entitled "Aluminum Wire", Long Island Lighting Co., January 30, 1962	6665	3507
82—List of Public Utilities Purchasing Covered and Insulated Overlap Aluminum Conductor from Both Alcoa and Rome in 1958	6666	3509
Order noting probable jurisdiction	6667	3510

[fol. a]

IN UNITED STATES DISTRICT COURT, NORTHERN DISTRICT OF NEW YORK

Civil No. 8030

UNITED STATES OF AMERICA, Plaintiff,

v.

ALUMINUM COMPANY OF AMERICA AND ROME CABLE CORPORATION, Defendants

COMPLAINT—Filed April 1, 1960

The United States of America, plaintiff, by its attorneys, acting under the direction of the Attorney General of the United States, brings this civil action to obtain equitable relief against the above-named defendants, and complains and alleges as follows:

I

Jurisdiction and Venue

1. This complaint is filed and this action is instituted against the defendants under Section 15 of the Act of Congress of October 15, 1914, c. 323, 38 Stat. 736, as amended, entitled "An Act to supplement existing laws against unlawful restraints and monopolies and for other purposes", commonly known as the Clayton Act, in order to prevent and restrain the violation by the defendants, as hereinafter alleged, of Section 7 of said Act.

2. The defendants Aluminum Company of America and Rome Cable Corporation maintain offices, transact business and are found within the Northern District of New York.

[fol. b]

II

Defendants

3. Aluminum Company of America is made a defendant herein. It is a corporation organized and existing under the laws of the State of Pennsylvania, with its principal

office in Pittsburgh, Pennsylvania. Said defendant, together with its subsidiaries and affiliates, is hereinafter referred to as "Alcoa."

4. Rome Cable Corporation (hereinafter referred to as "Rome-Delaware") is made a defendant herein. Rome-Delaware, a wholly-owned subsidiary of defendant Aluminum Company of America, was organized and exists under the laws of the State of Delaware, with its principal office in Rome, New York. Rome-Delaware was organized as a subsidiary of defendant Aluminum Company of America at or about the time of the acquisition, hereinafter alleged, of the assets of Rome Cable Corporation (hereinafter referred to as "Rome-New York"), a corporation organized under the laws of the State of New York.

III

Trade and Commerce

5. For many years Alcoa has been an integrated aluminum producer, engaging in the manufacture and sale of primary aluminum, intermediate aluminum products, and numerous end products including aluminum wire and cable, conduit, and cable accessories. Alcoa's combined sales of primary aluminum and aluminum products have for many years exceeded the combined sales of primary aluminum and aluminum products of any other domestic producer. As of December 31, 1958, Alcoa had assets amounting to $1,337,258,520. In 1958 Alcoa's net sales and operating revenues amounted to about $753,140,000, and its net sales in the United States of aluminum wire and cable, conduit, and cable accessories exceeded $32,000,000.

[fol. c] 6. Alcoa produces more primary aluminum than any other producer in the United States. In 1958 Alcoa's primary aluminum production constituted about one-third of total domestic production. As of December 31, 1958 Alcoa's total capacity, including capacity under construction, constituted about 38 per cent of the total primary aluminum production capacity, including capacity under construction, in the United States.

7. Alcoa mines and processes bauxite, an aluminum-bearing ore, in the State of Arkansas and in certain foreign countries; produces alumina from bauxite at plants in Ala-

bama, Arkansas, and Texas; owns and operates electric power facilities used in the production of alumina and aluminum; owns and operates steamship lines and railroads for the transportation of materials; produces primary aluminum pig and ingot from alumina at plants in several states, including Indiana, New York, North Carolina, Tennessee, Texas, and Washington; and sells and ships in interstate commerce aluminum pig and ingot manufactured at such plants to customers located throughout the United States.

8. Alcoa manufactures its intermediate and end products in several states, and sells and ships such products in interstate commerce to customers located throughout the United States. Alcoa also supplies aluminum pig and ingot, including types thereof required in the fabrication of electrical conductor wire and cable products, and intermediate aluminum products, including aluminum rod, to other manufacturers of wire and cable products.

9. Among the end products which for many years have been manufactured by Alcoa are aluminum wire and cable products, including those used as conductors of electricity, and conduit and cable accessories. Alcoa's aluminum wire and cable products include bare aluminum wire and cable, aluminum conductor steel-reinforced (referred to as "ACSR"), and insulated aluminum wire and cable, including weatherproof wire and cable and service drop cable. [fol. d] Alcoa manufactures these end products in several states and sells and ships such products in interstate commerce to customers located throughout the United States.

10. Prior to its acquisition by defendants in 1959, hereinafter alleged, Rome-New York was a manufacturer of copper and aluminum wire and cable products, conduit and cable accessories. Rome-New York also supplied intermediate copper and aluminum products to other manufacturers of wire and cable products, and engaged in the business of insulating, for other wire and cable manufacturers and others, bare wire and cable supplied by such customers. As of March 31, 1958, Rome-New York had assets amounting to approximately $24,000,000. For the fiscal year ending March 31, 1958 its net sales amounted to about $40,600,000.

11. Rome-New York manufactured aluminum rod from

aluminum pig and ingot purchased from primary aluminum producers, including Alcoa, and manufactured copper rod from copper wire bar purchased from copper producers. From its Rome, New York plant, Rome-New York shipped in interstate commerce aluminum and copper rod sold to its customers, including other wire and cable manufacturers, located in many states of the United States. In addition, Rome-New York fabricated copper rod for competing wire and cable manufacturers, on a toll basis, from copper wire bar supplied by such manufacturers.

12. Rome-New York also fabricated, at its New York plant, and sold and shipped in interstate commerce to customers located in many states of the United States, aluminum and copper wire and cable products, including bare wire and cable, ACSR, weatherproof wire and cable, service drop cable, magnet wire, building wire, power and control cable, service entrance cable, heavy duty flexible cords and cables, mining and welding cable, hook-up wire, instrumentation and missile cable, and many custom-built cables for industry and Government.

[fol. e] 13. Rome-New York also manufactured, at its plant in Torrance, California, and sold and shipped in interstate commerce to customers located in many states of the United States, steel conduit, elbows and couplings, and mechanical tubing. At its "Cope Division" plant in Collegeville, Pennsylvania, Rome-New York manufactured and shipped in interstate commerce to its customers located in many states of the United States, a complete line of aluminum and steel products used in cable supporting systems, including cable trough, cable pulling devices, and other cable installation accessories, tools, and equipment.

14. Prior to the acquisition of Rome-New York, Alcoa and Rome-New York had been competitors in the production and sale of various wire and cable products, accessories (including conduit and cable installation devices and products), and to some extent aluminum rod.

15. A large percentage of the total United States production and sale of various wire and cable products has become concentrated in relatively few companies, including Alcoa and other companies which also are suppliers of basic materials required by their wire and cable competi-

tors. Such concentration has been achieved, in part, through recent acquisitions and mergers.

16. In addition to the acquisition of Rome-New York, in January 1960 Alcoa acquired Rea Magnet Wire Co., Inc. (Rea). Rea had been engaged in the manufacture and sale of wire and cable products, including magnet wire. In 1958 Rea's net sales were approximately $17,500,000, and for the first ten months of 1959 were approximately $19,700,000.

[fol. f]

IV

Offense Charged

17. On or about February 17, 1959, defendant Aluminum Company of America and Rome-New York entered into a Plan and Agreement providing for the acquisition by said defendant of the assets, properties, contract rights, business and good will of Rome-New York in exchange for common stock of said defendant, and reserving in said defendant the right to effect the acquisition either directly or through a subsidiary. On or about March 31, 1959, pursuant to the aforesaid Plan and Agreement, all of Rome-New York's assets, business and good will were transferred to Rome-Delaware, a newly-organized, wholly-owned subsidiary of defendant Aluminum Company of America. Rome-Delaware, since said acquisition, has functioned as a division of defendant Aluminum Company of America. The effect of such acquisition may be substantially to lessen competition or tend to create a monopoly in violation of Section 7 of the Clayton Act in the following ways, among others:

(a) Actual and potential competition in the production and sale of various wire and cable products, and in the production and sale of various accessories thereto, including conduit and cable installation devices and products, may be substantially lessened.

(b) Actual and potential competition between Alcoa and Rome-New York in the production and sale of various wire and cable products, and in the production and sale of various accessories thereto, including conduit and cable installation devices and products, has been eliminated.

[fol. g] (c) Alcoa's competitive advantage over other manufacturers of various wire and cable products, and over manufacturers of various accessories thereto, may be enhanced to the detriment of actual and potential competition.

(d) Concentration of the production and sale of various wire and cable products in the hands of a few companies has been increased to the detriment of actual and potential competition.

(e) Alcoa's competitive advantage as in integrated producer of aluminum and aluminum products, as a supplier of materials to wire and cable producers, and as a producer of wire and cable products, may be enhanced to the detriment of actual and potential competition.

(f) Mergers and acquisitions in the wire and cable field may be fostered with a consequent increase in economic concentration to the detriment of actual and potential competition.

Prayer

Wherefore, Plaintiff Prays:

1. That the aforesaid acquisition of the assets of Rome-New York be adjudged and decreed to be in violation of Section 7 of the Clayton Act.

[fol. h] 2. That, pending a final adjudication of the merits of this complaint, a preliminary injunction issue enjoining the defendants, their officers, directors, agents, and all other persons acting on their behalf from consolidating or intermingling the business operations now conducted by Rome-Delaware or its assets or operating personnel with those of Alcoa, and from making any changes in the corporate structure by consolidation or otherwise, the commercial operations, or the distribution policies of Rome-Delaware.

3. That under such terms and conditions as this Court may prescribe, defendants be required to divest themselves of all the assets, business and good will of Rome-Delaware and all other assets, business and good will acquired from, or resulting from the acquisition of, Rome-New York.

4. That defendants, their officers, directors, agents, and all persons acting on their behalf be enjoined from acquiring, for such period as the Court may direct, stock or assets of any other company engaged in the production or sale of wire or cable products, conduit, or cable accessories.

5. That the plaintiff have such other and further relief as may be just and proper.

6. That the plaintiff recover the costs of this suit.

/s/ Samuel Karp, Attorney, Department of Justice.

/s/ William P. Rogers, Attorney General. /s/ Robert A. Bicks, Acting Assistant Attorney General. /s/ Charles L. Whittinghill, Attorney, Department of Justice. /s/ Theodore F. Bowes, United States Attorney.

[fol. i] Verification of Complaint Omitted in printing.

[fol. j] [File endorsement omitted]

[fol. k] IN UNITED STATES DISTRICT COURT, NORTHERN DISTRICT OF NEW YORK

Civil No. 8030

UNITED STATES OF AMERICA, Plaintiff,

v.

ALUMINUM COMPANY OF AMERICA AND ROME CABLE CORPORATION, Defendants.

ANSWER—Filed May 18, 1960

Defendants, Aluminum Company of America and Rome Cable Corporation, answer the complaint herein as follows:

1. Defendants deny each and every allegation of paragraph 1, except that they admit that the plaintiff, United States of America, purports to bring this action and to invoke the jurisdiction of this Court under the statutory provisions specified therein.

2. Defendants admit the allegations of paragraph 2.

3. Defendants admit the allegations of paragraph 3.

4. Defendants admit the allegations of paragraph 4.

5. Defendants deny each and every allegation of paragraph 5, except that they admit and aver that Alcoa has been an integrated aluminum producer engaging in the manufacture and sale of primary aluminum, intermediate aluminum products and certain end products, including electrical wire and cable using aluminum as conductor, aluminum conduit and cable accessories; that while Alcoa's combined sales of primary aluminum and intermediate products made from aluminum have for many years exceeded the combined sales of any other domestic producer, Alcoa's percentage of such sales has steadily declined during the past several years; that as of December 31, 1958, [fol. l] Alcoa had assets amounting to $1,337,258,520; and that in 1958 Alcoa's net sales and operating revenues amounted to about $753,140,000, and its net sales in the United States of electrical wire and cable, conduit and cable accessories exceeded $32,000,000.

6. Defendants admit the allegations of paragraph 6.

7. Defendants admit the allegations of paragraph 7, except that defendant denies that Alcoa has yet produced primary aluminum in the State of Indiana.

8. Defendants admit the allegations of paragraph 8.

9. Defendants deny the allegations of paragraph 9, except that they admit and aver that among the end products which have been manufactured by Alcoa are electrical wire and cable products using aluminum as conductor, aluminum conduit, and cable accessories; that Alcoa's electrical wire and cable products include bare wire and cable, aluminum conductor steel-reinforced (ACSR), and insulated or covered wire and cable, including weatherproof wire and cable and service drop cable; and that Alcoa manufactures certain of these products in one or more states and sells and ships them to customers located throughout the United States.

10. Defendants deny the allegations of paragraph 10, except that they admit and aver that prior to its acquisition by defendants in 1959, Rome-New York manufactured electrical wire and cable products, steel conduit, cable trough and cable installation devices; that certain of Rome-New York's wire and cable products were made with either copper or aluminum as the electrical conductor; that Rome-New York supplied certain intermediate products to other manufacturers of electrical wire and cable products; that Rome-New York insulated for defendant Alcoa bare wire and cable supplied by defendant Alcoa; and that as of March 31, 1958 Rome-New York had assets amounting to approximately $24,000,000 and for the fiscal year ending March 31, 1958 had net sales amounting to about $40,600,000.

[fol. m] 11. Defendants deny the allegations of paragraph 11, except that they admit and aver that Rome-New York manufactured aluminum rod from aluminum pig and ingot purchased from primary aluminum producers, principally Alcoa, and manufactured copper rod from copper wire bar purchased from copper producers; that from its Rome, New York plant, Rome-New York sold copper rod to other electrical wire and cable manufacturers located in other states of the United States; that Rome-New York sold aluminum rod almost exclusively for non-electrical pur-

poses; and that Rome-New York rolled copper rod for other wire and cable manufacturers on a toll basis from copper wire bar supplied by such manufacturers.

12. Defendants deny the allegations of paragraph 12, except that they admit and aver that Rome-New York fabricated, at its Rome, New York plant, and sold to customers located in other states of the United States electrical wire and cable products, including bare wire and cable, ACSR, and insulated or covered wire and cable products, including weatherproof wire and cable, service drop cable, magnet wire, building wire, power and control cable, service entrance cable, heavy duty flexible cords and cables, mining and welding cable, hook-up wire, instrumentation and missile cable, and many custom-built cables for industry and Government; further answering, defendants aver that the conductor used by Rome-New York in its electrical wire and cable products was predominantly copper.

13. Defendants admit the allegations of paragraph 13.

14. Defendants deny the allegations of paragraph 14, except that they admit and aver that Rome-New York, Alcoa and numerous other manufacturers were engaged in the sale of electrical wire and cable products and conduit; further answering, defendants aver that the cable installation devices offered by Rome-New York were different from and not competitive with cable accessories offered by Alcoa.

[fol. n] 15. Defendants deny the allegations of paragraph 15.

16. Defendants deny the allegations of paragraph 16, except that they admit and aver that in January 1960, Alcoa purchased substantially all of the assets and assumed substantially all of the liabilities of Rea Magnet Wire Company, Inc. (Rea), a manufacturer of magnet wire, and that Rea's net sales for 1958 were approximately $17,500,000, and for the first ten months of 1959 were approximately $19,700,000.

17. Defendants deny the allegations of paragraph 17, except that they admit and aver that on or about February 17, 1959, defendants Alcoa and Rome-New York entered into a Plan and Agreement providing for the acquisition by Alcoa of substantially all of the assets, properties, contract rights, business and good will of Rome-New York in ex-

change for common stock of Alcoa and the assumption by Alcoa of substantially all the liabilities of Rome-New York, and reserving in Alcoa the right to effect the acquisition either directly or through a subsidiary; that on or about March 31, 1959, pursuant to the aforesaid Plan and Agreement substantially all of Rome-New York's assets, business and good will were transferred to defendant Rome-Delaware, a newly organized, wholly owned subsidiary of Alcoa; and that Rome-Delaware since the said acquisition, has been a division of Alcoa.

Ferris, Hughes, Dorrance & Groben, First National Bank Building, Utica, New York. /s/ Robert Groben. Bergson & Borkland, 918 16th Street, N. W., Washington 6, D. C. /s/ Herbert A. Bergson. /s/ Howard Adler, Jr., /s/ William K. Unverzagt, 1501 Alcoa Building, Pittsburgh 19, Pennsylvania. Attorneys for Defendants.

[fol. o] [File endorsement omitted.]

[fol. 1] IN UNITED STATES DISTRICT COURT, NORTHERN DISTRICT OF NEW YORK

Civil No. 8030

UNITED STATES OF AMERICA, Plaintiff,

against

ALUMINUM COMPANY OF AMERICA AND ROME CABLE CORPORATION, Defendants.

Transcript of hearing—February 5, 1962

The trial in the above-entitled matter was had pursuant to notice at the United States District Court, held in and for the Northern District of New York, at Utica, New York, commencing Monday, February 5th, 1962, before Honorable Stephen W. Brennan, United States District Judge.

[fol. 2] APPEARANCES:

Hon. Justin J. Mahoney, United States Attorney for the Northern District of New York, Federal Building, Albany, New York. Donald F. Melchior, Esq., Charles D. Mahaffie, Jr., Esq., Richard J. Wertheimer, Esq., Attorneys, Department of Justice, Appearing in behalf of the United States of America.

Bergson & Borkland, Esqs., Herbert A. Bergson, Esq., Howard Adler, Jr., Esq., Hugh Latimer, Esq., John Voortman, Esq., 918 16th Street, N. W., Washington, D. C. William K. Unverzagt, Esq., 1501 Alcoa Building, Pittsburgh 19, Pennsylvania. Ferris, Hughes, Dorrance & Groben, Esqs., Robert Groben, Esq., John Liddy, Esq., First Bank Building, Utica, New York, Attorneys for Defendants.

[fol. 3] The Court: Gentlemen, I understand this is the United States of America against the Aluminum Company of America and the Rome Cable,

Are you gentlemen ready?

Mr. Melchior: The Government is ready.

Mr. Bergson: Defendants are ready, your Honor.

The Court: All right, let me see if I got the right appearances handed to me by the stenographer.

For the Government, Mr. Melchior, Mr. Mahaffie and Mr. Wertheimer.

Mr. Melchior: That is correct.

The Court: For the Defendants, Mr. Bergson, Mr. Adler, Mr. Latimer and Mr. Unverzagt and Mr. Groben and Mr. Liddy. Well, Mr. Groben and Mr. Liddy are for the Rome Cable; is that correct?

Mr. Bergson: For both, your Honor.

The Court: I guess that's right. All of you people represent both defendants?

Mr. Bergson: Yes, your Honor.

The Court: Appear for both defendants. All right, gentlemen. It is a little later than I expected it would be, but I would be glad to have you open the case and give me as much education as you can, because this particular type of case is somewhat new to me.

All right, Mr. Melchior, do you want to outline the [fol. 4] Government's contentions here?

OPENING STATEMENT ON BEHALF OF GOVERNMENT BY MR. MELCHIOR

Mr. Melchior: Yes, your Honor.

May it please the Court, this is a Section VII proceeding involving the merger of Alcoa, Aluminum Company of America and Rome Cable Corporation. It is not my purpose at this time to review the matters discussed in the brief at length. I do feel, however, it would be desirable to pose the issues clearly so that we may make clear to the Court what we think the basic issues are in this case. I am not sure that these have been made completely clear in the briefs, I want to make sure that the proper tests are applied. And we want to insure that we bring to this Court's attention what we think to be the clear congressional mandate as it was enunciated in 1950, when Section VII was amended.

As we see it, there are two basic primary issues in this case which should be decided at the outset, or should be posed at the outset. In the first place, shall a company of

the size, dominance and/or degree of integration of Aluminum Company of American in the field of aluminum or aluminum products be permitted to add to this dominance by merger, by acquisition, in a manner that we believe to be in controvention of the prohibitions of Section VII.

[fol. 5] And we feel the second basic competitive issue if whether a company of the stature and independence of Rome Cable Corporation, an important and substantial company in the field of wire and cable, can be eliminated from the competition scene as an independent factor.

Now, I believe I should mention in passing what we believe the congressional mandate to be. As your Honor knows, Section VII was first enacted in 1914 along with other sections of the Clayton Act. And the motivating purpose behind the enactment of Section VII at that time was to cure what the Congress considered to be the defects in the Sherman Anti-Trust Act, which had been passed about two decades earlier. The Sherman Act had been found to be wanting in avoiding the increase in economic concentration of the growth of trusts or monopolies. Section VII was a good part of that legislation. Over the years from 1914 to World War II, however, Section II had been found wanting. It did not appear to have halted the rise in economic concentration by merger which became severely acute following World War II.

As a result of this great wave of mergers in 1950, Con-
[fol. 6] gress amended Section VII to better implement what they considered to be their purposes. In so amending they gave an indication of what they felt the legislation would accomplish. Now, I don't intend to read from the legislative history except in one or two instances to point up what they believed to be the purpose.

The House report in 1950 which accompanied the Act stated: "Measured by practically any method and compared to practically any standpoint the measure of economic concentration in the American economy is high. Moreover the long-term trend of concentration has been steadily upward. This long length rise in concentration has been due in considerable part to the internal expansion of business through mergers, acquisitions and consolidations."

The Senate report likewise expressed the same philoso-

[fol. 7] phy. The report stated "While there exist many different opinions on other aspects of monopoly there is substantial agreement that the level of economic concentration is extremely high." The Senate also expressed the view that the enactment of Section VII as it was to be amended in 1950 would further be expected to limit the growth of monopolies, thereby aiding and preserving small business as an important competitive factor in the American economy. Since the amendment in 1950 a number of courts have expressed similar philosophies and we have covered those in the brief and I mention them in passing particularly U.S. v. Bethlehem Steel, and U.S. v. Crown Zellerbach which is the most recent Circuit Court opinion on Section VII as amended. I believe we made available a copy of this opinion to the Court. What has been the success of Section VII in halting the rise in the merger field and the increase in concentration? I would like to cite a few statistics on this account. The Government has filed 57 cases under Section VII involving mergers since 1950. Of these 57, only eight have been litigated and of these only three have been successfully concluded from the Government's standpoint. To date this case is one of the few which has moved particularly rapidly, and I think the Government is indeed fortunate in this respect that an important case of this type can be brought to issue so quickly. In January of this year the Federal Trade Com-
[fol. 8] mission made an announcement which indicated a degree of success which the Government has had in halting the rise in tide of mergers that Section VII was amended to halt and I think these figures are significant. They announced in 1960 there had taken place approximately 1,012 significant mergers, and in the year 1961, 1,234. Now the significance of this figure is that it is the largest merger year since the year 1929. To me, this points up the utter failure of the Government to halt this growing merger trend and it also points up to me the importance and significance of this case.

Now I would like to state briefly what it will be our purpose to attempt to prove in this proceeding. We will try and show that this merger is just one of a pattern of mergers in the aluminum, wire, and cable field. As a matter of fact, it is one of a pattern of mergers in the

whole conductor wire and cable field, including both aluminum and copper. It will be our purpose to show that the acquiring company in this case is a company of dominance. It is not only the largest primary aluminum producer in the country but also the largest in the country in a number of related products. It is fully integrated. They are producers of aluminum from the pig right through to the fabricated products.

[fol. 9] It is also broadly integrated from a horizontal standpoint in that the products that it manufactures and sells cover a wide and broad line.

We will attempt to show that the aluminum conductor wire and cable field can be best described as an oligopoly, and the word oligopoly to us means the next step to monopoly.

We will attempt to show that the aluminum wire and cable field is not only dominated by Aluminum Company of America, but that its closest competitors are other integrated aluminum companies, and that the industry as a whole is dominated by this small and exclusive group.

We will attempt to show that by virtue of this condition it will be extremely difficult and has proved exceedingly difficult for smaller companies, independent companies who desire to enter this field of production for the first time. As a matter of fact, we will show that there has been no significant entry over the last several years, and we will show you why there has been no entry through the testimony of witnesses.

We will also attempt to show that certain practices engaged in by the integrated companies and by the Defendant in this case create an environment that is not conducive to the growth and increase in the share of the market that is presently held by the non-integrated aluminum wire and [fol. 10] cable producers.

We will show their share of the market is in a constant decline, and that the share of the business is moving not only to the integrated companies, but to ALCOA.

Now in order to evaluate the two basic competitive issues which we have posed, we must do this against the background of three primary legal issues. These three issues have been posed by the Congress when they amended Sec-

tion VII, and they have been restated by the Courts in recent Section VII cases.

These three basic legal issues are, 1, line of commerce; 2, section of the country; and, three, the probable impact of the merger.

It is the Government's burden to prove each of these three legal issues to the satisfaction of the Court.

Directing our attention first to the legal issue of line of commerce, in this respect this particular issue has been narrowed by the pre-trial negotiations, briefs and other papers of the parties. The Government has urged that there are ten specific lines of commerce which will probably be adversely affected by this merger, and as we understand [fol. 11] the Defendant's admissions and pre-trial statements, they are willing to admit to five of these.

And I mention specifically in this regard that the legislative history of the Congress and the statements of the Court indicate in this respect that it is only necessary that one line of commerce be demonstrated where in a probable injury may take place.

As the supreme court stated, or as was quoted from the supreme court opinion in duPont, the phrase 'In any line of commerce' is comprehensive and means that if the forbidden, effect or tendency is produced in one out of all the various lines of commerce, the words 'In any line of commerce' literally are satisfied.

We submit in this connection that the burden of the Government has been materially decreased.

I would like to spend a moment pointing up the basic issue, I believe, facing the Court from a legal standpoint with respect to the question of line of commerce.

There seems to be two lines of opinions on this matter, [fol. 12] and it is our view that the difference is brought about because of a basic misunderstanding between the effect of the Clayton Act and the Sherman Act as regards a merger proceeding. This case is brought under Section VII of the Clayton Act. The Sherman Act and Sherman Act language have no relevancy in the Section VII proceeding.

There has been a tendency in recent months and years for Defendants' counsel in these proceedings to attempt

to import into the Clayton Act a Sherman Act standard.

This incidentally since the Congress and the Courts very readily agree that the Clayton Act standard is a much more liberal standard insofar as the Government is concerned. The line of commerce standard insofar as Section VII law is concerned we believe that is the best expressed in the General Motors-duPont case, wherein they established as a criteria to be used in determining the line of commerce are those products which have distinctive characteristics in use. And we urge that this is the proper standard in a Section VII proceeding as regards line of commerce.

[fol. 13] Now there is language, and I believe the Defendant has used the language in their briefs which indicate that the standard should be a standard drawn from a case which is better known as the Cellophane decision. And there has been a deliberate attempt on the part of the Defendants in merger cases to merge into Section VII proceedings, this Cellophane decision. As a matter of fact, certain Courts have almost taken this position also.

And I think this is the first basic issue that will face the Court in this proceeding. I do not intend to go into this in detail at this time. I believe our brief adequately covered it, but I think this is the basic legal question as regards the line of commerce here. Shall we have a Clayton Act standard to carry out the intention of the Congress or shall we drop it back to the Sherman Act standard and have the same problem facing the courts when the Clayton Act was amended.

The Court: Mr. Melchior, what really you are saying is that the Government is going to oppose and does oppose this theory of interchangeability.

[fol. 14] Mr. Melchior: Yes.

The Court: Of products as determining the line of commerce.

Mr. Melchior: Yes, Your Honor. It is our position that a line of commerce under Section VII should be determined on the basis of distinguishing characteristics and usage. The question of interchangeability we believe is one, is a Sherman Act standard.

Now I would like to say at this time we feel that the Government should prevail, under either standard. But we feel the proper standard is the Section VII standard

as expressed by the General Motors-duPont and as followed in the Cellophane decision and in the Crown Zellerbach decision.

The Court: That pretty near means I have to overrule the supreme court in the Cellophane case, I suppose.

Mr. Melchior: I don't believe that means that, Your Honor, because the Cellophane case was a Sherman Act case. It was not a Clayton Act case.

Now I would like to read some language from the Seventh Circuit in the Crown Zellerbach decision. [fol. 15] "The effort to establish that all coarse papers . . ." the question there was the plaintiff alleged that Census coarse papers were a line of commerce and the defendant alleged that all coarse papers should be a line of commerce—the defendant taking a much larger Universe and the defendant alleged this following the Cellophane philosophy—the Court said "The effort to establish that all trade coarse papers should be included within the relevant market on the basis of their being substitutable or interchangeable in end use with the products listed under Census coarse paper is, we think, put forward in an effort to apply such case as "Cellophane and Columbia Steel" —which was also a Sherman Act case, Your Honor. The [fol. 16] Court goes on, "We think that these cases are not relevant here." And this is the seventh circuit less than a year ago. They go on and say, "The problem which arises in a case involving Section VII of the Clayton Act, is a very different one. There the Commission—since this was a Federal Trade Commission case, the word "Court" could be substituted—"The Commission must determine in any line of commerce in any section of the country which merger may substantially lessen competition." As suggested in United States against Bethlehem Steel Corporation, and they quote "When the question is power over price substitute products may be relevant, because they can eliminate that power."

The issue under Section VII of the Clayton Act is not whether a merger may result in a company having power over price, or the power to exclude competition. The issue under Section VII is whether there is a reasonable probability of a substantial lessening of competition. There can be a substantial lessening of competition with respect

to a product, and here is the significant phrase, "Whether or not there are reasonably interchangeable substitutes," [fol. 17] and we think this decision poses the problem precisely and has selected the right view, and we think this is very significant. As I said, I believe that we can prevail under either the Cellophane Doctrine or the General Motors, Crown Zellerbach, or Bethlehem Doctrine, but we took the latter to be the correct one. Now, I don't want to give the Court the impression that we do not feel that the wire and cable field generally cannot also be a line of commerce. The Government in this case is arguing first that the Aluminum wire and cable lines are the appropriate lines of commerce where the most direct and immediate damage will probably be felt. We do think, however, that the broader line which would encompass both copper and aluminum is also an appropriate line, since this broader line also has peculiar use and characteristics, but we do not feel that the probable damage in this broader line will be as immediate or as direct. We feel the ultimate damage there may be even greater but . . .

Now, I would like to move on to the second basic issue, the second basic legal issue which is posed by this decision, [fol. 18] by this proceeding. And this is the legal question of section of the country. But here the Court and the parties are indeed fortunate as respects a proof situation since the parties are almost in comp-ete agreement on this matter. The Plaintiff has urged and the Defendant agreed that each of the ten lines of commerce or the five lines of commerce merged by the parties have as an appropriate section of the country the nation as a whole. I don't want to be in the position of misquoting counsel but this is as I read the papers. The only issue of a factual nature under this legal issue of line of commerce respects what the Government describes as eleven state western area. Wherein we believe competition will probably be substantially lessened in the conduit and aluminum conduit field in this eleven*th* state western area, bordering the Pacific Ocean. This is the only section of the country problem facing the Court in this instance. I would like to now pass to the third basic legal issue.

The Court: Let me interrupt you so that I don't have too much trouble with the so-called relevant market. All

[fol. 19] that I have here is that both of you urge the United States as a whole. Then you urge the other states as the relative market in certain types of lines of commerce and the Defendant disputes it?

Mr. Melchior: Yes. Let me be a little more specific. If we consider our ten lines of commerce, three of which are aluminum lines, three of which are general conductor lines service drop cable and then certain raw materials used for the production of aluminum wire cable and conduit—Now, the Government urges that an appropriate line of commerce is conduit including both steel and aluminum.

The Government also urges that aluminum conduit alone is an appropriate line of commerce. Defendants agree, as I read their papers that conduit is a line of commerce. They disagree that aluminum is a line of commerce, aluminum conduit.

The Government urges that with respect to both conduit and aluminum conduit the nation as a whole is an appropriate market, as well as the lesser included area, the eleven western states. In other words, the government is adopting the philosophy of a market, a narrow geograph-[fol. 20] ical market within a broader one, and we adopt this smaller market because we believe the probable damage will be greater in this smaller market than in the nation as a whole, although we are in agreement with the Defendant that the damage will take place in the nation as a whole.

Does that answer your question, your Honor? I would like now to discuss the third basic issue facing the Court of a legal nature, and this relates to the question of impact. With respect to the question of impact, which I use as a short term to describe the third legal issue, which is probable substantial lessening of competition, I believe here we have the same problem that we face with respect to line of commerce. Here there is a studied intent on the part of Defendant counsel to import, wittingly or unwittingly, a Sherman Act standard into the Clayton Act. And the question that is posed, as I see it, is must the restraint or the lessening of competition be actual or only reasonably probable?

Now, Section VII in its plain language prohibits a mer-[fol. 21] ger if there may result a substantial less--ing

of competition in any line of commerce in any section of the country, and the courts and the legislative history indicates that it may result in reasonable probability as opposed to actuality.

Now, in order to prove a violation of the Sherman Act you must show an actual restraint or an actual monopoly or an actual intent to monopolize. Section VII, however, is different. Section VII, the standard is merely a reasonable probability that a substantial lessening of competition will result. So it little serves Defendant to try and show that since the merger there has been no damage, because that is not the proper standard of Section VII.

The Court: Well, aren't probabilities measured to the extent that experience is available? Aren't probabilities measured by experience?

Mr. Melchior: I think this function of the Court, and it is the purpose of the Government to place before the Court market conditions as they exist at the time of the merger, as they exist now so the Court can see what factors are [fol. 22] motivating the parties, what factors are preventing small business from thriving, and that the other market conditions are, and against this back-drop it is the duty of this Court to predict what the probable result will be.

This Court does not have to find an actual damage. I wish to read in this respect from the legislative history, and it is very clear in many places on that point.

I would like to read this one paragraph: "The words, 'may be' in the statute have been in Section VII of the Clayton Act since 1914. The concept of reasonable probability conveyed by these words is a necessary element in any statute which seeks to arrest restraints of trade in their incipiency and before they develop into full-fledged restraint violative of the Sherman Act. A requirement of certainty and actuality of injury to competition is incompatible with any effort to supplement the Sherman Act by reaching incipient restraints."

This now again poses the problem that the Court will have to decide. The Clayton Act and Section VII specifically was enacted by Congress because the Sherman Act [fol. 23] was not doing the job in the merger field, and they tried to tighten it up in a number of ways. And one of the ways was to require the Court not to find an actual

damage but where there is a reasonable probability that damage may result in the future. The three cases I cited as the three cases consistent with the Government's theory again are General Motors-Dupont; Crown Zellerbach and the United States Steel-Bethelem, all of which were covered in our brief.

One other aspect of the impact problem that I think is worth mentioning in order to pose the problem has to do with the degree of the standard of probable damage that must be met. I think it is quite obvious that Congress amended the statute such as the Sherman Act because it was not doing the job in the particular respect that the standard must be a stricter one. And Congress was concise on this matter also. This report states, the Committee report states:

"The Committee wishes to make it clear that the bill is not intended to revert to the Sherman Act itself. The intent here, as in other parts of the Clayton Act, is to [fol. 24] cope with the monopolistic tendency in their incipiency and while before they have attained such efforts as would justify a Sherman Act proceeding."

The Court: Mr. Melchior, there is no contention here by the Government that in going to the language of Section VII that this merger tends to create a monopoly; is there?

Mr. Melchior: There is the view on the Government's part that this merger may result in a substantial lessening of competition and a tendency to monopoly.

Now, precisely what a tendency to monopoly is in here, we have gotten very little guidance from the Courts and the Congress in this matter.

The Court: I will define it.

Mr. Melchior: We don't allege that a monopoly exists, your Honor. Now, along this same line I would like to point out one of the arguments of defense counsel in this proceeding which keeps coming up to plague us. And this is their constant urgings that the degree of direct competition between Alcoa and Rome was not large. I think they say something to the effect that Rome competed only with about 4 per cent of the business of Alcoa. I am not [fol. 25] sure how they arrived at this figure, but let's accept it.

Now, we know that Alcoa was an aluminum company and made aluminum wire and cable and aluminum conduit. Rome, on the other hand, was primarily a copper wire and cable company and manufactured the steel conduit. But we will show that Rome had also begun the production of aluminum wire and cable and was rapidly moving into that field. We will also show that Rome was an excellent insulator of wire and cable, and expertise, which apparently Alcoa didn't have, because this was one of the primarily factors in Alcoa's purpose of acquiring Rome Cable. We will show, however, that Alcoa had also taken steps in the production of insulating wire and cable.

So while it is argued that the direct competition in identical products between the two companies was small, since it was embryonic, it is our position that if the merger had not taken place and Rome had continued as a strong independent entity that she would have continued to grow and the competition would have increased. But in spite [fol. 26] of this fact whether or not the degree of competition was large or small is not a necessary element in a Section VII proceeding. And I would like to read again from the Congressional Report on this matter. And they said as a type of merger which is prohibited by Section VII is the following, and I think it is very significant:

> "If, for example one or a number of raw material producers purchases firms in a fabricating field, i.e. a forward vertical acquisition . . ."

and I submit this is definitely a forward vertical acquisition

> " . and if as a result thereof competition in that fabricating field is lessened in any section of the country the law would be violated . "

and here is the significant statement

> " . even though there did not exist any competition between the acquiring and the acquired acquired firms."

So we submit that the efforts of the defendants to constantly reiterate the fact that the direct competition be-

tween the two was small and embryonic is of no consequence [fol. 27] in this situation, under the law.

I would like to close briefly by mentioning what we understand the government to show in this proceeding. We intend to show that each of our lines of commerce are characterized by distinguishing characteristics and uses and that they meet the General Motors, Bethelehem and Crown test. We intend to show that the relative sections of the country are nationwide with respect to all of these products; that the change will be felt throughout the nation and more specifically with respect to conduit in the eleven Western State areas.

We intend to show with respect to impact that by virtue of the size and dominance of Alcoa, and by virtue of the integrated nature of the industry that entry of new producers, new independent producers into the field of aluminum wire and cable and conduit, particularly aluminum conduit is made more difficult.

[fol. 28] We intend to show there has been no significant entry. We will show that this taken in conjunction with other mergers of integrated companies in this field if not stopped by the courts will continue to snowball and may result in the complete elimination of all non-integrated independent companies. Other than those who are so financially powerful they may weather the storm, and there are not many of them.

We intend to show certain practices utilized by the defendants and by other integrated companies which permit them to take advantage of their size and position in the market place to the detriment of the smaller companies. And we intend to show that if the Courts do not halt this rising merger trend in the aluminum wire and cable field and in the conduit, and particularly the aluminum conduit field that the continued independent competitive existence of many of the smaller companies will be seriously threatened and their demise may be imminent.

Thank you, Your Honor.

The Court: All right, Mr. Bergson, do you want to outline your case to me a bit?

Mr. Bergson: Yes, Your Honor. Rather than outline ours a bit, I would like to take a few issues with Mr. Melchior's first. I don't know whether I misunderstood him

[fol. 29] when he said that we agreed on five lines of commerce. We do agree that there are in existence five lines of commerce but we don't agree that this merger substantially affected these lines of commerce at all.

In listening to Mr. Melchior's argument you can't help but get the impression that the government takes the position that the Clayton Act was intended to make mergers unlawful per se; that the mere fact of acquisition unduly lessens competition or tends to a monopoly. This of course was not the purpose of the Act and it has not been the practise of the Courts in interpreting the Act. The Courts have said that the impact of the acquisition has to be such that there is—an injury to the public may result, which was in the International Shoe Case, which was prior to the 1950 amendment cited with approval in the legislative history of the 1950 Act.

[fol. 30] Secondly, the Court in the Continental Can case has said that the competition lessened must be substantial, that it can't be any insubstantial lessening of competition.

Now, thirdly, and much more importantly, however, the fundamental issue between us and the Government here other than the effects issue is what the Congress meant when it used the term "line of commerce."

Mr. Melchior has cited from the General Motors-Dupont Case and said that there the Court adopted a distinctive characteristics and uses test. He said that the Sherman Act tests of yore were never intented to apply; that if a product has distinctive characteristics and uses it constitutes a line of commerce.

Now, I think it important to read to the Court what the Supreme Court did say in the General Motors-Dupont case, and not to extract from that opinion the one sentence that Mr. Melchior referred to. As a guide for determining the line of commerce in Section VII cases, the Court said: "The determination of the relevant market is a necessary predicate to a finding of violation of the Clayton Act, be-[fol. 31] cause the threatened monopoly must be one which will substantially less competition within the area of effective competition. Substantial can be determined only in the terms of the market affected. The record shows that automotive finishes and fabric have sufficient peculiar characteristics and uses to constitute them products suffi-

ciently distinguishable between all other finishes and fabrics to make them a line of commerce within the meaning of the Clayton Act."

So what the Court did in the General Motors-Dupont case is find that as a matter of fact they couldn't apply the test of the Cellophane Case because factually there were no reasonably interchangeable products.

Now, this decision has been battered back and forth by the Government and Defendant in anti-trust cases on many occasions, and in the Screen Gems Case, Judge Herlands in the Southern District of New York took up these two contentions and said this: "The test" namely, the reasonably interchangeability test and the peculiar characteristics and uses test, he said, "The tests enunciated by the [fol. 32] authorities are consistent. Effectively, the test 'reasonable interchangeability for the purposes for which the products are produced,—price, use and qualities considered,'—and the test 'sufficient peculiar characteristics and uses to constitute them products sufficiently distinct . . . to make them a line of commerce within the meaning of the Clayton Act,' are but different verbalizations of the same criterion. They require the same accumulation and scrutiny of facts and application of judgment. The task is to find the area of effective competition, the characteristics and uses formulation does not limit the Court's inquiry to physical attribute and foreclose inquiry into the competitive situation."

And the Court applying that formula to that case, refused to adopt the Government's peculiar characteristics and uses test on motion picture film for projection over television stations, and said that all television programming was the area of effective competiton to be considered.

Now, this is consistent with the Brown Shoe Case on [fol. 33] which the Government relies, because in the Brown Shoe case the Court said, "We must go to the facts in the case and see what the testimony here revealed and make a determination of the line of commerce from the practices in the industry, the characteristics and uses of the products, their interchangeability, price, quality and style."

Now, I submit, your Honor, that to conjure up a phrase that the Government did in its brief when they said that

the uses test was to find a distinguishable economic context, which is something we have never been able to find anywhere else but in their brief, is an indication of their fear that they will not be able to establish an area of effective competition in this case within which there will probably be a lessening of competition or a tendency to monopolize.

Further than that, your Honor, Mr. Melchior, says that Section VII was enacted to cure the evils that were not taken care of by the Sherman Act. He said that the evil was that we had to nip incipient Sherman Act violations in the bud. Well, if you are going to nip an incipient Sherman Act violation in the bud, how do you find whether it is an [fol. 34] incipient Sherman Act violation unless you apply the same market test to determine what the relevant market is, or to use the phrase in the Clayton Act, "The relevant line of commerce." Now it doesn't hold together from [fol. 35] an economic standpoint and from a legal standpoint to say that because a product has a peculiar characteristic that it constitutes a line of commerce. It's got to be a peculiar characteristic sufficient to distinguish it from other products so as to constitute a line of commerce and we submit that in this case that the Government is going to be unable to show that aluminum wire and cable has sufficient peculiar characteristics and uses to establish it as a relevant line of commerce within the meaning of that phrase as used and interpreted by the courts.

Now there has been a lot of talk about the dominance of ALCOA and how this dominant company has swallowed up independent producers of wire and cable. Apart from the fact that the producer of wire and cable is still operating at the same old stand and hasn't been swallowed up, the fact of the matter is that this dominant company he talks about which had 90 percent of the aluminum ingot capacity in 1947 and 45 percent of it in 1956 and 35 percent of it now—strong evidence of dominance—and that com- [fol. 36] pany which had 100 percent of the aluminum, the bare wire and the aluminum wire and cable in 1940, and 48 percent in 1954 and 32 percent of it in 1958 and less than that since it acquired Rome is hardly an indicia of dominance as far as I can see, and we will demonstrate in our case this is what happened to ALCOA from the days

when it was the dominant producer in the Aluminum Industry.

Now there are several statements in the decided cases particularly one in the Third Circuit that evidence of size and participation in a substantial share of the line of business involved is not enough to produce a violation of the Clayton Act. This is the Third Circuit's language in Trans America against Board of Governors of the Federal Reserve Board. In that case also the Board made this statement which was cited with approval by the Supreme Court in the General Motors-duPont case:

"A monopoly involves the power to exelude competition when the monopolist desires to do so. Obviously under Section VII it was not necessary to find that the Defendant has actually achieved monopoly power, but merely that the [fol. 37] xxx acquisition under attack has brought it measurably closer to that end." Measurably closer to that end.

"For it is the purpose of the Clayton Act to nip monopoly in the bud. Since by definition monopoly involves the power to eliminate competition and lessening of competition is clearly relevant to the determination of the existence of a tendency to monopolize. Accordingly in order to determine the existence of a tendency to monopoly in any line of business the area or areas of existing effective competition in which monopoly power might be exercised must first be determined." This is where we are poles apart in this case, and this is one of the major issues that is presented to Your Honor, as to what are appropriate lines of commerce in this case. There is no dispute between us, as Mr. Melchior pointed out, on the section of the country in that we are in agreement that the entire United States is the section of the country. We don't dispute, as a matter of law that there can be a substantial lessening of competition in the eleven Western States. Any appropriate market area in which they can prove that there has been a substantial lessening of competition would be proper [fol. 37a] for Your Honor to act upon. Our position there is that they are not going to be able to prove that the eleven Western States is a separate area of the country for the purposes of marketing the products involved.

[fol. 38] On the issue of effects as a matter of law again

I don't think there is any real dispute between us. The law says that there must be a reasonable probability that the acquisition will substantially lessen competition or tend to a monopoly. "A reasonable probability" that it will.

Now Your Honor asked Mr. Melchior about subsequent events having something to do with the determination of whether or not the acquisition has had the proscribed effects and whether or not it is proper to consider that.

Under the Proctor & Gamble case in the Federal Trade Commission, the Federal Trade Commission lost the case before the Commission itself. I mean the Federal Trade Commission prosecutors lost the case before the Commission itself. But the Commission sent the case back for a new trial and in sending it back for a new trial the Commission said that it preferred hind sight upon which it can act rather than placing too strong a reliance upon "treacherous conjecture" a the better way to determine the effects of an acquisition.

So they sent it back so that evidence could be introduced as to what had happened in the industry since the ac- [fol. 39] quisition.

Now we will show in our case, and hopefully in the government's case, that what has happened in this industry since the acquisition completely precludes a determination that Alcoa's domination, as it has been called has prevented the growth of independents or that it has aggrandized the position of Alcoa. We will show that it has given Alcoa no power or that the acquisition has had no effect in substantially lessening competition or the tendency to a monopoly.

That one quotation that Mr. Melchior read to you from the Senate Committee report, I have just one comment. He read, and I hope I am quoting him correctly—I will try—that it didn't make any difference whether there was any competition between the acquiring company or the acquired company; that there would be a substantial lessening of competition even though there had been no competition between the acquiring company and the acquired company.

Now that quotation which I am sure is in the legislative history dealt with the question of vertical acquisitions where a supplier of raw materials who did not compete with his customer acquired a customer with, or a substantial

market outlet for his products so it would give him a [fol. 40] substantial position with that customer. That would be the type of lessening of competition embraced by the Act.

Now we submit that in this case while Alcoa did supply aluminum to Rome, that Rome was such an unsubstantial producer of aluminum that the effect of the acquisition in that regard is completely inconsequential. That no one was foreclosed from an appreciable market and that no buyer was prevented from buying anything as a result of such foreclosure.

So that this case comes down, I think, to the question of whether the government can prevail, and they have the burden of proof—Mr. Melchior took that upon himself—and there is no question that he has it—whether the government can prevail on the establishment of a proper line of commerce on the establishment of appropriate sections of the country, and on proof that there is a reasonable probability that there will be a substantial lessening of competition or a tendency to monopoly.

We will adduce evidence to show that the acquisition has had no such effect whatsoever in any of these lines of commerce; that to the extent that there has been an vertically [fol. 41] aspects it has had no appreciable effect upon competition. That so far as the question of the entry to which Mr. Melchior refers, the question of entry or non entry into the aluminum wire and cable business which we say doesn't exist, the insulated aluminum wire and cable business that anybody who can insulate copper can insulate aluminum; can insulate steel; can insulate a piece of string. The art is in insulating. And that anybody who wants to, who is an insulator, can enter the aluminum insulating business.

On the question of acquisitions in this industry, if you take the government's line of commerce, the aluminum wire and cable lines of commerce, we will show that such acquisitions as there were, were insignificant. That in one instance, the acquiring company was not in the aluminum wire and cable business. It just acquired. It was an aluminum producer and acquired an aluminum wire and cable business. No lessening of competition there.

In the other acquisition that preceded ours the only other one in the aluminum industry, the company involved

was primarily a copper company and the amount of business that they did in aluminum was insignificant.

I think our proof will show that in areas where [fol. 42] even adopting the lines of commerce that the government relies on and they rely primarily on the aluminum wire and cable lines of commerce. They very graciously said when we designated wire and cable as a line of commerce, they said "O.K. we will take that as a line of commerce too" but their heart is in aluminum wire and cable. And we will show that in those lines of commerce there has been no adverse effect on the independants, the independent producers of aluminum wire and cable. There has been no adverse effect on the buyers of aluminum wire and cable, and there has been no adverse effect on the public. And that under those circumstances it is our position that this acquisition which is not unlawful per se, because if our acquisition were unlawful per se these twelve hundred mergers he referred to from the Federal Trade Commission would have resulted in twelve hundred cases and not the few cases that he has mentioned.

But we will show that this acquisitiion engaged in by Alcoa for the purpose of diversifying its product line into the insulated wire and cable field was because Alcoa prior to the acquisition was in the insulated wire and cable field in a very, very limited way, Your Honor. A surprisingly [fol. 43] limited way. They didn't have the knowhow. They didn't have the techniques; they didn't have the ability to go into the insulated wire and cable field. And the reasons for the acquisition, which we will show, were not for the purpose of eliminating competition or for the purpose of obtaining a monopoly but for the purpose of getting ourselves into this wire and cable business on which we had—were apprentices and which Alcoa had been for a number of years. And the public we think is not affected by this and no one we think has been hurt by this, and we think we can demonstrate this and it will be—while it is not our burden so to demonstrate I think in meeting the government we will do so.

The Court: Mr. Bergson you just made a statement a moment ago that the purpose was to get into—what business? The purpose of the merger.

Mr. Bergson: Get into the business of insulating wire, a broad line of wire and cables.

Your Honor, prior to the acquisition Alcoa was the producer of bare aluminum cable and a producer of what is known as weather proof line wire, which is the wire that runs from the transmission station—I mean from the distribution stations along to the place where they connect [fol. 44] to the houses. And in the so-called service drop field which is the connection from the wire, from the distribution wire to the home or to the building. Now these were simple, easy constructions. But even simple as they were when Alcoa went into that business it went in by asking Rome to do it for them on a toll conversion basis. They sent the wire to Rome. Rome put the covering on it and then Alcoa sold it.

[fol. 45] But Alcoa felt that it could serve the public better if it were able to offer a broad line of aluminum—I mean a broad line of insulated conductors, and they went out and they looked for companies, and the evidence will show, and I don't know whether they will bring it in, if they don't, we will, they looked for companies, they looked at a half a dozen companies skilled in the insulating field, because it was the belief that Alcoa management that it would take Alcoa years to get the skills necessary to make the wide variety of complex insulated products that Rome makes, because Rome in addition to making the simple constructions that I mentioned makes very, very complicated power cables, instrumentation cables, all sorts of cables which we will show, your Honor, and which require a high degree of skill in insulating, compounding of materials to cover them, neoprene, thermo-plastics, rubber, polyvinyl, all the various coverings that go on, Alcoa had absolutely no prior experience prior to the acquisition except thermo-plastic line wire, and this was the reason for the [fol. 46] acquisition. And we will adduce evidence to show that.

Now, we think that the Government's taking the position, it doesn't make any difference what your purpose was, if you have a good business motive and a non-trade restraining motive in acquiring anything, if the result is

that it has an adverse effect on trade, there is a violation nevertheless.

Well, to a certain extent we agree with that, but it is our position that motive illuminates and helps to illuminate the effect. If we acquired Rome, for example, on the theory that Rome was a vicious price-cutter in the industry, we wanted to get them out of the way so they wouldn't be cutting prices, that would be an evil purpose and it would substantially lessen competition, and the Government says that is pertinent information. But if we want to acquire Rome for the purpose of adding to our line of insulated and covered productions, and be able to give a diversified line to our customers, with no intent, no purpose, with utter disregard of whether or not Rome was making the overlap products, as they are called, we weren't [fol. 47] interested in the overlap products, we had all the capacity that we needed for the overlap products, we weren't trying to eliminate a competitor in the overlap products, we will show Rome wasn't even a vigorous competition in those products, that ALCOA lost practically no business to them as a result of meeting them in the market place in those products, but what ALCOA wanted to do here was to be able to offer to the trade a diversified high quality line of insulated wire and cable products, and it is our position that the line of commerce involved here is not aluminum insulated wire and cable but all insulated wire and cable. That our motive in acquiring them was sound and the effect of our acquiring them was not illegal and was proscribed by Section VII of the Clayton Act. Thank you.

The Court: Gentlemen, it's getting reasonably close to the time to adjourn for the day. I think I will let you people go until ten o'clock tomorrow morning.

(Whereupon, an adjournment was taken until Tuesday, February 6, 1962, at 10:00 a. m.)

[fols. 48-49] [Title omitted]

Civil No. 8030

Transcript of Hearing—February 6, 1962

[fol. 50] The Court: Gentlemen, there are a couple of things I would like to get straightened out. No. 1, I want to put on the record I appreciate counsel's efforts in pre-trial. This case has been pre-tried and the proceedings in this case have accomplished as much as any I have been engaged in. I think counsel deserves a little credit for that.

The next thing we run into controversy very often and I wonder if it can't be avoided after the case is over as to the payment of the Judge's copy of the Minutes. I just spoke to Mr. Jordan—I suppose that what they do—I haven't talked to him very much—they generally give me perhaps what is actually the original, first copy. He told me he would not do that here, because I guess he had some troubles yesterday.

Mr. Bergson: He mineographed.

The Court: I guess so. Any copy whether mimeographed or carbon is just as good as the original for me and there is no necessity particularly to give me the original. I wonder if you people can't agree as to the Judge's copy how it is to be handled in regard to payment.

[fol. 51] We had a long controversy in the last long case and I want to avoid that. Why don't you confer this noon and see if you can get it straightened out, to see if you can avoid arguments and opinions a year from now.

All right, I guess the custodian is going to bring a table, but I suppose we can start, can't we? All right.

Offers in Evidence

Mr. Melchior: I intend to offer some documents so we won't need the witness stand immediately.

May it please the Court, I would like to offer at this time Government Exhibit No. 1 to Government Exhibit No. 50 for identification. These documents have been exchanged by counsel and counsel for Defendant have had an opportunity to make an objection thereto, if so desired. These

documents generally relate to papers supplied to the Department of Justice by the Defendants at the time of the merger when the Department was considering this merger under its merger program. In order to keep the record to a minimum it deleted a number of documents and if they are received in evidence, it would be my purpose to [fol. 52] discuss briefly particular ones and point them out to Your Honor.

(GX-1 to GX-50 for identification.)

I offer GX-1 to GX-50 for identification into evidence at this time.

Mr. Bergson: No objection, Your Honor.

The Court: All right. Exhibits 1 to 50 will be received. I believe they have already been marked by the Stenographer.

Mr. Melchior: They have already been marked, Your Honor.

The Court: All right. Perhaps it would be wise to at least give me a little bit of an outline what they contain.

Mr. Melchior: Yes, Your Honor. The first group would be Government Exhibit No. 1 to 23. These are documents which were submitted to the Department of Justice in response to its letter to Defendants dated February 2, 1959. At that time pursuant to our normal practice we inquired into this merger, and requested that the parties who were concerned supply to us information which we felt to be vital and relevant to a consideration of this merger under Section VII of the Anti-Trust Law.

[fol. 53] This first group of documents came in response to our request and I would like to call Your Honor's attention in particular to certain ones. I don't intend to discuss them fully. I don't think it would be wise since we have a substantial number of documents to introduce. It would be my purpose to introduce these in groups from time to time in order not to spend too much time on the documents.

GX-4 is a document of an advisory nature supplied to ALCOA by Ebasco Services, which is a consulting organization and they offered certain advice to ALCOA in respect to the proposed merger.

GX-5 is the actual agreement of merger.

GX-7 is the ALCOA proposed rules relating to the exchange of stock with certain statements therein of interest indicating ALCOA's position as to pioneering in the field of aluminum conductor and pointing out that the merger will give ALCOA a full line of products.

GX-9 is a proxy statement in connection with the SEC, the Securities Exchange Commission consideration and this document is replete with information relating to the two [fol. 54] companies and the products they manufacture and their activities in the field of wire and cable.

GX-11 to GX-22 are annual reports of the two major companies for the years prior to the merger.

As in the case of most annual reports of large concerns they contain quite a bit of information relevant to the company's activities.

GX-23 is a series of answers to questions posed by the Department of Justice in its letter of inquiry.

GX-24 to GX-35 inclusive are a series of documents which were submitted by the parties to the Department of Justice in response to the Department's second letter of inquiry. These letters were dated August 18 & 19th, 1959. The fact that there was a second submission indicated that the Department wanted additional information with respect to the merger.

GX-27 contains various statistics of concern in the merger.

GX-28 to 31 relate to a tolling arrangement between ALCOA and Rome Cable prior to the acquisition. Under this arrangement generally ALCOA who was manufacturing bare aluminum wire and cable had Rome Cable per- [fol. 55] form certain services upon this cable by insulating the cable. As the documents indicate the cable remained the property of ALCOA and was sold by ALCOA.

As counsel for ALCOA yesterday indicated this was a service performed by Rome Cable Company, a company with a great deal of know-how in this field and apparently a field in which ALCOA, according to counsel, would take perhaps as much as five years in order to learn how to perform the same operation itself adequately. We think this is very significant because it does indicate the competitive importance of the know-how that Rome Cable had in the insulating field which ALCOA did not have and ap-

parently felt necessary to have performed for it by Rome Cable.

GX-34——

Mr. Bergson: May I interrupt?

The Court: Yes.

Mr. Bergson: I don't mind, but I do think it is questionable for him to interpret the documents and argue from the documents as he has.

The Court: Well, I will have forgotten the argument [fol. 56] long before I ever decide the case.

Mr. Bergson: We know that copy that you asked us to arrange and pay for.

Mr. Melchior: May it please the Court, it was not my intention to argue. I was just referring to some arguments made by Counsel yesterday.

GX-34 relates to a somewhat similar arrangement between ALCOA and Rea Magnet Wire Company, a company later acquired by ALCOA and mentioned in the Government's complaint in this proceeding.

GX-37 to 43 generally relate to practical problems of manufacturing aluminum and copper rod on the same production machinery. GX-32 is a document entitled "The [fol. 57] Rome Technical Manual" and it contains a wide variety of technical information relating to aluminum and copper and their several and significant characteristics.

GX-36 to 46 are documents which were secured by the Government from ALCOA in connection with the acquisition by ALCOA of the Rea Magnet Wire Company. GX-36 in particular is the telegram of inquiry. GX-37 is the agreement of sale. GX-38 deals generally with the Rea Magnet Wire Company. GX-39 relates to a series of financial date concerning Rea. GX-40 is the proxy statement submitted to the S.E.C. and as in the case of Rome and ALCOA proxy statement contains a great deal of relevant information.

Mr. Bergson: Your Honor, I don't like to interrupt but I think that is a misdescription of the document. It's not important but it was just a letter to stockholders. I don't think it was submitted to the S.E.C.

Mr. Melchior: Well, my notes indicate that it was a proxy statement. Counsel may be right. I don't think it's really that significant.

[fol. 58] Mr. Bergson: No, I don't either.

Mr. Melchior: I will pass it now. GX-41 is an announcement made by ALCOA of the purchase of the Rea Magnet Wire Company and there are certain quotes of interest in that letter. It indicates that ALCOA's desire was to make Rea the industry leader in the aluminum magnet wire field and I quote: "We do anticipate that your" meaning Rea "experience in the magnet wire field and our know-how in the properties of aluminum can be combined through aggressive research into leadership in the development and utilization of aluminum magnet wire in those applications where aluminum is equal or superior to copper." It also indicates that ALCOA felt that both Rome and ALCOA were research-minded companies.

The final group GX-47 to GX-51, these are various informal submissions submitted by the parties to the Government. GX-47 we would like to call to the Court's attention in particular since it is Rome Cable Corporation's —I would like to correct my statement there. I indicated 47 to 51, it is actually 47 to 50. We are not offering 51 [fol. 59] at this time. GX-47 is Rome Cable Corporation's annual report for the year 1937. The year near the time of the founding of the company and it shows or gives the Court an opportunity to compare the growth of Rome Cable Company up to the time of the merger.

GX-49 is ALCOA's 1960 annual report. This is an interesting document in that that it discusses the way in which aluminum and aluminum electrical conductors are made and where ALCOA's plants and other operations are located.

The final document is GX-50 which is generally known as the Ashley Report. This report was prepared by a firm of consulting engineers for and at the request of ALCOA for use in promoting the usage of aluminum electrical conductor products. It covers generally such items as: 1, differences in the physical and electrical characteristics of aluminum and copper; 2, the different prices of these two metals; 3, the differences between aluminum and copper conductors; and 4, the differences between aluminum and steel conduit.

The Court: Are you finished with that?

[fol. 60] Mr. Melchior: With that group, yes, Your Honor.

The Court: I think I will let Mr. Bergson make any comment he wishes to. I don't know whether it is necessary or not in connection with counsel's statement in the opening on those Exhibits.

Mr. Bergson: I don't think it is necessary, Your Honor. Anything we want to say we can say in argument or in rebuttal when we put our testimony in.

The Court: All right.

Mr. Melchior: I would like to offer at this time Defendant's answers to Government interrogatories which were served upon Defendant in two series. The first series came on or about June 21, 1960. The second one on or about December 21, 1960. We are offering those with the following exceptions—we have deleted the following interrogatory answers because of their bulk and questionable utility in this proceeding, but we would like to reserve the right to introduce them at a later date if the occasion may warrant. The interrogatory answers that are not being [fol. 61] introduced or offered at this time are interrogatories Nos. 10, 11, 31, 59, 67, 68. The Government is prepared to call its first witness.

Mr. Bergson: No objection.

The Court: All right. Now those answers, Mr. Melchior, were not given an Exhibit No., were they?

Mr. Melchior: No, we did not give them an Exhibit No.

The Court: All right.

KENNETH B. HIGBIE, called as a witness in behalf of the Government, being first duly sworn, testified as follows:

Direct examination.

By Mr. Melchior:

Q. Would you state your name and place of employment?

A. I am Kenneth B. Higbie. I am employed by the United States Bureau of Mines, Washington, D.C.

Q. Would you state the title of your position and the location of your position in the organization.

A. I am a Commodity Specialist in the branch of nonferrous metals. My particular responsibility is to the

commodity aluminum and its associated materials bauxite and alumina. You will find I will be referring to alumina and aluminum. Alumina is aluminum oxide and aluminum [fol. 62] is a metal obviously. I will try to keep it as distinguishable as possible.

Q. Is your place of employment a Government Agency?

A. Yes, it is a Government Agency.

Q. Would you identify it?

A. Department of the Interior.

Q. Is it a particular bureau within the Department of the Interior?

A. Bureau of Mines.

Q. Bureau of Mines. How long have you been employed by the Bureau of Mines?

A. Approximately ten years.

Q. Has all of your employment been in the field of non-ferrous metals?

A. Yes.

Q. What are non-ferrous metals?

A. This is a group of metals that in the periodic chart is not related to iron. Nickel. Cobalt. These are light metals, refractory metals, such metals as aluminum, magnesium, tin, copper; and refractory metals, tantalum, columbium.

[fol. 63] Q. Have you had any prior experience in the field of non ferrous metals prior to your being employed with the Bureau of Mines?

A. In addition to my Bureau of Mines experience I spent approximately five years with the beryllium industry, an additional light metal, working for the Beryllium Company in Reading, Pennsylvania.

Q. Mr. Higbie, what is your educational background?

A. I have a Bachelor of Science degree from Oregon State College with a major in chemical engineering.

Q. Have you ever written any professional papers in the field of non-ferrous metals?

A. Yes. I have approximately two dozen papers on various subject matter pertaining to non-ferrous metals. This would include other beryllium, zirconium, hafnium, columbium, tantalum and some associated papers on aluminum, now.

Q. What are the duties and responsibilities of your present position?

A. The Bureau of Mine- has been charged with the responsibility of assisting in the development of domestic natural resources. In part, in this program the Bureau has research programs projects being carried out in various bureau research locations pertaining to mining ore extraction of the ore, reduction of the valuable material [fol. 64] in the ore to a metal and the purification of the metal. We have been following through to the point where the metal loses its identity in fabrication.

My particular office is the focal point for all of our aluminum programs. Any product programs that may be developed in the field may be submitted to the Washington office for their comments, for their criticism, are they pertinent to the national interest, and if they are, then it is my office that carries out the necessary details to see that such a program is actually taken place or will take place. My office also acts as a focal point for the procurement of information, statistical information on the aluminum, alumina and bauxite industries. We have a group of statistical clerks that send out and receive monthly canvasses on certain phases of this industry.

Q. Mr. Higbie, through your education and experience are you generally familiar with the location of mines and other facilities in the aluminum industry.

A. I believe I am..

Q. Are you generally familiar with the processes used in mining and ore processing?

A. Yes.

Q. Now, are you generally familiar with the companies [fol. 65] engaged in these processes and in the various stages of smelting and refining to the point where these metals lose their identity in fabrication?

A. I have this understanding.

Q. Are you generally familiar with any of the trade associations in the field of aluminum?

A. Yes.

Q. Would you identify any of the trade associations in the field of aluminum with which you are familiar?

A. Basically there are two organizations think that fit this field. The Aluminum Association which is primarily

interested in the primary metal as produced by the primary producers and the Aluminum Smelters Research Institute which consists of several, approximately 15 secondary aluminum industries where so-called secondary metal is made. They are interested in the later phase of the metal industry.

Q. Mr. Higbie, would you state what are the basic stages involved in the production of aluminum metal?

A. I would consider that there are three basic stages in this operation. One would be the mining of the ore; two would be extraction of the valuable aluminum oxide from the ore; and then three would be the reduction of aluminum oxide to aluminum metal. So that first we have the ore itself. Then we have an intermediate product, [fol. 66] which is the oxide, and then finally the metal itself. I think we will call it mining, extraction and reduction.

Q. You say it has three stages, mining, extraction and reduction. Now, Mr. Higbie, I wonder if you would explain to us generally what is involved in mining of the bauxite, where the bauxite ore may be found, and generally the processes utilized in mining bauxite up to the second stage which you have called the extraction stage?

A. This industry is rather fortunate in that raw materials containing aluminum are quite abundant. Statistically it has been stated that aluminum materials compose approximately 8 per cent of the earth's surface. They vary in nature and chemical composition, but bauxite has been considered the primary commercial source. Bauxite is a name for a group of minerals, all of which contain varying percentages of aluminum oxide and water. Waters of hydrogen. Generally speaking, it will be the chemical formula of AL 203.3 H2O or AL 303.1 H2O.

Bauxite is found throughout the world. Our domestic industry utilizes bauxite primarily from the Caribbean in such locations as Jamaica, Haiti. Also from the north coast of South America, Surinam, British Columbia. There are other deposits throughout the world in Australia, In- [fol. 67] dia, Sumatra, Greece, France. It is fairly well distributed.

The United States has also deposits located in Arkansas, Alabama, Georgia. To give you an idea of how much was

mined last year, somewhat close to 28 million tons of bauxite was mined throughout the world. The United States mined 1.2 million. So you see we are not very large in production. We imported approximately 8.7 million. We imported primarily from the Caribbean and the north coast of South America, the first areas I quoted.

Q. Mr. Higbie, can you give us some idea as to the ore content, the metal content and the ore process and the type of ore and the type of structure in which the ore bodies may be found?

A. A reasonable commercial grade ore is one that is considered to have approximately 46 to 40 per cent aluminum oxide in it. A good grade would be something in the 50s, and it has been known to go as far as 60 per cent aluminum oxide.

Q. Have you completed your answer?

A. I think that will cover what you asked.

Q. Now, where does the mining stage end? You have divided the processes into three stages, mining, extraction and reduction. Where does the mining stage end?

[fol. 68] A. I think I should say that most of the bauxite is found on the surface of the ground. The mining stage would end after the material is recovered from the ground and is transported to an intermediate plant where it may be dried for shipment. Since we are considering that most of our material is imported the water content of this ore is very valuable as far as weight is concerned, the economics of shipping water is such that it should not be shipped so that there is a plant located at all, I would say all of the mining areas designed to dry the ore as it comes from the ground prior to shipment to the U.S. I would consider that would be the end of the mining stage. I think if it would help the Court, I have prepared a small flow diagram that would show the two different steps and perhaps might be easier to follow in my testimony.

Q. Do you have copies for counsel?

A. I have two copies. One for counsel.

Mr. Melchior: Counsel, it is not my intention to mark this at all.

Mr. Bergson: I have no objection.

Mr. Melchior: If you have no objection.

Mr. Bergson: I wondered about the relevancy of all this testimony.

[fol. 69] Mr. Melchior: I would explain that, if Your Honor so desires. Our purpose in having this witness and the one to follow was to try to get as good and straightforward background information as possible. We selected these gentlemen from the Bureau of Mines because we didn't feel that there would be any slant or bias expressed as far as the testimony is concerned. I think it will also help the Court in understanding the products and where they came from.

Mr. Bergson: As I say, I have no objection to——

The Court: I will just take it as a piece of information.

By Mr. Melchior:

Q. Now, I believe you said the second stage was the extraction stage, Mr. Higbie; is that correct?

A. Yes.

Q. Will you describe generally what is involved in that stage?

A. The dry bauxite——

Q. May I preface this. Mr. Higbie, I don't think it will be necessary for you to go in greater detail on this. If you [fol. 70] would just give us a quick run-down so we can understand what happens.

A. The dry bauxite that is shipped into the country is sent to an extraction plant where the material is combined with several chemicals and then the entire mass permitted to digest under high temperature and high pressure for a reasonable length of time, at which time the chemical action takes place in the aluminum oxide, which is tied up in the material, becomes a water soluble content. The impurities tend to remain as unaffected material or as water insoluble compounds. This digested product is then filtered to remove the water soluble material. The solution is sent to a holding tank where it is allowed to crystalize and we obtain a hydrated alumina which is now a much purer form of aluminum oxide. This hydrated alumina is calcined to form aluminum oxide and we now have something which ranges in purity to greater than 99 per cent pure. This is called the Bayer process, where we have converted an impure aluminum oxide to a pure aluminum oxide and we have

separated it from its minerals. Basically that is the general step.

Q. And the end product of the second step is what?

A. An aluminum oxide powder, a white powder.

[fol. 71] Q. Now would you briefly describe what takes place on the third step?

A. This step as I have labeled the electrolytic reduction is the means by which the aluminum that is tied up in the oxide can be freed to form a metal oxide, it is electrolytic. It has a cell approximately 20 feet long by 10 feet wide by about three feet deep. Very large cells. So constructed that a bath of molten cryolite is used as the electrolyte. In the electrolysis the electricity causes the aluminum, which is in the aluminum oxide and which is dissolved in the cryolite, to become free to form small molten globules and separate away from this molten bath of cryolite. It separates to the extent that since it is a heavier metal in the salt and the cryolite it sinks to the bottom, and by a siphoning technique the aluminum, which is at the bottom, can be siphoned out and recovered as primary aluminum. The metal then as it is siphoned out into some sort of ladle can be sent to the furnace or can be cast directly into metal ingots for shipment to the customer. The purity of this metal may not be exactly that which the customer requires; therefore, very often it is sent to what we call a remelt furnace where certain metals are added to form the specific alloys. That alloy material then can be cast into a specific size ingot and shipped to the customer.

[fol. 72] Q. You used the term "primary aluminum" in your testimony, Mr. Higbie. Will you state for the record what primary aluminum is?

A. Primary aluminum is the first metal that is produced from the ore. It is the electrolytic product. I have used the term secondary aluminum. This is an aluminum metal that comes from reclaiming scrap; remelting scrap in such a manner that the final product will be usable. In primary aluminum there is very little or no scrap utilized unless it happens to be within the plant itself.

Q. Can you tell us in what form primary aluminum comes, in what shape or form or how do you describe or is there a name applied to primary aluminum as far as the shape or form is concerned?

A. It is cast into 50 pound ingots. It might be cast into larger ingots, rectangular ingots if it is going to be rolled into sheet. As I understand it, it is generally cast into 50 pound ingots, which is approximately 30 inches long by about five inches wide by four inches high and it is then shipped to the customer.

Q. And this shape is the primary aluminum?

A. Yes. This is primary aluminum.

Q. The basic metal that results from your third stage then, the reduction stage, is that correct?

A. Yes. This would be the basic form.

[fol. 73] Q. Before the ingot is fabricated into fabricated aluminum products does it take on other shapes or forms? Are other shapes or forms made from this into consumer items?

A. It is, I think, normal practice to cast into an ingot size that is comparable to whatever your final product would be. If you are going to make sheet you would prefer to cast into a large rectangular type ingot. If you are going to make rod, perhaps wire, you would cast into a round cylindrical type ingot. The length and size of the ingots, I think, would be dependent upon the lenth and size of the final product. Obviously it is difficult to combine two ingots once they have been fabricated, unless you use a welding technique later on, so that if a long sheet is required you would cast a larger rectangular ingot than a short sheet.

Q. Do you know what shape is generally used for the fabrication of wire and cable products in aluminum?

A. I believe a round cylindrical type.

Mr. Melchior: No further questions at this time. Your witness.

Mr. Bergson: No Cross Examination.

ALBERT D. MCMAHON, called as a witness in behalf of the Government, being first duly sworn, testified as follows:

[fol. 74] Direct examination.

By Mr. Melchior:

Q. Would you state your name and place of employment?

A. My name is Albert D. McMahon. I am a copper specialist at the Bureau of Mines in the Department of the Interior.

Q. Would you describe your position with relation to this organization?

A. In a like manner I have responsibility for the Bureau's interest in copper.

Q. You have heard Mr. Higbie's testimony?

A. That's right, sir.

Q. Are you Mr. Higbie's counterpart in the Bureau of Mines as a coper commodity specialist?

A. That is true.

Q. Does that describe your position?

A. Yes.

Q. How long have you been in your present job, Mr. McMahon?

A. Since January, 1957.

Q. Would you briefly describe what your prior experience has been in the field of non-ferrous metals?

A. Prior to my tenure with the Bureau of Mines I was with the Defense Minerals Exploration Administration, where we dealt in drawing of contracts for the exploration [fol. 75] of various minerals in the United States. Prior to that I was with the General Services Administration as a Resident Engineer at the Nickel Smelter at Riddle, Oregon. After that I was in the Materials Division of the Munitions Board, in the Department of Defense. Before that I was engaged in engineering responsibilities with the Metals Reserve Company. With the R.F.C. and before that I was with the Anaconda Copper.

Q. Mr. McMahon, would you state your educational background?

A. I have a Bachelor of Science Degree in metallurgy from Montana School of Mines.

Q. I believe you stated your duties in the copper field were approximately the same as Mr. Higbie's in the aluminum field, so I will not inquire into that. Now through your education and experience are you generally familiar with the location of mines and other facilities in the copper industry?

A. Yes, sir.

Q. Are you generally familiar with the processes used in the mining and ore processing in the copper field?

A. Yes, sir.

Q. Are you generally familiar with companies engaged and the processes used in the various steps of smelting and refining the copper ore?

A. Yes.

[fol. 76] Q. Are you generally familiar with trade associations in the field of copper, if there are any?

A. Yes, I am familiar with some.

Q. Would you state those with which you are generally familiar?

A. I am thinking of the Copper and Brass Research Association. Copper Products Development Association. And these are primary research and market analysis organizations. And Waste, Trade and Materials Dealers is a secondary association of secondary producers. These are the ones I have some familiarity with.

Q. Are these associations concerned with copper?

A. Yes.

Q. Are they concerned with aluminum also?

A. Secondary producers are, yes.

Q. Secondary producers are. Are you generally familiar with the pricing practices of the industry as recorded by the various publications in the field?

A. Yes.

Q. Would you state for the record generally where the prices for copper are reported—the various reporting agencies, if there are any such agencies?

A. Prices are quoted principally by,—let's see—prices are announced by the major producers, what we call the producer's price, the quoted price, and this here [fol. 77] is quoted in our trade publications as the Ameri-

can Metal Market, the Engineers Mining Journal, foreign publications such as the British Metal Bulletin, and the prices are quoted in all daily papers.

Q. Are you referring to the producer's price only, now?

A. Producer's price. Right.

Q. Is there any other?

A. I said the producer's price. Also in the American Metal Market, E.M.J. You also have the London Metal Exchange price quoted. And what we used to call the Congo price. It gives a price at destination of the Congo copper.

Q. Now these reported prices that you are referring to, are these the reported prices of primary copper or are they the reported prices of secondary copper, or various stages of copper?

A. The prices I mentioned are the prices of electrolytic copper in wire bar form.

Q. Wire bar form. Now are these prices as reported by these various groups generally the same or do they vary from time to time as between the various reporting agencies?

A. The producer's price is very stable.

Mr. Bergson: I don't think that was the question.

[fol. 78] Mr. Melchior: Do you have a question, counsel? Did you wish to make an objection?

Mr. Bergson: I am sorry. I don't think the answer is responsive to the question.

The Witness: Well, he asked me if there was any difference in the prices as quoted. I said our producer's price is stable. The L.M.E. price fluctuates.

Mr. Bergson: L.M.E.?

The Witness: London Metal Exchange price. And it is sensitive to fluctuation.

Q. Your L.M.E. price you are referring to, this is a price for primary copper. Correct?

A. Yes.

Q. And this is quoted in London, England. Is that correct?

A. Yes.

Q. Did you characterize this price in some fashion? I didn't hear your characterization of this price. Did you say this was a stable price or a fluctuating price?

A. No, you asked me the difference in prices and I mentioned the L.M.E. price before. I mentioned the producer's price. I just merely wanted to state that the producer's price has been stable. The L.M.E. price fluctuates.

[fol. 79] Q. Is there any relationship between changes in price on the L.M.E. and the domestic producer's price from your observation of the daily reports in the newspapers and trade publications?

A. As the variation becomes pronounced there is a tendency for the other to follow. In other words, if the L.M.E. price drops say more than two cents below the producer's price, our producer's price becomes soft and is liable to change.

Q. Now, directing your attention, Mr. McMahon, to the production of copper from its ore are there generally recognized in the trade stages involved in the production of copper?

A. Yes, indeed.

Q. Would you name these stages that are recognized?

A. Generally we speak of copper ore—the production stages for copper—as mining, concentration, smelting, and refining.

Q. Four stages?

A. Four stages.

Q. Now would you describe very generally what is involved in the mining of the copper ore? Tell us where the ore is generally found, some of the characteristics of the copper mines, and the location of some of these ore bodies, just as a general matter, very briefly.

[fol. 80] A. Our reported production in the world comes from 45 countries. Out of this 26 countries produce in excess of ten thousand tons; eight produce more than one-hundred thousand tons; and only one produces more than a million tons, that is the United States. In the various countries the ore is concentrated in certain portions of the country. The ore bodies are associated with geology, with igneous intrusions. So this tends to concentrate them in certain parts of the country. Eight countries in the world produce 88 percent of all the copper. The United States produces 24 percent, and in the United States, almost all of our copper is produced in five western states, and most of that in the State of Arizona. In the United States

in the year 1960 we mined 135 million tons of copper averaging less than three-quarters of one percent copper. This gave us a primary copper production of one-million one-hundred thousand tons. Most of the copper mined in the United States comes from open pits. Open pits are exploits of ore deposits that are close to the surface or where it is economically feasible to mine the ore without the removing of too much over-burden. The balance of the copper in the United States is mined by mass producing underground methods such as blockading and pillar methods. Open pit mining is the extraction of ore by blasting, the use of shovels, railroads and trucks. Open pit min-
[fol. 81] ing accounts for 80 percent of the production of ore, and 75 percent of the production of copper in this country.

Q. Are you now prepared to go to the second stage, which I believe is concentration?

A. Concentration.

Q. The second stage you have described as concentration, I believe. Would you briefly tell us what that involves?

A. Over 90 percent of the ore occurs as sulphite. Sulphites are treated by the floatation process which separates the sulphite minerals from the gas. In this concentration, of course, is crushing, grinding, classification, floatation, thickening, and filtering. And the product is ready for smelting.

Q. What is that product called?

A. Concentrated copper. Copper concentrate.

Q. The third stage you have described as smelting where a process is performed upon these concentrates. Is that correct?

A. Yes.

Q. Would you briefly describe the smelting stage?

A. The smelting stage consists of three steps; roasting, reverberation, smelting and converting. Roasting is employed to get rid of a portion of the sulphur. Reverberatory smelting melts directly the concentrates which separates the molten mass into slag and mat.

[fol. 82] Mat is a mixture of iron sulphate and iron sulphide. It is tapped from the reverberatory furnace and to the converters. In the converters air is blown through the molten mass. The air converts the iron and the iron

sulphate to iron oxide which combines with silicon and blocks out, the silicon, and this goes off as a slag. The sulphur from the copper sulphate combines with oxide, goes off as a gas and leaves the copper, copper metal in the converter, and this is what you call converter copper of blister copper.

Q. So would you understand that the product would be such as you would describe as blister copper?

A. Yes.

Q. Now, we are ready for the fourth stage which you described as refining. Would you briefly describe that stage?

A. The molten operation of the blister copper produced is fire refined and this is a process in which air is introduced into the melt which oxidizes the impurities that are slagged off. Then it is poled with large wooden poles and the products of combustion that is the harder carbons and the carbons which form from the burning of the poles reduces the oxidation in the melt, and this refines your copper to 99.9 per cent.

[fol. 83] Q. And what is this product described as?

A. This is first refined copper. This is first refined copper. 92 per cent of the blister copper product is treated by an electrolytic process, the copper leaving the converter goes to a homing furnace which it is cast into anodes. The anodes along with the cathode are immersed in a bath of acidified copper sulphate. When a current is passed through the cell the copper precipitates from the, or rather the copper goes into solution from the anode and deposits on the cathode, the impurities fall to the bottom or are dissolved in the electrode and your cathode deposit is brought the term electrolytic refined copper.

Q. And the name of the product that results from the electrolytic process of the refining such as you describe is what?

A. This electrolytic product is referred to as cathode copper.

Q. What shape is the cathode copper?

A. Cathode copper is in a flat. It is a deposit about 3 foot by 3 foot. This is melted and goes into various shapes of various properties, cakes, slabs, ingots and ingot bars and these are the shapes that are taken off for fabrication.

[fol. 84] Q. Do you know which of these shapes are used in drawing copper wire and cable?

A. Wire bars.

Q. Do you know the approximate electrolytic product that is produced that goes into the form of wire bar?

A. All the refined copper in 1960, that was produced in 1960, 66 per cent went into wire bar.

Mr. Melchior: You may examine.

Mr. Bergson: No cross-examination.

(Witness excused.)

Mr. Mahaffie: John G. Detwiler.

JOHN G. DETWILER, called as a witness in behalf of the Government, being first duly sworn, testified as follows:

Direct examination.

By Mr. Mahaffie:

Q. Mr. Detwiler, will you state your occupation, please, sir?

A. I am president and treasurer of the Central Cable Corporation.

Q. Where is the Central Cable Corporation located?

A. The main office is in Jersey Shore, Pennsylvania. We have plants in Illinois and Georgia.

Q. Illinois and Georgia?

[fol. 85] A. That's right.

Q. How long have you been with the Central Cable Corporation, Mr. Detwiler?

A. Since it started, in 1939.

Q. In what capacity, sir?

A. Always as an officer. First as a vice-president and then my present capacity.

Q. When did you become president?

A. In 1946.

Q. You have been president of the Central Cable Corporation since 1946, sir?

A. Correct.

Q. Mr. Detwiler, what are the products which are produced by the Central Cable Corporation, generally speaking, sir?

A. We produce transmission and distribution wires and cables for the transmission and distribution of electrical energy.

Q. Now, would you so list the specific products which are included within your product line by the names by which they are usually called in the trade?

A. Wire aluminum, bare aluminum and copper wire and stranded cable. We make insulated aluminum and copper wires; insulated in many ways with cotton and asphalt, [fol. 86] plastics, synthetic rubbers, et cetera, and then we make composition cable which also include aluminum and steel reinforcement, which is called ACSR in the trade.

Q. All right, will you state what ACSR is specifically?

A. Those four letters which stand for aluminum cable steel reinforced.

Q. And how is that product made, sir?

A. Are you asking the long, technical description?

Q. No, sir.

A. It is made by twisting aluminum conductor wires called strand conductor around galvanized or aluminized steel core wire.

Q. What is it used for?

A. It is used for the transmission of electrical energy.

Q. Is it sold in bare form or covered form?

A. Both, but largely in bare form.

Q. All right, sir, you sell a product known as all aluminum cable?

A. Yes, we do.

Q. What is that, sir?

A. That is all aluminum or alloys stranded together with steel wire.

Q. What is that used for, Mr. Detwiler?

A. Same purpose. Transmission of electrical energy.

Q. Same purpose as ACSR?

[fol. 87] A. Same purpose as ACSR.

Q. Do you produce a product known as line wire?

A. Yes, we do.

Q. All right, sir, what is line wire?

A. Line wire in general is bare or insulated single con-

ductor. In other words, it is a single or stranded single unit conductor which carries electricity from one place to another.

Q. What metals do you make line wire out of, sir?

A. Copper or aluminum or ACSR.

Q. Now, do you sell, produce a product, a line wire product made of copper which is sold bare, that is; without a covering?

A. Yes.

Q. And what is the use of that product, sir?

A. It also transmits electrical energy but it can be used for signal wires and other purposes, other than the transmission of power.

Q. What is its principal use?

A. It is principally used as a transmission of electrical energy.

Q. Do you produce a covered line wire product?

A. Yes, we do.

Q. What metals are used in that product?

A. The same copper and aluminum or ACSR.

[fol. 88] Q. And what covering materials are used?

A. The original old-fashioned weatherproof covering with a braided cotton covering which was then saturated with asphalt to be able to stand the weather better, finished with wax and mica. That was substituted with polyethylene and also neoprene, a rubber-like material so that all this figures in that construction.

Q. Do you make this product with all three of these types covering?

A. Yes, we do.

Q. What would you say the percentage of each of them on covering in your product is?

A. I couldn't answer that offhand. It varies from year to year.

Q. How much cotton covered line wire is used today?

A. It is a declining market. I would hesitate to say how much of it is, but it is a declining market. It is an old-fashioned product.

Q. All right, sir, do you produce a product known as service drop cable?

A. We do.

Q. What is that, sir?

A. That is a composite cable generally used to bring low voltage distribution electricty from a higher voltage [fol. 89] line into your house or into this building, above the ground.

Q. How is it made?

A. It is made by combining plastic or rubber insulated conductors together with bare conductor generally twisted together into a form called triplex, duplex or quadruplex, depending on whether there are two, three or four conductors.

Q. Now you stated that you make conductor products using both aluminum and copper. In the field of aluminum what kind or grade of aluminum do you buy?

A. It is known in the trade as E.C. which translated is electrical conductor grade.

Q. Do you buy any secondary aluminum?

A. Not for this product. It is impossible to use it.

Q. The reason that you do not buy it is that you cannot use it?

A. Yes, it won't meet the specifications, sir.

Q. Do you buy secondary copper?

A. Yes.

Q. For the reason that you can use secondary copper?

A. It can be made to meet the specifications.

Q. All right, sir, and what form does Central Cable buy aluminum?

A. We buy aluminum in the form of a rod, which is our [fol. 90] starting product.

Q. What is an aluminum rod, Mr. Detwiler? What does it look like?

A. Well, it is about the size of your index finger in diameter and it is called 3/8 of an inch diameter. Normally it is wound up in a coil about the size of this table, weighs about 250 pounds in the coil.

Q. How is aluminum rod made?

A. There are two methods. Generally one by rolling an ingot on a rolling mill and then there are various continuous casting methods that are more or less successful in producing these rods.

Q. The original form from which the rod is made is an aluminum ingot?

A. It would be an ingot for the rolled rod. I guess they

would call it an ingot, in the direct casting method, but I am not sure of that.

Q. In what form does Central buy copper?

A. We buy copper in the rod form as I described, and also in the open market in the form of a wire as heretofore described by the witnesses.

Q. You buy both copper rod and copper wire?

A. Yes.

Q. What does copper rod look like?

A. It looks like as big around as your finger and it is [fol. 91] rolled in a coil as high as this table and weighs about 250 pounds in that form.

Q. How is copper rod made?

A. It is normally rolled on a hot rolling mill.

Q. From what product?

A. From the wire bar.

Q. From the wire bar. Mr. Detwiler, are there any differences in buying copper as compared with buying aluminum?

A. There is no commodity way for copper as I know of. By that I mean the London Metal Exchange or New York Commodity Exchange, so we must buy copper from producers or secondary producers. While in aluminum we have to buy it directly from the producer of the metal, as they don't have the other sources available.

Q. There is then a difference in source; is that right?

A. Yes.

Q. Now, you said that there were no secondary sources of copper. You meant aluminum, didn't you?

A. There are no secondary sources of aluminum.

Q. Is there a difference in the number of prices at which you can buy aluminum as compared with copper, the number of different prices, if any?

A. There are prices on various world markets for copper in the form of wire bars and other shapes which [fol. 92] provide a variation in pricing on copper.

Q. They are different?

A. They are different. Generally they are different.

Q. Yes.

A. There is generally for us one market price for aluminum rod that we can buy and use.

Q. Now, is there a difference in the terms and conditions

if they are available to you between buying aluminum and buying copper?

A. In aluminum we are only able to purchase our requirements of rod at a price in effect the date I take them. In copper it is possible for me to buy future deliveries of copper so that I can at a price known today buy copper at a later date, at a price that I can afford and pay for.

Q. Did you say that is not true in aluminum?.

A. To my knowledge that is not true in aluminum.

Q. Mr. Detwiler, will you describe the manufacturing processes involved in converting aluminum rod into aluminum wire?

A. This is a process in our operation known as cold drawing stranding and insulating. We introduce the rod into the draw bench and draw it down in smaller and smaller diameters from the three-eighth rod to the re-
[fol. 93] quired size of wire, through tungsten carbide dies made so that the diameters come out the way we want the wire at the end. This is done on high speed, and we can then sell that wire at that diameter, strand or insulated.

Q. What is a draw bench, Mr. Detwiler?

A. A draw bench is a heavy base mechanical equipment driven by electric motor which has a very specialized gearing and drive and serves to pull by means of the power motor, serves to pull the aluminum wire through various diameter dies that we inserted in the proper places in the bench.

Q. Now, what is the manufacturing process involved in converting the copper rod into copper wire?

A. Exactly the same.

Q. Can the same machine be used for both conversion operations?

A. We use the same machine. After a while you are developing enough volume to put a faster machine on aluminum. But you can use the same machinery.

Q. Do you use the same machinery?

A. We don't today.

Q. Why not, sir?

A. We need to make aluminum wire at a higher rate of
[fol. 94] speed than we are making the copper in order to get the proper physical properties and so forth.

Q. What are the differences, if any, between drawing copper and drawing aluminum in a draw bench?

A. In the first place, the speed I mentioned can be higher in aluminum and get the required physical and electrical properties. In the second place the lubricant that you use to draw the aluminum is essentially different. Normally, it is a soluble oil for aluminum. With copper we use a fat or tallow solution, an animal fat solution. We have a temperature control in this solution on aluminum because of the speeds, which we don't have to have on the copper. But we can do it generally with the same process except for speed and lubrication.

Q. What about the dies?

A. The dies are the same—tungsten carbide dies are the same—tungsten carbide dies are used commonly.

Q. If you changed the machine from the drawing of copper to the drawing of aluminum what changes would you make in the machine?

A. Normally this involves cleaning the entire machinery and associated piping with steam or some other method to remove the particles of the previous metal that would [fol. 95] have been drawing.

Q. Why is it necessary to do that, sir?

A. Well, in general these two metals are in a different place than the electromotive series and it would cause corrosion if one appeared on the other out in the atmosphere, so you must keep that from happening.

Q. If you did switch the machine over, would you make any change in the dies in the machine itself?

A. As a practical matter you would put some different dies in, but you can leave the same in, if you don't know any better.

Q. All right, sir, would you describe the manufacturing process involved in converting wire into ACSR?

A. Yes. In that case we draw the wire as described and we also produce the steel core wire with appropriate galvanized or aluminized coating and then we put these aluminum and steel wires in a machine called a strander and we strand that with the aluminum on the outside and the steel core wire in the center.

Q. What operation is involved in making stranded cable other than ACSR?

A. Aluminum?

Q. Aluminum or copper.

Q. You will eliminate the core wire and strand the metals in the strander without that particular steel [fol. 96] core.

Q. If you change the stranding machine from stranding of aluminum to the stranding copper, what, if anything, would be necessary?

A. There, again, we have to clean the machine very carefully with steam or some other solvent to remove the particles which are already contained therein.

Q. What manufacturing process is involved in the production of covered line wire?

A. There are three general processes. The oldest, 75 years or more old, being a cotton asphalt covering which I have described.

Q. Yes, sir.

A. And then there are thermo plastic coverings which are newer, which consist of extruding of the polyethylene or other thermo plastic on the outside of the wire much the same as if you would put a hose on the outside of the wire.

And the third is a continued vulcanizing operation which looks very much the same as a plastic extruder, but you use a material such as neoprene or synthetic rubber.

Q. What manufacturing processes are involved in the manufacture of service drop cable?

A. We would draw the wire as described, stranded, as [fol. 97] I have described, insulated either with thermo plastic or rubber like materials and then combine two, three or four of these bare and insulated wires into what is known as a service group.

Q. Is there a machine which does that, combining?

A. Yes, it looks like a strander. A little larger.

Q. What is it called?

A. It is called a twister in our game. I don't know what others call it.

Q. Mr. Detwiler, would you state as best you can the relative use today by Central Cable of aluminum and copper in your total product line?

A. We make three and one-quarter to four times as many feet of aluminum conductor as we make of copper.

Q. Can you state or give me the same information with respect to covered line wire?

A. In line wire we make eight to ten times as much aluminum as copper.

Q. Then is that again in feet, sir?

A. It is in feet.

Q. And would you give me the same information with respect to your product of service drop cable?

A. Service drop would probably be eight times as many feet because we take three or four cables to make a [fol. 98] foot of that, and in the final product it would probably be eight times. That is what my estimate would be.

Q. About eight times in foot production?

A. The finished product, copper service drop cable, that is made by us.

Q. Let me go back, Mr. Detwiler. Am I correct that you said you make in terms of finished product about eight times as much aluminum as you make copper service drop?

A. Yes.

Q. And when you say in the finished product that includes three separate, in the case of triplex, three separate——

A. Yes.

Q. (Continuing)—conductors?

A. Yes.

The Court: Would this be a good time to take a short recess?

(Whereupon at this point a recess was taken after which the trial was resumed.)

[fol. 99] Q. Mr. Detwiler, I want to ask you one thing which you testified to previously. Is there a future's market in aluminum?

A. Not that I know of.

Q. Is there a future's market in copper?

A. Yes.

Q. Now, Mr. Detwiler, has there been any trend over the past ten or fifteen years in the relative uses of copper and aluminum in the product you manufacture?

A. The trend, is an increasing penetration of aluminum into my product.

Q. Do you expect this trend will continue?

A. That would be a guess, but I am prepared to accommodate that trend. It would be a guess.

Q. Mr. Detwiler, is there a difference in price between your aluminum and your copper conductor products, speaking generally?

A. The difference in price is in the footage that the customer uses. There is a price differential in the footage.

Q. What is the difference generally?

A. The difference is in favor of the aluminum because you can get more feet of aluminum cable in a given quality for a dollar than you can get of copper.

Q. Are the prices of aluminum conductor products——

[fol. 100] The Court: Let me interrupt. I don't know as I understand. You say the difference is in the footage. That means in one measured foot?

The Witness: The price for one foot of aluminum conductor is less than the price for one foot of copper because of the weight difference, Judge.

The Court: I see.

The Witness: The weight difference of the metals themselves.

Q. Are the prices of aluminum conductor products related to the prices of copper conductor products which you sell?

A. I see no relationship.

Q. Have they ever been related?

A. In my opinion they were related when aluminum began to penetrate the market 10 or 11 years ago. They priced the aluminum product quite close to the copper product which it was replacing in my business and so sold it for some time. But as increased quantities came along, the prices became out of phase, so to speak.

Q. What kind of buyer purchases your products, Mr. Detwiler?

A. The bulk of my products are sold to the public utility purchasing agent.

[fol. 101] Q. You stated the price of aluminum per foot is less than the price for copper. You still do, however, manufacture copper. Why in general do your customers buy copper instead of aluminum?

Mr. Bergson: I object to that, Your Honor.

The Court: Well, of course, it's pretty speculative in the form it is. Why doesn't somebody else do something, which requires this man to pry into the mind of somebody else? I wonder if you can't get it some other way. I think you have told the different uses of aluminum as compared with copper, which I suppose is the difference which prompts the buyer to buy for the particular use he has in mind. I don't think it's very harmful but I think we have got it anyway. Just let me see if I can clear that up a little bit. Your copper production has a certain purpose, doesn't it?

The Witness: In general both are used for the transmission of energy, if that's what you mean. Both products are.

The Court: The question he asked was, why would anybody buy copper products, which, of course, requires you to delve into somebody else's mind.

[fol. 102] The Witness: Perhaps my answer might clear it up for you. I would say I sell what the customer asks for and that is an engineering decision which I have no part in.

The Court: I guess that answers that.

Q. An engineering decision on the part of the customer.

A. Yes. I sell anything he wants, if I can make it.

Q. Well, as a seller of this product, Mr. Detwiller, do you know, generally speaking, the uses that your customers make of aluminum as opposed to the uses they make of copper?

A. I'm not sure I understand that question. The uses. I only make electrical transmission cable or energy transmission wires and cables.

Q. Let me try it again. As a seller, you are, of course, interested in the type of products your customers buy. And as far as you are concerned and as you have testified it is an engineering decision on the part of the customer as to which product he will buy. Am I correctly stating your testimony, sir?

A. That's the way I understand the purchasing of my product. What the engineer says he wants.

Q. What factors to your knowledge as a seller would cause a utility to buy a more expensive copper conductor

product in preference to a less expensive aluminum conductor Product?

[fol. 103] Mr. Bergson: That's limited to your knowledge, Mr. Detwiller.

The Witness: Yes, I understand.

Q. Yes, it is so limited.

A. In speaking to customers who use copper I find that an industrial atmosphere, a sea coast atmosphere where there is a salt problem in the air sometimes either one of those conditions causes a man to specify copper instead of aluminum at a given place.

Q. What would be the reason for that, sir?

Mr. Bergson: Highly speculative, Your Honor. The last answer was based on hearsay. I think it is going a little far afield. I don't like to object.

The Court: I think that's true, but I think he has substantially gotten the answer. He says his experience or his knowledge. Those concerns that our purchasers located near the sea coast or some particular area, I suppose it may be attacked by salt deposits in the air—it's his experience that they use copper there. I think you got it.

Q. All right, Mr. Detwiller, as a manufacturer of wire and cable, what is the principal area within which you can make a profit?

[fol. 104] A. You mean where do I live in the business?

Q. Yes, sir.

A. In the spread between the rod price I pay and the wire and cable I fabricate and sell.

Q. Does the spread between the price of aluminum rod and the price of aluminum cable vary from time to time?

A. Yes.

Q. And what is the effect on your company when it narrows?

A. I don't make as much money making the product as I did before.

Q. Is this general situation also true in the case of copper?

A. Yes.

Q. Mr. Detwiller, what group of producers are your principal suppliers of aluminum?

A. We buy from the major primary producers over the course of the years. We have from Kaiser Aluminum, Reynolds, ALCOA.

Q. These producers are producers of the primary metal as well as rod?

A. Yes.

Q. Are these producers also among your competitors, sir?

A. Yes, they are.

Q. What group of producers are your principal copper suppliers?

[fol. 105] A. We buy from Phelps-Dodge, Kennecott; in the past have purchased from Anaconda. Much the same caliber people.

Q. Is this group of producers also among your competitors in the sale of copper wire products?

A. They are.

Q. Mr. Detwiler, I am going to hand you a document which has been marked as Government Exhibit 422 for identification and I will ask you what this is, sir.

A. This is a letter from my Vice-President, Mr. Melvin C. Harris dated January 26, 1955 to Mr. Alfred R. Gneiser, Aluminum Company of America, York, Pennsylvania.

Q. Do you recognize this signature on this letter, sir?

A. I do.

Q. Whose signature is it?

A. Melvin C. Harris.

Q. And on January 26, 1955 was Melvin C. Harris, Vice-President of the Central Cable Corporation?

A. He was.

Q. And were you at that time President, sir?

A. I was.

Mr. Mahaffie: I will offer Government Exhibit 422 in evidence as Government Exhibit 422.

Mr. Bergson: I have no objection to the admission of the document in evidence as proof of fact that the docu-
[fol. 106] ment was sent, but I question the admissibility of the document as far as the truth of the statements contained therein. That is hearsay.

The Court: Well, I think that's true. The document I suppose refers to some facts, or alleged facts. There

is no dispute it was sent, but how far it proves the facts there is something else again.

Mr. Mahaffie: May I question the witness on that.

The Court: Yes.

Q. Have you read that letter?

A. Yes, I have read the letter.

Q. Are the statements contained therein true?

A. The first paragraph certainly is. The second paragraph certainly is. The last paragraph, the last sentence of that paragraph, the second paragraph says, "We were told". So that probably is hearsay, isn't it, in evidence? We were told, however, by the fellow we wrote the letter to.

Q. Well, sir, is it true that it would be a true statement you were told?

Mr. Bergson: Do you know that you were told?

[fol. 107] The Witness: My own knowledge, no, sir.

Q. Well, have you any reason to believe Mr. Harris would misrepresent this fact in your letter?

Mr. Bergson: I don't think that has any relevancy.

The Court: Nobody would intentionally——

Mr. Mahaffie: I am going to offer this as a piece of business correspondence from the Central Cable Corporation, Your Honor.

The Court: I know you are, but here is something this witness—somebody else writes that he was told something. I suppose the time, the place, who told him, does that appear in the letter?

Mr. Mahaffie: No, sir. As a matter of fact——

The Court: As a matter of fact, in order to prove a fact of that kind you have to give the time, the place, the circumstances, and who was present.

Mr. Mahaffie: I am really not interested in proving what they were told in the second paragraph. I am not going to offer it for that purpose. I will offer it without the second paragraph, if that will meet with your objection.

[fol. 108] Mr. Bergson: That does not meet with my objection.

The Court: Is the last paragraph correct to your knowledge?

Mr. Mahaffie: What about the third paragraph, sir?

The Witness: There are in this five paragraphs.

Mr. Mahaffie: What about the third one?

The Witness: The third paragraph, sir?

Mr. Mahaffie: Yes, sir.

Mr. Bergson: That is not the one we are talking about.

The Witness: It was in the second one "We were told", Mr. Bergson. Should I read the third paragraph?

Mr. Mahaffie: Yes, sir, if you have not already.

The Witness: Out loud?

Mr. Bergson: No. Read it to yourself.

The Witness: I thought you were waiting for me to read something. The conversations referred to in the third paragraph in my opinion took place in my office without my being present.

[fol. 109] Mr. Bergson: I object to it, Your Honor.

The Court: So that you don't know the facts of those conversations if those facts are recited or conclusions drawn in that letter.

The Witness: That's correct.

The Court: I am very fearful that that doesn't prove a fact. While it is not in evidence they can't stop me from looking at it. (Reading) I am not very excited about it as proof of any fact.

Mr. Mahaffie: Well, I want to make an offer of this document.

The Court: I will receive it as a piece of correspondence passing between the parties.

Mr. Mahaffie: All right, sir.

Q. Now Mr. Detwiler, would you read the text of this letter dated January 26th out loud, sir?

Mr. Bergson: Oh, I——

The Court: Not necessary, is it? I took a quick glance at it especially the last end of it.

Mr. Mahaffie: All right, sir, I withdraw that.

Q. Mr. Detwiler, what is the nature of the request, if any, made in this letter?

[fol. 110] Mr. Bergson: Objection.

The Court: Overruled; I will receive it. Did you request something or did Mr. Harris request something in that letter?

The Witness: He is stating a position our company found ourselves in with regard to the commercial terms of the day, Judge.

Q. What was that position?

A. Well,——

Q. I would like you to state the position, sir, that the letter relates to.

A. It relates to the selling price of rods and the selling price of the wire and cable made from said rods and aluminum.

Q. What is the position of the company in relation to the selling prices?

A. The price of the rod was increased as stated in the first paragraph and coincidental with that increase of the rod price, which was public knowledge, the Aluminum Company of America published certain price sheets covering the sale of the conductor, and we pointed out to them in this letter to ALCOA that they were not selling the conductor at these new prices, that they were selling it at reduced prices. And we were saying that if they did that they should reduce the price of the rod.

Q. And that in effect was the nature of the request?

[fol. 111] A. Yes.

Q. All right, sir. I now offer a document which has been marked as Government Exhibit No. 423.

The Court: Just a moment, counsel. Let me get that straightened out because I don't know how far this sort of condition arises, but let me see if I can understand you gentlemen's position. Of course, if you change what you might say is your wholesale price the margin of profit is reduced, and that's exactly what I get from this witness's statement. That happens in the milk industry, it happens in the gasoline industry. Where there is a spread between the producer or the manufacturer and the sale price, that spread is not constant in many lines of commerce. Isn't that right?

Mr. Mahaffie: That is correct, sir.

The Court: Well, all right, what inference do I draw or what importance do I attach to the fact that the spread as between the primary or ingot aluminum and the finished

product varies from time to time? What inference do I draw?

Mr. Mahaffie: The importance of it here, Your Honor, [fol. 112] and the thing which this document demonstrates is that the same company is at both ends; namely ALCOA. ALCOA establishes the price for the rod, that is the raw material, and the price for the cable, which is the finished product.

The Court: Same thing in the gasoline outside the place, don't you think?

Mr. Mahaffie: I'm not up on the——

The Court: Well, I am not either.

Mr. Mahaffie: I am sure that is true.

The Court: I assume there are producers, refiners and also distributors. I don't want to get into an argument with you gentlemen, but I just thought this would be a good time to bring this out.

Mr. Mahaffie: Well, what we are trying to show here is that the independent non-integrated producer of these products is by the very nature of the industry operating in an area both ends of which are controlled by the primary producer, both as to suppliers and competitors. This very simply is all we are trying to show.

The Court: Isn't that a common thing in American business?

[fol. 113] Mr. Mahaffie: In some businesses, it is. Yes, Your Honor.

The Court: I think so. What do I draw from all that?

Mr. Bergson: I would just like to state for the record, Your Honor, I take issue with the statement that we control price at both ends of the——

The Court: I assume that's true.

Mr. Bergson: Both or either end.

The Court: All right. I think I get it. Actually I suspected something like this was coming and I don't see very much to it. The answer is "so what?"

Mr. Mahaffie: I think there is a good deal to it, Your Honor. This is an area of the case which we will develop.

The Court: Okay.

Mr. Mahaffie: And what we are trying to do here with this witness is merely to show the very basic economic business facts which——

The Court: There is no question about the basic economic fact, of course, that there is a spread between the producer and the ultimate consumer in a great many lines of commerce. I think the only point we've got is that [fol. 114] ALCOA controls it. If ALCOA doesn't control it how is it of any importance?

Mr. Mahaffie: Well, if it's controlled not just by ALCOA but by a very few producers similarly situated to ALCOA, we think it's important. If the number of sources of supply at the top of the spread is changed or is altered in some way we think that's important. Similarly if a number of people competing at the end of the spread is changed we think that's important. And all of these facts are things which we will bring out and show are relevant in this case.

The Court: All right.

Mr. Mahaffie: May I proceed, sir?

The Court: Yes.

Mr. Mahaffie: I offer at this time a document which has been marked Government Exhibit 423 for identification and ask that this document be admitted in evidence as Government Exhibit 423.

Mr. Bergson: No objection.

The Court: Received. I will let you identify it. What is it, a letter?

[fol. 115] Mr. Mahaffie: It's a letter from the Assistant District Sales Manager of ALCOA, Mr. Fisher, in response to Mr. Harris' letter which has gone in as Government Exhibit 422.

The Court: All right. Received.

(Government Exhibit No. 423 received in evidence.)

Q. Now Mr. Detwiler, have you read that letter, sir?

A. Yes, I have.

Q. What is the general nature of the response contained therein?

Mr. Bergson: Your Honor, I think the letter speaks for itself.

The Court: Yes, I will let you call his attention to any particular part of the letter if you want to.

Mr. Mahaffie: Surely.

The Court Indicating what you want brought out.

A. He says they couldn't do what we asked them.

Q. That's what I wanted to bring out, Your Honor. I don't think it's objectionable. Mr. Detwiler, has Central Cable Corporation at any time subsequent to 1955 made any request of the Aluminum Company similar to that contained in the letter we have just been discussing?

A. We have requested prices for aluminum products [fol. 116] from them on similar terms.

Q. Have you done this from time to time?

A. To my knowledge at least once. I can't say more than once.

Q. And did these attempts meet with any results different from that shown by this exchange of letters?

A. I was able several weeks ago to make a contract with this company on terms which I considered satisfactory. But for a new product.

Q. For aluminum have you had any greater success?

A. On rods, no.

Q. Mr. Detwiler, does the Central Cable Corporation have any plans to expand its operations further into the field of metal fabrication?

A. Yes, we do.

Q. What do you plan to do generally, sir?

A. We plan to integrate backwards, as I call it, produce our own rod.

Q. Why do you plan to do that, sir?

A. Because that increases the spread in which I live. I can buy raw materials for that at a lower price and, therefore, increase my own spread.

Mr. Mahaffie: No further questions, Your Honor.

The Court: Cross examination.

[fol. 117] Cross-examination.

By Mr. Bergson:

Q. Mr. Detwiller, you testified that you have been in the wire and cable business since 1939, I believe that is correct.

A. I have been associated with my company. I was in the Army a few years in the meantime.

Q. Yes, I understand. When you first became asso-

ciated with the company, what type of products was it making?

A. It made copper distribution cables, sir, and some copper transmission cables in small quantities, but no aluminum.

Q. No aluminum at that time?

A. No, sir.

Q. And when did your company go into the fabrication of products with aluminum as a conductor?

A. As soon as the first customer asked us, about 1950, somewhere in that year.

Q. When you did that did you have any plant expansion program, any machinery expansion program?

A. You mean at the same time?

Q. At the time you got this first order for aluminum.

A. No.

Q. How did you fulfill that order?

A. I took as described the copper machine and cleaned it [fol. 118] up and started getting some help from my suppliers and made aluminum on the machinery I already had in use.

Q. Was that much of a problem?

A. As I look back on it, it was, but it turned out as we did it more often, it was rather routine over three or four years.

Q. And during that three or four years you made both copper and aluminum products on the same machinery?

A. Yes.

Q. Drawing, stranding, insulating?

A. Right.

Q. What you did when you got an order for aluminum you cleaned the machines up, changed the dip on your drawing machines, and drew aluminum on the same machine. Did you need any different personnel to do this?

A. No.

Q. Any different salesmen to sell the product?

A. We were selling to the same purchasing agent. Also they were the same men.

Q. So that at the time that you went into the business of manufacturing aluminum transmission cables and conductors with aluminum as a conductor, you used the same

machinery and the same personnel with which to do it and you did that for two or three years?

A. Somewhere between two and four years I would judge.

[fol. 119] By Mr. Bergson:

Q. Now, was it because of increased volume in the aluminum business which justified the additional machinery that led you to put in equipment that you used primarily and even solely for aluminum?

A. It was.

Q. And had it not been for that increased volume you would have continued to operate on the same machines. Now, this is true as to drawing, this is true as to stranding, as I understand it?

A. That is correct.

Q. I noticed in his direct examination Mr. Mahaffie failed to ask you or didn't ask you whether you used the same machines for insulating copper or aluminum?

A. Identical.

Q. Now, is there any change that has to be made in these machines to insulate copper or aluminum?

A. No.

Q. Is there a contamination problem or dip problem?

A. No, because the wire is made then when it goes in there.

Q. So there is absolutely nothing that has to be done?

A. Nothing.

Q. When you insulate, you use the insulating facilities. Now, let me ask you this. On occasion today when you [fol. 120] have an extremely large order, do you convert one type of machinery to the other type of machinery, the machinery used for copper to aluminum or vice versa?

A. It happens at times we do, because we have sleet storms and emergencies and then we are converting to whatever we need to make the order.

Q. So it will be safe to say that except for the change of the lubricants and the cleaning out of the machinery, which you did regularly for two to four years, and which you do now occasionally as the demand requires it, that same machinery can be used for drawing, stranding and insulating copper and aluminum?

A. Yes.

Q. You also testified that you had two plants, one I think you said was in Illinois and in Georgia, I think you said, it was in Georgia.

A. I have three. One in Pennsylvania where I am.

Q. I beg your pardon. I didn't hear that. When was your Georgia plant built?

A. It was started in March, 1961 and completed for operation in November.

Q. Since this acquisition?

A. What date are you talking about?

Q. I am talking about April 1, 1959.

[fol. 121] A. Definitely since that date.

Q. And what do you plan to use, what are you using that plant for?

A. That is designed for the manufacture of high quality transmission cable in aluminum only.

Q. Can it be used for copper?

A. Yes.

Q. And did you build that plant because of your growing needs for capacity?

A. No, turn it around, Mr. Bergson. I built it because of the industry's growing need for product, which I surveyed, and then I decided we had to have it.

Q. And you built it because you expected to participate in that increase in the industry's need for the product?

A. Fully expected.

Q. Now, I think you mentioned that you are now buying aluminum pig because you are integrating as you said further backward?

A. I have not bought it yet, Mr. Bergson.

Q. You have placed an order for it?

A. I am negotiating and have placed some orders for it.

Q. I take it, then, you have acquired or are in the process of acquiring a mill that will roll aluminum rod.

[fol. 122] A. Yes, sir.

Q. Where will that mill be located?

A. Jersey Shore, Pa.

Q. That is where you are?

A. Yes, sir.

Q. And will that mill roll both copper and aluminum products?

A. Yes.

Q. How much of an increase in your capacity was effectuated by building of your Georgia plant?

A. About double my capacity in Aluminum, total capacity of the other two plants had doubled.

Q. So that this plant is equal to the capacity in the other two plants?

A. Correct. But for a different product. I am talking now on the capacity tonnagewise.

Q. I understand. I think you said also that certain percentage of your volume was in copper and certain percentage today in the aluminum. I think we should make one thing crystal clear now, if we can, and that is that are the copper, the products using copper and the products using aluminum used for the same purpose by the producers?

A. To transmit electrical energy.

The Court: The answer is yes.

Q. And you said the ratio that you have in bare, I [fol. 123] think you said the copper was about three and a half times footwise than aluminum?

A. No, the other way, Mr. Bergson.

Q. I beg your pardon. Aluminum was 3½ times footwise. Now, what would be the ratio valuewise, in dollars valuewise?

A. We sell more dollars worth of aluminum conductor than copper conductor.

Q. But would the ratio be as great as you have indicated in dollars?

A. No, I would be less.

Q. But the ratio would be closer to two to one?

A. Closer to two to one in dollars, yes, sir.

Q. And in line wire and service drop, would the same hypothesis hold true?

A. Yes, the ratios would be the same because the reduction would be the same, because the price per foot is lower than for the aluminum.

Q. But from the standpoint of your dollar value, the difference between copper and aluminum would not be as great if you used dollars than it would be if you used feet; is that right?

A. That is right.

[fol. 124] Q. Now, when you sell your electrical conductor, how do you ordinarily sell it, in terms of delivery? Do you sell it ordinarily on price at the time of delivery or do you sell it on a firm price, ordinarily?

A. The bulk of our business is sold on prices in effect at the time we deliver it.

Q. The price in effect at the time you deliver it?

A. Yes.

Q. Which is the same pricing formula that is used when you purchased rod, price in effect at the time it was delivered to you?

A. That is correct.

Q. There have been occasions, I take it, however, when you have sold at a firm price?

A. Yes, we have had to.

Q. What has occasioned you to do that?

A. A competitor offering firm price.

Q. Or a customer demanding a firm price?

A. The purchasing agent has something to do with the series of negotiations.

Q. Do you know what ALCOA general policy is on the sale of aluminum conductor deliverywise?

A. I have read printed policy on their price sheet.

[fol. 125] Q. That price sheet is price at term of delivery?

A. Price at time of delivery. That is what the price sheet I read said.

Q. Let me ask you this, Mr. Detwiler? This merger took place on April 1, 1959. Has your business in the sale of aluminum conductor, and limiting this to the sale of aluminum conductor increased or decreased since that time?

A. Our sale of aluminum has increased.

Q. Has it increased from year to year?

A. That would be '60 and '61.

Q. Right.

A. Yes, sir.

Q. And '61 is better than '60?

A. In volume of sales, yes, sir.

Q. Yes. Prior to the acquisition of Rome Cable did you find in the market place that Rome was an aggressive price competitor in these products, the insulated products with aluminum?

Mr. Mahaffie: That is objected to, your Honor, as beyond the scope of direct examination.

The Court: Overruled.

The Witness: May I have the question again, Mr. Bergson?

[fol. 126] (The Court Reporter repeated the question as above recorded.)

A. I didn't hear much about, I think, before then, because they didn't make very much of that for their own account. I don't believe so. I don't have any information about them being aggressive or non-aggressive.

Q. You didn't even encounter them?

A. I very seldom ran into Rome before that on these products we are speaking of.

Q. In the light of that would you say that this acquisition by ALCOA of Rome has hurt you in your business?

A. It hasn't hurt me.

Q. The Government, I don't know whether you heard the Government's opening statement here yesterday but they alluded to the rash of mergers in the electrical conductor industry. If you will recall Olin Mathison acquired Southern Electric Company, Did that merger hurt you?

A. No, sir.

Q. You will recall that Kaiser acquired U.S. Rubber Company. Did that merger hurt you?

A. No, sir.

Mr. Melchior: Your Honor, I think I am going to have to interpose an objection here to this line of questioning. In the first place, the criteria determining legality [fol. 127] under Section VII has to do with the probable effect upon competition.

And as we indicated in our arguments yesterday no showing of actual effect is necessary.

The Court: That is true, Counsel, but where there has been an opportunity for actual effect wouldn't that be helpful to me in determining the probability. Suppose the shoe is on the other foot and here were companies that were hurt badly by the Olin Mathison and this other corporation, do you mean to say that you can't prove that?

Mr. Melchior: I believe we could, your Honor, because I think in that case the witnesses could demonstrate how they had been injured. I don't think the basis has been laid here for showing that this witness has not been injured.

The Court: He can't demonstrate in any case. He said he hasn't had one. No, overruled.

By Mr. Bergson:

Q. Let me ask you one final question, has the totality of these three mergers that I have just alluded to hurt you in your business?

[fol. 128] A. No, sir.

The Court: Gentlemen, I think we will recess until two o'clock. I don't know how it is going to work out with you. We will try it. I think if you people go upstreet why, it will take you about an hour and a quarter.

Mr. Mahaffie: If the Court please, I have about three questions on redirect and then Mr. Detwiler could be excused.

The Court: All right.

Mr. Mahaffie: If you don't mind, sir.

Redirect examination.

By Mr. Mahaffie:

Q. Mr. Detwiler, as a practical matter, is the same machinery used today in your plant for drawing aluminum and copper?

A. On occasion but not regularly.

Q. The rolling mill which you stated you are putting in, sir, will the same machinery be used in that rolling mill to roll aluminum and copper?

A. That is a complex technical question, because I would have to describe to the Judge how we do it. And we have [fol. 129] a little bit of an edge in this mill, Judge, that I don't like to expose here.

The Court: I will talk to you about that privately.

The Witness: Yes.

Q. All right, I will rephrase it. In rolling mills in operation today is the same machinery used to roll aluminum and copper?

A. Not that I know of, sir.

Q. Does the Aluminum Company of America to your knowledge sell its electrical conductor products at the prices and terms and conditions of sale shown on its price-lists?

A. I have no way of telling that.

Q. To your knowledge, have they ever departed from those prices and terms and conditions of sale?

A. I have seen published bills from TVA and the Bureau of Reclamation in past years where I was able to see that they sold to those government agencies at a price below the sheet that I had in my hand at the time. But I have no knowledge of that myself.

Mr. Mahaffie: That is all, sir.

The Court: Anything else?

Mr. Bergson: No.

(Witness excused.)

The Court: Recess until two o'clock.

(Whereupon, a recess was taken until two o'clock p. m. of the same day.)

[fol. 130] AFTERNOON SESSION

APPEARANCES: Same as Morning.

Mr. Bergson: Your Honor, Mr. Melchior and I conferred as you requested this noon and we will take care of the cost by splitting it between us.

The Court: Alright now, suppose the government wins. Is it taxable? You couldn't get any cost against the government.

Mr. Bergson: No, sir.

The Court: The tax, as a part of the taxable cost?

Mr. Bergson: I'm not at all sure it would be.

The Court: Neither am I.

Mr. Bergson: I don't think that's in the bill of cost.

The Court: That's the part I wanted to settle.

Mr. Bergson: I think they should pay a little bit from their fund.

The Court: Of course, you have the question of whether [fol. 131] or not it's taxable. That's what I wanted to avoid having come up six months or a year later because I have had the same thing happen in another trial. Why don't you people——

Mr. Melchior: We will confer a little bit longer, your Honor, and advise you.

The Court: If you could settle whether or not the part paid would be an item of taxable cost.

Mr. Melchior: Yes, we will determine that.

The Court: All right. I guess we are ready, Mr. Melchior.

Mr, Melchior: The government is ready. Yes, sir. We call Mr. David Dale Martin. May it please the Court, Dr. Martin is an expert witness for the government in the field of statistical analysis and we will use Dr. Martin to present to the Court some statistical tabulations which have been made available to the defendant some time ago, in most cases. One or two we have served upon them recently in accordance with the pre-trial order. It may be a little cumbersome in handling these and we have thought at length how we can best handle them. There are about twenty-eight or thirty different tabulations, and we have [fol. 132] formed them in one ledger. If there is no objection from the defendant what we would like to do is to make available to the Court a complete set and as we offer them in evidence and as they are admitted in evidence the Court then could follow the witness's explanation. Rather than offer the whole thing as one group and try and meet objections to various ones, we will introduce them in numerical order. They have been numbered.

Mr. Bergson: I have no objection to that procedure, your Honor, provided it is understood that I am reserving my objections to the individual charts as they go in.

The Court: Yes.

Mr. Melchior: I don't think counsel understands exactly what I intend to do. The first offer will be of GX1-7 for identification. We will offer those because if I understand counsel the objection to those would be a common objection. The same objection to all of them. All relating to the same general objection. We will offer the first seven, listen to

counsel's objections, and if and when they are admitted [fol. 133] then it would be our purpose to have the witness explain them to the Court, then we would go to the next one or two or the next series.

The Court: Well, I guess it's all right. Suppose we start off and if we get hopelessly lost, we'll start over.

Mr. Melchior: I beg your pardon. I didn't hear you.

The Court: We will start off the way you indicated. We can change our method of doing this.

Mr. Melchior: May I ask that my reference to GX number be stricken. I erroneously used the number GX 1: Actually these tabulations had pre-trial numbers beginning with number one, but we had in the last recess marked them with GX numbers for identification.

Direct examination.

By Mr. Melchior:

Q. Would you state your name and occupation?

A. David Dale Martjn; Business Economist.

Q. Are you employed?

A. I am Associate Professor of Business Economics and Public Policy in the Graduate School of Business at Indiana University, and I am employed on a part-time basis as a consultant to the Anti-Trust Division United [fol. 134] States Department of Justice.

Q. How long have you served as Associate Professor at Indiana University?

A. About three and a half years.

Q. Where were you employed before that?

A. For the preceding six years I was first an instructor in Economics and then Assistant Professor of Economics at Washington University in Saint Louis, Missouri.

Q. What is your educational background?

A. I received an AB degree in Economics and an MA degree in Economics and Statistics from the University of Texas and a Ph.D. degree in Economics from the University of California at Los Angeles.

Q. As Assistant Professor in Business Economics at Indiana University do you have occasion to teach courses in statistical analysis?

A. Yes. I teach post-graduate students in the School of Business entitled "Methods of Business Research."

Q. Professor Martin, when you are responding to the questions, if you will enunciate clearly and perhaps address the Court——

The Court: A little louder.

Q. In connection with your consulting employment with [fol. 135] the Anti-Trust Division of the Department of Justice, have you been familiar in any way with the Rome-Alcoa merger?

A. Yes. I have prepared or personally supervised the preparation of a number of statistical tabulations relating to various product categories with which the merging companies were concerned, in connection with the case.

Q. Now in connection with your work in this proceeding have you prepared any tabulations relating to shipments of aluminum conductor wire and cable?

A. Yes, I have.

Q. Did you identify them?

A. Governments Exhibit For Identification Number 434 entitled "Shipments of aluminum conductor wire and cable, 1955-1959."

(Government's Exhibit for Identification No. 435 entitled "Shipments of ACSR and Aluminum Cable Bare 1955-1959.")

(Government Exhibit No. 436 for Identification entitled "Shipments of Aluminum Wire and Cable Insulated or Covered 1955-1959.")

Government Exhibit No. 437 for Identification entitled "Explanation of Estimates of Shipments of Kaiser Aluminum and Chemical Corporation.")

[fol. 136] (Government Exhibit No. 438 for Identification entitled "Concentration of Shipments of Aluminum Conductor Wire and Cable accounted for by integrated producers 1955-1959.")

(Government's Exhibit No. 439 for Identification entitled "Concentration of Shipments of ACSR and Aluminum Cable Bare accounted for by integrated producers 1955-1959.")

(Government's Exhibit No. 440 for Identification numbered "Concentration of Aluminum Wire and Cable Insulated or Covered accounted for by integrated producers 1955-1959.")

Mr. Melchior: The Government offers into evidence in this proceeding the Government's Exhibit 434 for Identification up to and including Government Exhibit 440 for identification.

Mr. Bergson: Your Honor, the defendants object to Government Exhibit 434. They do not object to Government Exhibit 435. We object to 436. And I will state my reasons in a moment. We do not object to 437. We object to 438, 439 and 440.

Our objection to 434 is based on the ground that the tabulation is irrelevant because it refers to Aluminum Wire and Cable which we say is an irrelevant line of commerce. [fol. 137] Our objection to 436 is based on the same grounds. It covers insulated and covered aluminum wire and cable and we say that is objectionable because it is irrelevant, because there is no such line of commerce.

438 is objectionable on two grounds that it relates to an irrelevant line of commerce and two because it testifies and talks about concentration.

We object to 439 solely upon the conclusionary testimony about concentration among the integrated producers.

We objection to 440 on the grounds of irrelevancy and of the conclusionary statement in the title.

The Court: Those objections, not all of them I guess, go to the dispute between the government as to whether or not these particular items to which the Exhibits refer are proper lines of commerce.

Mr. Bergson: Right.

The Court: The additional objection made as to several of them is that they are conclusory rather than statistical facts. Well, of course, I don't see I can—I am cer- [fol. 138] tainly not prepared to say at this time whether or not these different lines of commerce are in fact proper lines of commerce. It seems to me what I'd have to do would be to receive them and possibly subject to a motion to strike, and I think as far as these conclusory statements in them I can handle that when I come to use them. I'll receive the Exhibits.

Mr. Melchior: Dr. Martin would you make available a copy, in accordance with our earlier instructions? Now, your Honor, this is the complete set, and I guess as they are admitted you will want to refer to them because Dr. Martin will comment on them and what they purport to show.

The Court: All right.

Direct examination.

By Mr. Melchior:

Q. Now, Dr. Martin, directing your attention to GX 434 which is the first tabulation I believe would you state to the Court, Dr Martin, what this tabulation purports to show?

A. Yes. This tabulation sets forth statistical information on shipments of Aluminum Conductor Wire [fol. 139] and Cable. Aluminum Conductor Wire and Cable is defined in the footnote to the title specifically to include the sum of shipments of Aluminum Conductor Steel Reinforced and Aluminum Conductor Bare and shipments of Aluminum Conductor Wire and Cable Insulated or Covered. The information in the table comes from several sources. The first line labeled "Total Industry Shipment" gives the total reported to the Business And Defense Services Administration Of The Department Of Commerce, published by that agency, and in addition further down the table we have the comparable figures from individual companies that reported to the Business And Defense Services Administration. The Aluminum Company's figures and the Rome Cable Company's figures were obtained from the answers to interrogatories. The other firms were asked in letters from the Department of Justice to give information about what they had reported to the Business And Defense Services Administration or BDSA as I have noted here—and on the basis of the letters from those companies to the Department of Justice I have compiled individual company shipments. Now for each of the years 1955-1959 we have set forth both the submission [fol. 140] and the percentage figure which shows the particular companies' shipments as a percentage of the industry total as reported to BDSA. The firms included in

the list, in addition to Alcoa and Rome Cable Corporation, are all of the firms that reported to BDSA except three firms that shipped very small amounts, less than one-tenth of one percent total, and one firm that did not supply information to the Department of Justice. These firms are given in footnotes in detail. The table I think is quite complete. There are a few firms that did not report their shipments to BDSA, but we had letters from some firms giving us information though they had not reported to BDSA. They are included in the footnotes and the total of footnote two explains that the total of these shipments would amount to a very small amount compared with the ones listed. I think I have the significant information on the face of the table and all other information I have available included in the footnotes. I might say that some figures for the Kaiser Aluminum company were not from the same sources as others. They were estimated on the basis explained in the footnote and explained in detail in other tabulations.

The Court: Shouldn't we have, to start with, your defi- [fol. 141] nition, the witness's definition, of "Aluminum Wire and Cable"? Shouldn't he define that so that we know in particular what we are talking about or is it capable of any more definite definition other than the terms themselves?

By Mr. Melchior:

Q. Dr. Martin, the phrase "Aluminum Conductor Wire and Cable" which you have used in this tabulation, was drawn from what source?

A. This phrase I have defined in footnote one as the sum of two sub-categories—Aluminum wire insulated or covered and ACSR which means Aluminum Cable Steel Reinforced and other aluminum cable, bare—These are categories—bare aluminum conductor cable, and insulated or covered aluminum conductor cable that are used by the Bureau of the Census in the Business and Defense Services Administration on the forms that they collect the information on.

Mr. Melchior: Your Honor, the following two tabulations will be tabulations of on the one hand the insulated and

covered aluminum, and on the other hand bare aluminum cable and ACSR and this first tabulation is a joinder of the two and as the witness stated these are the terminology [fol. 142] used by the Government in collecting this information, so it is not——

The Court: I overlooked that note which is the answer to my question.

Mr. Melchior: All right.

By Mr. Melchior:

Q. All right, Dr. Martin, now I direct your attention to GX 435, and ask you what this tabulation purports to show?

A. This tabulation is set up in essentially the same fashion as the first one. The primary difference being that it shows shipments of aluminum cable steel reinforced and aluminum cable bare rather than the total of that shown in the other tabulation. It covers the same years. It does not have precisely the same firms listed because there were some firms who were reporting shipment of other categories that this one. This was a similar list. The firms given here are firms who reported shipments of ACSR and aluminum cable, bare.

Q. In other words, Dr. Martin, this is the one side of the coin, which is the bare, and the next tabulation GX 436, to which I now direct your attention, is the reverse side of the coin which relates to aluminum wire and cable insulated and covered?

A. Yes.

[fol. 143] Q. And the totals of GX 435 and GX 436 are combined in the first tabulation you discussed, GX 434: is that correct?

A. That is correct. The second two tabulations are a break-down of the first one into two sub-categories.

Q. I think perhaps, Dr. Martin, you might explain to the Court that reference to his earlier question as to what do these terms mean. That in those cases where those companies did not report to BDSA and from whom we got the statistical information directly reported that information to us in what manner? Was what they are reporting to us consistent with the BDSA inquiry?

A. Yes. They were asked in the letter of inquiry to them,

to give us the same information that we asked from others, and also to tell us whether or not they have reported.

Mr. Melchior: I might also point out, your Honor, that all the statistical raw data upon which these tabulations were based was submitted to the defendant some months ago, and there was no objection rendered with respect thereto.

Q. Dr. Martin, I now direct your attention to government Exhibit No. 437 and ask you to state what that purports to show?

[fol. 144] A. This is an explaination of the way in which I estimated the shipments for the Kaiser Company that went into the three previous tabulations.

Q. Dr. Martin, oh, would you identify that company by its full name?

A. The Kaiser Aluminum and Chemical Corporation. Kaiser Aluminum and Chemical Corporation was sent the same letters as the other companies but they did not give the information that was asked for but gave some other information that was not in my opinion comparable with what we had on these companies. I had, however, from the Business and Defense Service Administration publications giving for these years the shipments reported to them of the groups of companies including Kaiser. I had the information on the individual companies in the group for all of these years with the one exception of Kaiser. So I took that total from the BDSA publication subtracting from it the individual companies included in the group other than Kaiser and the difference is used as Kaiser's figures.

Q. And you are in a position to compute Kaiser's figure based on the fact that you had substantially all of the industry members' figures; is that correct?

A. I was able to compute it because I had from BDSA [fol. 145] for example, in 1955 a figure that was published as the combined total for Aluminum Company of America, Reynolds Metal Company and Kaiser. I had figures from Reynolds and Aluminum Company of America. I added these together, subtracted them from this total, to get the Kaiser figure. For each of the years I had similar infor-

mation, in some cases three companies, some cases four or five.

Q. Dr. Martin, I now direct your attention to government Exhibits 438, 439 and 440. Would you state what these tabulations purport to show?

Mr. Melchior: This again, your Honor, are three related tabulations.

A. No. 438 corresponds with the first tabulation we talked about, No. 434. That is this is concerned with shipments of aluminum conductor wire and cable including both bare and insulated. The information on the table is identical with the information on the first table except that it has been arranged for convenience of the user of the information to show certain aspects of the figures on the first table. Specifically the companies listed on the first table have been broken down into integrated and non-integrated companies and the sub-titles are listed here in No. 438. The right-hand column shows a percentage break-[fol. 146] down. The middle column shows the shipments in thousands of pounds. And then in addition I have listed for each of the years the companies that are included as integrated and the individual shipments of those companies taken from the first table; the same source. The companies in the integrated group are not the same for the years 1955-59 because of changes in the industry.

Q. Would you explain the relationship between the government Exhibit 438, 439 and 440.

A. Yes. 439 I have done the same except the shipment figures are limited to shipments of ACSR and Aluminum Cable Bare. And in 440 the shipments are of aluminum wire and cable insulated or covered.

Q. Are these the same two general categories we discussed in connection with the first three tabulations?

A. Exactly the same.

Q. In other words we are now showing by these the bare total and the insulated and covered total and the two are added together and they form the first of these three series; is that correct?

A. Yes.

The Court: Dr. what do you mean on 439 and I guess on 440, "Concentration of shipments of ACSR and Alu-

minum Cable Bare." What do you mean by that "concentration of shipments."

[fol. 147] A. Well, what I meant by the term was when this table was labeled I put together what had been the break-down on a company basis showing the percentage of all the shipments in the hands of the group of companies. The group being the integrated group and the other——

The Court: What it really means is that it shows the shipments made by the integrated companies and non-integrated companies.

The Witness: Yes.

The Court: All right.

By Mr. Melchior:

Q. Dr. Martin, in connection with your work on this proceeding have you prepared a tabulation relating to the relative position of Rome Cable among the non-integrated producers of aluminum conductor wire and cable?

A. Yes.

Q. Would you identify it?

A. Government Exhibit No. 441 for Identification entitled "Position of Rome Among the Non-integrated Producers of Aluminum Conductor Wire and Cable 1955-1958."

Q. And Dr. Martin, I would like to caution you again that you enunciate loudly and clearly so that the reporter can get this in the record.

[fol. 148] Mr. Melchior: The government offers Government's Exhibit 441 for Identification into Evidence.

[fol. 149] Mr. Bergson: Defendant objects, your Honor, for the reason stated before, that aluminum is not a relevant line of commerce and on the ground that the chart is immaterial because it doesn't make any difference in the overall aspect what Rome's position was even if Aluminum were a line of commerce, what its position was among the non-integrated. This dichotomy that the Government has made is an artificial dichotomy and Rome's position among the independents in our opinion is completely immaterial.

The Court: Overruled. I don't understand it, therefore I will overrule it.

By Mr. Melchior:

Q. Dr. Martin, directing your attention to Government Exhibit 441, would you explain to the Court what this purports to show?

A. Yes, I have taken again information from the first tabulation, the one that gave the basic information on shipments by company, and on this table I have simply set it forth in a little different form. There is no information on this table that is not on the other tables or cannot be obtained from the other tables. I have compared the ship-
[fol. 150] ments in each of the years from 1955 to 1958 of Rome Cable Corporation with the total shipments of the non-integrated firms for each of these years. I have done it all on one tabulation this time rather than on three for aluminum conductor wire and cable for ACSR and for aluminum cable bare and aluminum wire and cable insulated or covered.

Q. In other words, on this tabulation you have included the two groups and the group combining them all in one tabulation?

A. Yes, sir.

Q. And these product lines are the identical product lines referred to in the earlier tabulations, is that correct?

A. That's correct.

Q. Now, Dr. Martin, in connection with your work in this proceeding——

The Court: Let me interrupt.

Mr. Melchior: Yes, sir.

The Court: On II on this Exhibit 441 you put ACSR and aluminum cable bare.

The Witness: Yes.

The Court: On the next one I notice its aluminum wire and cable covered. You leave the ACSR off the third table, don't you?

[fol. 151] The Witness: Yes, your Honor.

The Court: All right. Why do you do that? If the second table is a proper comparison with ACSR and bare aluminum cable?

Why should it properly be included also in the table where the wire and cable is insulated or covered? Maybe there is no point to this.

The Witness: I think, Your Honor, if I understand the question, it's a matter of terminology. I use the terminology of the Business and Defense Services Administration.

Category No. 2 on this Government 441 ACSR and aluminum cable, bare, means aluminum cable and aluminum cable steel reinforced, also bare.

The Court: It means aluminum covered steel reinforced?

The Witness: No, sir, aluminum cable steel reinforced covered or insulated would be in the other category. All cable with aluminum conductor that is insulated or covered is in the third category even though ACSR does not appear in the name of that category.

The Court: I see. So that ACSR is actually included in Table 3.

[fol. 152] The Witness: If it's insulated or covered it would be in table 3. If it's bare it would be in table 2.

The Court: Yes, so that really the only difficulty, I guess, that I have is your not putting ACSR in Table 3, that is, putting it down on paper as in Table 3. Actually it is in Table 3. Am I right?

The Witness: Yes, your Honor. I am not an expert on the technical aspects of wire and cable field, but the criterion that is used in dividing is whether it is covered insulated or covered on the one hand or bare on the other. The distinguishing characteristic of No. 3 is that it includes all wire and cable that has aluminum conductor, and also is insulated or covered.

The Court: Doctor, maybe I didn't make myself clear. You turn to Table 2, it says ACSR and aluminum cable. That indicates to me you are joining two things together and that they are two separate things. I don't know whether I am right or not. Now, down at Table 3 you don't use ACSR at all. What you simply say is aluminum wire and cable which I suppose means the same as [fol. 153] aluminum cable insulated. All I am trying to find out is do you use this ACSR as a part of your third table? Your second table seems to add two things together. How many things are added to go into your third table?

By Mr. Melchior:

Q. Now, let me ask you this. If ACSR is insulated or covered, where would it be included in your tabulation?

A. In No. 3.

Q. It would be in No. 3. If ACSR is not insulated where would it be included?

A. No. 2.

Mr. Melchior: Does that answer your question, Your Honor?

The Court: Yes, only it plainly appears to be in 2 and is not mentioned in 3.

Mr. Melchior: I think this is historical because the agency collected under these titles and rather than confuse the issue we use the same category. But this is a simple division between insulated and covered on the one hand and bare on the other hand.

By Mr. Melchior:

Q. Dr. Martin, in connection with your work on this [fol. 154] proceeding have you prepared a tabulation relating to companies who have been engaged in the production of aluminum conductor wire and cable as evidenced by a B.D.S.A. directory or series of directories?

A. Yes, I have.

Q. Would you identify it?

A. Government Exhibit No. 442 for identification entitled "Companies listed as producing aluminum conductor wire and cable in the United States Department of Commerce B.D.S.A. directory of aluminum suppliers," dated April 1, 1961, but not listed in the directory for June 30, 1955.

Mr. Melchior: The Government offers Government Exhibit 442 for identification into evidence at this time.

Mr. Bergson: I object, Your Honor, on the same grounds. In addition, I object on the ground that the chart is misleading because it does not give any indication how many companies are engaged in the wire cable, so called aluminum wire cable business. I have no doubt as to the accuracy of the chart as it is portrayed here, but I think it is completely misleading.

The Court: Well, it doesn't mislead me, because I don't [fol. 155] quite understand what we are getting at. All it is is some names that were in the directory in 1961 that weren't there in 1955. Now, what is its purpose? Maybe we could find out in that way. In the directory in 1961 but not in 1955.

Mr. Melchior: I may make a few remarks there. The reason we prepared this chart was in an attempt to keep the record down. We have in mind showing the lack of significant entry of companies into the field of aluminum conductor wire and cable between the years 1955 and 1961. Now, there are published by B.D.S.A. each year a directory listing all the companies in the industry that purport to manufacture this product. Now, we could have done this by copying off the directories and putting them into evidence. In order to save the size of the record, we computed this chart, or tabulation, which purports to show the names of the companies that were in in 1961 but not in in 1955, and, as you can see, the tabulation is annotated to show who these companies are and if they are actually new companies or otherwise.

[fol. 156] The Court: Now, we see.

By Mr. Melchior:

Q. Dr. Martin, directing your attention to GX-442, would you state what this purports to show.

A. This shows the names and the number, by counting it up, of the companies that were listed in the 1961 directory that were not in the 1955 directory. The three companies whose names were listed in the more recent directory but not in the earlier directory identified in the footnote, and it gives a little additional information about them that was implicit in our other tables, on the fact—I have noted earlier in another table that Olin Mathison Chemical acquired the Southern Electrical Corporation. I point out here that Southern Electrical Corporation had been listed in the earlier directory, and the name that appears in the recent one is Olin Mathison. The Circle Wire and Cable Corporation was listed in the 1961 directory but not in the 1955, but my information that I also have in the first table showed that they were producing the product. One of those few companies that were pro-

ducing a product in 1955 and had not reported to the BDSA, and I noted that fact in the footnote.

Q. Dr. Martin, in connection with your work in this [fol. 157] proceeding have you had occasion to prepare a tabulation relating to shipments of aluminum weatherproof and service drop wire and cable?

A. Yes, sir, I have.

Q. Would you identify it?

A. Government Exhibit 443 entitled "Shipments of Aluminum Weatherproof and Service Drop Wire and Cable compared with total shipments of aluminum wire and cable insulated or covered by six companies, 1959."

Mr. Melchior: The Government offer Government Exhibit 443 in evidence at this time.

Mr. Bergson: Defendant objects, your Honor, on the ground of relevancy previously adverted to and, on the ground that the chart is incomplete and misleading. They have taken apparently six companies and used the figures for those six companies. There are 20 million pounds of insulated wire and cable unaccounted for in the chart and consequently we think that the chart has no material value whatsoever.

The Court: Well, again, gentlemen, I am not too certain until I get into this case farther than I am, as to whether or not it is relevant or—I notice, Mr. Martin, at the [fol. 158] top, am I right that you are comparing the shipments of weatherproof and service drop wire cable compared with the shipments of aluminum wire and cable? You seem to leave out the word "weatherproof" this time. Insulated or covered. They mean the same thing when you are referring to weatherproof? You mean insulated or covered?

[fol. 159] The Witness: Weather proof and service drop are both insulated aluminum wire and cable. Some of the wire and cable in this category, shipments of aluminum wire and cable insulated or covered are called, some of these types of wire are called by these two names, service drop and weather proof. Weatherproof and service drop are part of a larger category. I have given the larger category and this component of it.

The Court: Well now, I notice your first column is titled "Insulated or Covered." And the next column is weather

proof and service. So there must be a difference between the two terms, or is there? I don't know.

The Witness: Yes, Your Honor, there is a difference between the two terms. The difference is total insulated or covered include in addition to weather proof and service drop some other types of insulated wire and cable.

The Court: All right. I will receive it. Just a minute.

Mr. Bergson: Your Honor, I would like to point out——

The Court: All right. Go ahead.

[fol. 160] Mr. Bergson: Even their own line of commerce is aluminum insulated wire and cable, and now they are trying to bring something out of their own line of commerce. In addition to the inaccuracies I can't see the relevancy or the materiality of this chart.

Mr. Melchior: May it please the Court, maybe I can clear this up.

The Court: Yes.

Mr. Melchior: This chart or tabulation is not being offered by the Government to prove a line of commerce at all. This chart is being offered to show that the overwhelming preponderance of all the insulated and covered aluminum wire and cable is used for overhead purposes. We would expect to show by testimony that weather proof and service drop are overhead types of wire and cable. They are not used underground. They are used overhead.

And they are set forth in the first column the total figure of all insulated and covered aluminum wire. The second column purports to show what portion of the total insulated and covered field, weather proof and service [fol. 161] drop appear.

Now when you work out the ratio for each of the companies listed you will find that the percentages set forth in the third column showed that part which is of all other insulated and covered shipments actually are made up of weather proof and service drop.

Mr. Bergson: I submit, Your Honor, that even there they have not accounted for one-third of the total insulated or covered aluminum pounds that are reported to B.D.S.A., which is their source of a material. And if you will notice, Your Honor, this figure for General Cable Corporation has no effect on any of this. They list 45,902 feet richer

they footnote, but in pounds that represents about 6,000 pounds. The 6,000 pounds when added up against—it is six million pounds, and the total you add up to is forty million pounds. But the total reported to B.D.S.A. is sixty million pounds. Therefore, this chart is inaccurate.

Q. Dr. Martin, if you have the figure I will inform the Court as to what the share of the total of this is represented on this page. Explain this to the Court.

[fol. 162] A. Yes. Footnote 1 states that these six companies ship 73½ percent of all of the shipments of insulated and covered——

Mr. Bergson: Where is that? It is not on any chart that we have.

Mr. Melchior: Do you have Government's Exhibit 443, counsel?

Mr. Bergson: We have the one that you gave us. It doesn't say that.

Mr. Melchior: Don't you have footnote 1 on it?

(Mr. Bergson: Reads.)

The Court: They apparently added a new footnote.

Mr. Melchior: This chart was revised. Has counsel been supplied with the revision?

Mr. Bergson: I have not seen it, Your Honor.

Mr. Melchior: I will withdraw it at this time Your Honor and make sure counsel have a right one.

The Court: Well before we leave it, let me just ask you another question. These figures now, as I understand it, don't purport to represent the total shipments of aluminum wire and cable but only 73 percent?

The Witness: Yes, Your Honor.

[fol. 163] Mr. Melchior: That is correct.

The Court: All right. In order to show the true picture why shouldn't you show the 100 percent?

The Witness: The footnote goes on to say that these six are the only companies for which the Department of Justice had data on weather proof and service drop shipments that were comparable to the data on insulating shipments generally. We used all the information we had. We don't pick and choose amongst them. I would have included more firms if I had information but I couldn't obtain it.

Mr. Melchior: You see, Your Honor, one of the problems we have faced in this proceeding is that we are not always able to gather the statistics either by public or private sources as we would like. It has therefore been found necessary not only in this case but in other Section VII proceedings to get the statistics that are readily available in order to indicate what the direction of the problem is. Now we feel that companies producing 73 percent of the total would be sufficient to indicate the general usage of this type of cable. We don't claim that it is 100 percent statistically accurate but we think it is sufficient for the purpose.

[fol. 164] And for this reason and only for the reason of showing that the overwhelmingly and predominant use of insulated cover wire and cable is for overhead purposes.

The Court: All right. I will receive it over your objection.

(Government's Exhibit No. 443 for Identification received in evidence.)

By Mr. Melchior:

Q. Dr. Martin, in connection with your work on these proceedings have you had occasion to prepare a tabulation relating to sales by domestic primary aluminum producers of e.c. electrical conduit pig and ingot?

A. Yes, I have.

Q. Would you identify it?

A. Government's Exhibit No. 444 for Identification, entitled "Sales by domestic primary aluminum producers of e.c. aluminum pig and ingot and e.c. aluminum rod and bar to non-integrated producers of aluminum conduit wire and cable, and to other firms, 1956 through 1959."

Mr. Melchior: The government offers Government's Exhibit 444 for Identification into evidence at this time.

Mr. Bergson: Your Honor, the defendants object to Government Exhibit 444 for Identification for a variety of [fol. 165] reasons. One, we object on the ground of relevancy because we do not believe that there is an e.c. aluminum pig or ingot market.

Further than that, we object that the chart is misleading and incomplete because it fails to show sales of e.c.

aluminum pig by foreign producers and by non-integrated domestic users. There are companies in the field, in the United States which are not integrated, which sell e.c. aluminum re-draw rods. They are not included in the chart. The Aluminum Ltd. of Canada supplies tremendous amounts of pig and ingot to the United States, a considerable portion of which could be designated e.c. aluminum pig.

It is our position that what is sold by the particular producers is a grade of pig and that there can be no distinct market for e.c. aluminum pig and that any chart relating to e.c. aluminum pig is immaterial, irrelevant and misleading.

The Court: Perhaps the witness ought to explain before I try to guess at this anything more about this chart that he wants to. If Mr. Bergson's statements are right, wouldn't this exhibit be somewhat misleading? For in- [fol. 166] stance, the Canadian concern sells to non-integrated producers in the United States. Wouldn't a more accurate table be prepared containing reference thereto?

Now he also states that the integrated or the non-integrated producers do sell some ingot or some pig.

Mr. Bergson: Rod.

The Court: Rod. Why shouldn't that be included here?

Mr. Bergson: Yes.

Mr. Melchior: May it please the Court, may I make a few remarks there?

The Court: Yes.

Mr. Melchior: In the first place, Your Honor, we expect to show by other testimony in this case that e.c. aluminum pig and e.c. ingot are a special type of ingot, utilized for the purposing of making conduit wire and cable. Ordinary aluminum pig and ingot and alloy pig and ingot of most varieties are not suitable for this purpose.

We feel that e.c. pig and ingot, which is a term generally recognized and understood in the trade is the basic raw material used for making electrical conduit wire and cable of the aluminum variety which we think is the very heart [fol. 167] of this case.

Now we have attempted to show here what there is available by way of e.c. pig and ingot to domestic non-integrated producers who must purchase these supplies on the open

market, and we feel that it is extremely desirable that this supply be available to them from domestic sources. I don't think competition in an American industry should have to depend upon foreign markets for its continuing competitive life. Now it is true there are makers of Canadian aluminum; there are makers of foreign aluminum. We think we can demonstrate by figures the approximate share of the market this is. And we can demonstrate that within certain bounds. The figures are not complete.

But I can't urge too strongly that small American business should not be called upon to depend on foreign markets for their continuing life. This is the reason we didn't put them in but we can show this collaterally.

The Court: Well the first part of that is probably all right, but this does not represent the exact situation, does it?

[fol. 168] Mr. Melchior: Are you directing your remarks to that made available by domestic producers?

The Court: Yes.

By Mr. Melchior:

Q. Dr. Martin, I will ask you this question. Do you have any information which will indicate how much rod may be available to the non-integrated wire and cable purchaser from domestic source or do you have information as to how many such companies there are in this category who supply e.c. aluminum rod but are not primary producers?

A. No, I don't think I have.

Q. Let me ask you this question, Dr. Martin. How many domestic primary producers of e.c. ingot are there in this country?

A. Six.

Q. There are six. Now do these six producers of ingot also supply rod?

A. Yes.

Q. Now are there companies who purchase the ingot—strike that. Are there domestic companies who purchase aluminum ingot and convert it into rod, aluminum rod, for sale to aluminum wire and cable companies? Now by this question I am referring, I mean companies who are not primary ingot producers themselves?

A. I have no information on this in my tabulations. I

[fol. 169] have in my recollection of the sources with which I work, I found only very slight reference to such sales. But I believe Rome Cable Corporation sold a very small amount of e.c. re-draw rod in some years. I have some information on that in another tabulation showing Rome's purchases and sales and manufacture of e.c. rod. The table here shows I think what the total says it shows. I know of no information that would be relevant to what I say in the total I am demonstrating here that hasn't been included.

The Court: But it does not show, does it, the total e.c. aluminum ingot purchased from any source or all sources by non-integrated producers?

The Witness: No, Your Honor, it doesn't. I have another tabulation that will be presented later.

The Court: That may help.

The Witness: That gives that information for one year from government publication by B.D.S.A.

Mr. Melchior: I think, Your Honor, this is another one of those tabulations in that same category where except for these data there are just no collected published information. The only way of ever making some of these tabulations 100 percent complete would be to subpoena every company in the industry, which I hardly believe [fol. 170] would be required in a Section VII case.

Mr. Bergson: Oh I think though you ought to have an accurate chart and I think we are as aware, or you are as aware as I am that there are other companies who are non-integrated who produce and sell rod in the United States, and that you are as aware as I am that Canada and foreign sources sell e.c. grade pig in the United States. And to present a chart of this kind I think is misleading.

Mr. Melchior: We are aware that there are foreign markets. We will show by testimony that there perhaps are one or two other companies that do sell that. We do not think that that reflects on the accuracy of this chart. This chart may not be 100 percent complete but it can't be made on the basis of statistics 100 percent complete. But it is offered as material to what it is trying to prove. And insofar as the figures represent it is accurate.

Mr. Bergson: We have never questioned the accuracy of the figures represented on the chart. We told you that.

We don't question the figures represented on the chart, but we do say that the chart as a whole presents a mis-
[fol. 171] leading picture and should not be admitted in evidence.

Mr. Melchior: Then I think counsel can demonstrate by testimony or evidence as to the weight, but I don't think that relates to the question of admissibility.

The Court: I will receive it with the limitation that I think goes with it. I will receive it.

(Government's Exhibit No. 444 for Identification received into evidence.)

By Mr. Melchior:

Q. Dr. Martin in connection with your work on this proceeding have you prepared a tabulation relating to purchases of aluminum pig and ingot by Rome Cable Corporation compared with total sales e.c. aluminum pig and so forth?

A. Yes, I have.

Q. Would you identify it?

A. Government's Exhibit No. 447 for Identification, entitled "Purchases of aluminum pig and ingot by Rome Cable Corporation compared with total sales of e.c. aluminum pig, ingot, bar and rod by domestic primary aluminum producers of non-integrated producers of alumi-
[fol. 172] num conductor wire and cable and with total receipts of aluminum pig, ingot, bar and rod by non-integrated producers of wire and cable, 1958."

Mr. Melchior: Your Honor, I might point out that I am taking this out of order because of it's close relationship to the preceding tabulation.

The Government at this time offers GX-447 into evidence.

The Court: Just a minute perhaps, off the record.

(Discussion was held off the record which the Reporter was asked not to take.)

[fol. 173] Mr. Melchior: This is out of order.

The Court: All right, 447. All right, Mr. Melchior.

Mr. Bergson: I object on the ground of relevancy.

Mr. Melchior: If I may interpose, Mr. Bergson, at this

time you didn't object to it. This is one you didn't object to.

Mr. Bergson: This is one that was handed to us last night.

Mr. Melchior: My notes indicate there was no objection.

Mr. Bergson: We didn't even talk to you about it.

Mr. Melchior: Perhaps I should explain counsel's remarks, you Honor. In an effort to try to stipulate as many of these facts as we could when we submitted these tabulations to counsel, they made objection and in every case possible we tried to correct and change these tabulations. This accounts for counsel getting it at a late date, and we apologize.

The Court: But apparently he has a right to object.

[fol. 174] Mr. Bergson: I got this about 9:30 or 10 o'clock last night.

Mr. Melchior: We regret that.

Mr. Bergson: I object on the ground of relevancy as expressed in relation to the previous exhibit, namely, that there is no E.C. pig ingot and rod market and that is not a relevant market, and I also invite your Honor's attention to the difference between B and C, and I think this helps to illuminate Chart 444, was it? The one we were just talking about because we have in B total sales to E.C. aluminum pig ingot by domestic primary producers to non-integrated of 33 million pounds, and we have total receipt of 69 million pounds. I think that that illustrates the deficiencies in this previous chart.

By Mr. Melchior:

Q. Dr. Martin, can you explain the difference between the figures which counsel has just mentioned, the 33,000 figure and the 69,000 figure?

A. Yes, sir.

Q. I might ask you to express the total import of the chart at the same time, if you will.

A. This is the Chart I referred to in answer to the [fol. 175] question when we were discussing the last one. This is all the information I have on the import question. Part of this difference is undoubtedly accounted for by the imports. I have no figures on the imports. This is one explanation and one reason for putting this chart in at a late date as far as I was concerned was to get this informa-

tion in so that as much as possible was put in. There is a difference, however, between the two, that is accounted for by the definition. The sales of E.C. aluminum pig by domestic primary aluminum producers are sales to non-integrated producers of conductor wire cable, whereas receipts by non-integrated wire producers are receipts by non-integrated conductor and also non-conductor wire and cable producers. The receipts are from the Business and Defense Services Administration publication listed in the source which lumped together conductor and non-conductor aluminum wire receipts.

Q. And what, Dr. Martin, was your purpose in listing both of these figures and showing percentages relating to both of these figures? Was it not through a hyper abundance of caution, to make sure the benefit of the doubt was given to the Defendant by showing the largest figure you [fol. 176] could find and the smallest and setting forth a ratio in order to show Rome's position? Is that your purpose?

A. Yes.

Q. In other words, Rome's position was either four and five-tenths per cent or nine and five-tenths per cent depending on which universe you use.

Mr. Bergson: This is another case of mixing apples and oranges and I think it supports my argument there is no E.C. aluminum pig ingot market. I feel sorry for Dr. Martin, he had to throw this chart together, but after all, this is a lawsuit and the chart should have been prepared properly and it shouldn't be admitted in evidence just because he had to put it together in a hurry. If it is inaccurate, if it's unreliable, it should——

Mr. Melchior: Counsel, I thought counsel said they didn't challenge the accuracy of the other figure.

Mr. Bergson: We didn't challenge the accuracy of the figures stated therein.

The Court: The figures are not all in.

Mr. Melchior: We admit they are not all in, Your Honor, but we submit they are not necessary.

[fol. 177] The Court: Gentlemen, I am a little bit lost but I am hopelessly lost on this exhibit. I don't know what it

means. Can you tell me in simple English what it means, what this chart purports to show?

The Witness: I think, sir, that it purports to show the magnitude of Rome's purchases of aluminum pig and ingot compared with information available and total purchases by Rome, as well as on other non-integrated conductor wire and cable firms of this raw material. It indicates, I think, the relative size of Rome as a producer of——

The Court: Suppose, for instance, Rome bought 50 per cent of their aluminum pig ingot from Canada.

The Witness: This would be included in Rome's figures. This is a figure that gives the total purchases of aluminum pig and ingot by Rome from whomever they bought it.

The Court: Yes. What you are comparing it with doesn't include Canadian ingots, how could you get an accurate . . . ?

The Witness: I think that the middle figure clearly ob- [fol. 178] viously does not include Canadian ingot but a later figure, I think does include Canadian ingot.

Mr. Melchior: If I suggest what we have in mind, it may clarify it. We urge as you recall in our opening remarks that Rome Cable Corporation was a substantial independent corporation in the field of wire and cable, and that its elimination was in violation of Section VII. We are trying to show by another manner the importance of Rome on a domestic field. We are trying to show what Rome's position was among the other non-integrated aluminum wire and cable corporations. Trying to show how significant they were not only in the copper field, which we will show later but in the aluminum field. You recall our remarks indicate Rome had just moved into the aluminum field as an embryo. These figures purport to show how much aluminum pig and ingot and rod of an E.C. grade which is the line of commerce we urge the raw materials line of commerce that Rome bought and compare Rome's purchases with purchases of the other non-integrated, and we think this chart demonstrates that if we use all the receipts [fol. 179] of the non-integrated companies, if we used the smallest universe, Rome would have had 10 per cent of that market. If we used the largest universe which includes imports as well as a large portion of non-conductor wire, which is not even relevant—we have leaned over so

far backwards we have included in our universe non-conductor wire—Rome's position would still represent four and five-tenths per cent?

The simple purpose of this tabulation is to show that Rome was an important non-integrated producer of aluminum wire and copper, a field which the defendants have urged Rome played no part in at all. We submit that four and five-tenths or nine and five-tenths is certainly more than minimal and that is all this chart is to show. We are not trying to prove lines of commerce by this at all.

Mr. Bergson: I hate to prolong this. You will note that in A reference is to Rome's total purchases of aluminum pig and ingot without reference to E.C.

The Court: We do an awful talking about E.C. but when you get down here——

[fol. 180] Mr. Bergson: Secondly, in their next chart, Your Honor, they cite Rome's purchases of pig and ingot and in the year 1958 Rome bought 563,000 pounds of pig and ingot from Aluminum, the Canadian Company. $142,000 worth in the following chart. Now, I don't think its proper for the Government in trying to put a point across to take a bunch of unrelated figures and try to draw a conclusion from them. And I submit, your Honor, this chart—I don't want to go back over all old ground, but I think the chart that was previously admitted should not have been admitted in this case. Irrespective of the lines of commerce.

By Mr. Melchior:

Q. Directing your attention to counsel's comment that there is a distinction between the title and the line A, the title indicates purchases of aluminum pig and ingot by Rome Cable Corporation compared with total sales of E.C. aluminum. We drop down to A and show total purchases of aluminum pig and ingot. Now, Dr. Martin, is that statement in A correct? Is it properly stated? Were these all their purchases or just their E.C. purchases or is there some other explanation?

[fol. 181] A. I used the figures from the Defendant's answer to Plaintiff's pre-complaint letter dated August 18th. I used the label that corresponded to the way in which the figures were reported by the company. I did that consistently throughout. I didn't tamper with label. If the

letter of the interrogatory answers gave some figures under the label, that is the label I used.

Q. Now, in other words, the 3,000 figure that you had there was given to you by the Defendant, is that correct?

A. Yes.

Q. Now, in connection with your study of this proceeding have you become generally familiar with the products that were manufactured by Rome Cable Corporation prior to the merger?

A. Yes.

Q. Do you know of any product that Rome Cable manufacture that would have utilized aluminum pig and ingot of an E.C. grade for other than aluminum wire and cable?

Mr. Bergson: I object, Your Honor. I think this is beyond the witness' competence.

The Court: Yes, I think so. You probably can prove that directly. Let's pass on. I'm inclined to take it [fol. 182] and tell you at the time that I don't think——

Mr. Melchior: We can connect it up, Your Honor.

The Court: Right up to date I don't understand it. I can do nothing with it.

Mr. Melchior: We hope by subsequent testimony we can clarify the position of this among the others, Your Honor.

The Court: Well, all right.

Q. Dr. Martin, in connection with your work in this proceeding have you had occasion to prepare tabulations relating to purchases of aluminum pig and ingot by Rome, total production, use, purchases and sale of aluminum E.C. redraw rod total production sales of E.C. redraw rod, value of shipments of conductor wire and cable, value of shipments of insulated wire and cable and value of conductor wire and cable bare? Have you had occasion during your work to prepare tabulations on those subjects?

A. Yes. I have.

Q. Your Honor, this will be another group coming in at one time. Would you identify them individually.

A. Government Exhibit No. 445 for identification, entitled "Purchases of aluminum pig and ingot by Rome, 1953, to March 31, 1959. Government 446 for identifica- [fol. 183] tion, entitled "Value of purchases of aluminum pig and ingot by Rome," 1953 to March 31, 1959. Govern-

ment Exhibit No. 448 for identification entitled "Total production, use, purchases, and sales of aluminum E.C. redraw rod by Rome Cable Corporation, 1953 to June 30, 1959." Government Exhibit No. 449 for identification, entitled "Total production and sales of aluminum E.C. redraw rod by ALCOA, 1953 to June 30, 1959." Government Exhibit No. 450 for identification, entitled "Value of shipments of conductor wire and cable, 1958."

Government Exhibit No. 451 for identification, entitled "Value of shipments of wire and cable insulated and covered, 1958." Government Exhibit No. 452 for identification, entitled "Value of shipments of conductor wire and cable bare, 1958."

The Court: Is that the end of the list?

Mr. Melchior: Yes.

The Court: We will take a short recess before you start.

(At 3:45 p. m. a short recess was taken, after which, the hearing was resumed.)

[fol. 184] Mr. Melchior: May I proceed, Your Honor?

The Court: Yes.

Mr. Melchior: At this time the Government offers Government's Exhibit 448 to 452 inclusive for identification into evidence.

The Court: How about 445 and 446?

Mr. Melchior: I will read the numbers, Your Honor. Oh yes. 445, 446, 448, 449, 450, 451 and 452. I offer them in evidence at this time.

The Court: Now why can't we get some kind of a description of them?

Mr. Bergson: I have no objection, Your Honor.

The Court: All right. I will receive them.

(Government's Exhibits 445, 446, 448, 449, 450, 451 and 452 for identification received into evidence.)

Mr. Melchior: I was going to have Dr. Martin give a brief explanation of them.

The Court: All right.

By Mr. Melchior:

Q. Dr. Martin would you discuss each one of these tabulations individually and point out any salient facts concerning them?

A. Yes. Beginning with No. 445. This is a tabulation [fols. 185-186] of some information all of which comes from the plaintiffs' answers, or the defendants' answers to plaintiff's inquiry. It shows the total amount of pig and ingot purchased by Rome from '53 on to the point of the acquisition, the first quarter of '59.

It breaks down these purchases according to the company from which they are purchased and you will notice includes the purchases from Aluminum Ltd. It is complete with respect to everything that they purchased categorized as pig and ingot.

The sub-total adds together that which was purchased from firms other than Alcoa. Then the figures of purchase from Alcoa are given and then the total purchased. The numbers here mean thousand of pounds.

The following tabulation, No. 446, is identical except that the numbers are in thousands of dollars of value of the purchases rather than the physical quantity.

No, skipping over to 448, which is the next one in this group, No. 448 again is taken completely from defendants' answers to plaintiff's inquiry and it shows production of e.c. re-draw rod by Rome Cable Corporation. It also shows the amount of e.c. re-draw rod purchased by Rome broken down again on the basis of the companies from which it was purchased.

[fol. 187] The purchases are added together giving the total purchases from all companies of e.c. re-draw rods.

Then the last line, skipping over to the next to the last one, gives sales of re-draw rod by Rome, And derived from the production along with the purchases and sales we are left with the amount of the re-draw used by Rome in the manufacture of wire and cable.

The calculation of this was done in the answers to the plaintiff's letter. I simply took the information and set it forth out of it.

The Court: Witness, does this mean that in 1958, see if I am interpreting it right, and the first two quarters of 1959 that Rome didn't purchase any re-draw rod?

The Witness: Yes, Your Honor. They purchased none and they sold a little bit. And from the production you get the amount that was left. All purchases are shown here.

The Court: Does this mean that for instance they didn't purchase anything from Alcoa since 1954?

The Witness: Yes, Your Honor.

The Court: All right. Purchase any rod.

The Witness: Re-draw rod.

A. (Continuing) The following tabulation, No. 449, is [fol. 188] concerned with the production and sales of aluminum e.c. re-draw rod by Alcoa covering the period for which I had information in that regard, in the answers to plaintiff's letter. The first line gives total aluminum e.c. re-draw rod manufactured. Included in this during the first four years was some rod manufactured on a toll basis. This is listed separately and subtracted from the first line to give the amount of rod manufactured for themselves or to sell.

The Court: What does "toll basis" mean?

The Witness: This is my understanding, Your Honor, that this means that some other firm paid Alcoa a fee to process aluminum that they supplied to Alcoa.

The Court: I see.

A. (Continuing) The last line here shows the amount of rod sold by Alcoa to other companies.

No. 450 shows the value of shipments of conductor wire and cable in 1958. Now this is a new term that is appearing on this table for the first time as we have gone through. Conductor wire and cable as it was used includes both insulated and bare and both copper and aluminum. This table gives the total shipments during this year 1958 taken from the census, Bureau of Census publication, the 1958 census of manufacturers. And comparable figures from Aluminum Company of America and Rome Cable Corpora- [fol. 189] tion and the Rea Magnet Wire Company. These are set forth in detail to show the three added together. And each of these is taken as a percentage of the industry total and put in the next column.

The following two tabulations give the breakdown of this category, conductor wire and cable into insulated or

covered and bare. Insulated or covered wire and cable, both copper and aluminum shipments, are shown in 451 and in 452, the same information for copper and aluminum conductor wire and cable bare.

I believe that is the last one of the group.

[fol. 189a] Mr. Melchior: Very well.

Q. Dr. Martin, have you discussed 451 and 452?

The Court: Yes.

The Witness: Yes.

Mr. Melchior: You have. Fine. If the Court please, I am not going to introduce at this time the next two. I would like to introduce as a group the following.

Q. Dr. Martin, in connection with your work on this proceeding have you had occasion to prepare tabulations relating to the value of shipments of conduit, sales of steel and aluminum conduit, value of shipments of aluminum conduit, and similar tabulations?

A. Yes, I have.

Q. Would you identify them?

A. Government No. 455 for identification entitled "Value of shipments of conduit in the United States 1960." Government No. 456 for identification entitled "Sales of Steel and Aluminum Conduit, rigid and E.M.T., in the United States by ALCOA, Rome in the industry 1960." Government Exhibit No. 457 entitled "Sales of steel and aluminum conduit, rigid and E.M.T., in the United States by ALCOA, Rome and the industry 1960." Government Exhibit 458 for identification entitled "Value of shipment of aluminum conduit 1960." Government Exhibit No. 459 [fol. 190] for identification entitled "Sales of aluminum conduit, rigid and E.M.T. in the United States by ALCOA, Rome and the industry second half of 1960." Government Exhibit No. 460 for identification entitled "Sales of aluminum conduit, rigid and E.M.T., in the United States by ALCOA, Rome and the industry, second half of 1960 and first half 1959." Government Exhibit No. 461 for identification entitled "Sales of steel conduit, rigid and E.M.T., in the United States by Rome Cable Corporation and the industry 1958 and first half 1959."

Mr. Melchior: The Government at this time offers——

Mr. Bergson: May I interrupt here please, Mr. Melchior?

Mr. Melchior: Yes.

Mr. Bergson: Your Honor, our charts are a little bit jumbled on this because of the substitution of charts and I would appreciate it very much, Mr. Melchior, if instead of offering them as a group, you would offer them one by one.

Mr. Melchior: I will offer them one by one. Be happy to.

Mr. Bergson: Permit me to state my objection at this time rather than waiting.

[fol. 191] Mr. Melchior: The Government at this time offers Government Exhibit for Identification No. 455.

Mr. Bergson: Your Honor, the Defendant objects to Government Exhibit 455 on the ground that in our view the universe figure as taken from the census is inaccurate and misstates the total value of business done in the United States in these E.M.T. and aluminum conduit, Understates them. Unfortunately we are not prepared and will not be prepared in our case to show the exact amount, but we will show that they are understated.

The Court: Well, I will receive it, giving it what weight I think it is entitled to when we get down to it.

Q. Dr. Martin, will you explain the import of Government Exhibit 455?

A. Yes. This table shows shipments of conduit in the United States in 1960 in dollar value terms; thousands of dollars. This set of figures comes from the United States Census of Manufacturers. The defendants supplied plaintiff with information on the same definition for ALCOA and Rome. That information is set forth—shipments by ALCOA and Rome compared in percentage terms with [fol. 192] the total shipment of conduit in the United States as reported by the census. The figure for conduit that I have used in the census is defined precisely in the Footnote No. 1 as being a combination of four census categories—rigid conduit, steel and other electrical metallic tubing, steel and other.

Aluminum, included in the other along with any other metallic conduit that might be, so we don't have any further breakdown on that. The figure on that is written in, I might say, on the chart by hand. It is a revision of the census figure we received just yesterday in a letter from

the census, giving us the latest revised figure that is being published in the final bound copy.

Q. Would you explain to the Court the import of the letter we received from the census. What was the occasion for our receiving that letter from the Bureau of Census?

A. We received information from the defendant that they might object to the accuracy of the census universe figure, so we called the people in the Census Bureau and wrote a letter to the people in the Census Bureau, asking them to give us any information that might have been de-
[fol. 193] veloped since the publication from which I took it out of the current latest figures we have. In other words, for our census universe figures for the whole United States sales of conduit. The very latest, best information that the Bureau of the Census was able to supply.

Q. Has a copy of that letter been made available to Defendants, to your knowledge?

A. Yes, it has.

Mr. Melchior: The Government at this time offers Government Exhibit for Identification No. 456.

Mr. Bergson: Defendants object to Government Exhibit 456 on the ground that the industry total reported by NEMA is on its face less than complete and does not show the proper universe. The source bulletin from which this was taken shows the number of companies reporting and the number of companies reporting were far less than the number of companies making the product. It is our view that the industry total as represented to NEMA is a correct statement of what was reported to NEMA. It is completely meaningless so far as this case is concerned be-
[fol. 194] cause there was an awful lot not reported. This is indicated by the fact that the NEMA total is nine million dollars less than the census figure, and we think the census figure is understated.

Q. Dr. Martin, would you state for the Court the purpose of this tabulation?

A. This tabulation was made in an attempt to get all the possible information on the subject after I was informed that the Defendants were questioning the validity of the census universe. I obtained the publication of the National

Electrical Manufacturers Association, and found that they had some information on conduit sales in the United States and I tabulated them in a way comparable with the previous tabulation that gives the same thing with the census as the source. This gives as the total sales for the whole country the amount recorded by the NEMA, instead of the census. The figures are somewhat different, but very close.

Q. Dr. Martin, do you know of any other national collection agency of statistics that collects statistics on conduit aluminum or steel?

A. I know of no other that collects information on sales or shipments of conduit. I have a tabulation later that [fol. 195] hasn't been—that's in this group—but hasn't been brought up, that deals with shipments of aluminum for and in use in conduit production.

Q. This is not conduit, however. The only two collection agencies you know of are the two you have utilized—the United States Department of Commerce, Bureau of Census, and the NEMA, otherwise known as the National Electrical Manufacturers Association; is that correct?

A. Yes.

Mr. Melchior: We offer that document.

Mr. Bergson: May I add another statement here, Your Honor. We have here the source document from which this was taken, and it lists the participating companies, and of the participating companies not one of the Government's own conduit witnesses is listed.

The Court: Say that again.

Mr. Bergson: It lists—the NEMA report lists the name of the participating companies from which NEMA got this total of 116 million dollars. It lists each company which reported its figures. Not a single one of the companies that the Government has called as a witness in this [fol. 196] case as a conduit manufacturer is listed on this list.

Mr. Melchior: I think I can direct some remarks——

Mr. Bergson: With one exception, the Triangle Conduit and Cable.

Mr. Melchior: Does the Defendant appear in that list, Mr. Bergson?

The Court: You mean Rome, or ALCOA?

Mr. Melchior: ALCOA.

Mr. Bergson: No. Rome Cable.

Mr. Melchior: Were you aware that ALCOA was not listed in this tabulation in this source material when you prepared this tabulation?

The Witness: Yes.

[fol. 197] By Mr. Melchior:

Q. Have you taken Alcoa's statistics into consideration in preparing any of these tabulations?

A. Yes I have the information contained in defendants' answers to plaintiff's interrogatories on Alcoa's and Rome's shipments of conduit and have added to the amount the total before calculated as the NEMA total the amount shipped by Alcoa shown it its sources. It was ambiguous as to how much might have been left out and I prepared two tabulations to give us alternate additions.

Q. Are these the tabulations among those which you prepared in the field of conduit?

A. Yes.

Mr. Melchior: Your Honor, directing your attention to counsel's remarks that certain of government's witnesses in the field of conduit or whose companies' names have the word "conduit" in them, I should like to observe that aluminum conduit is a new field and there is nothing in the record to indicate when the government witnesses began or attempted to begin the production of conduit.

Q. The statistics presented in these tabulations cover what year, Dr. Martin?

A. In this tabulation? 1960.

[fol. 198] Q. Are there any tabulations or any sources of material for years earlier than the year 1960 from Nema or from Census?

A. My knowledge is limited to information for a year or two earlier, on steel only but not on aluminum. But I have used that in a separate tabulation and I assume that is true.

Q. No earlier years than 1960 on aluminum conduit?

A. No.

Q. Can you explain why there are no earlier years for which statistics are available on any broad basis from

your knowledge of the aluminum conduit statistical field? I ask you this question, Dr. Martin, do you know of your own knowledge whether the field of aluminum conduit is an old industry or a relatively new industry?

A. My knowledge of the field is limited from what I have seen in the statistics that I have worked with. It would seem to be new.

Q. Do you know of your own knowledge what——

The Court: Seem to be what?

(The Court reporter repeated the last part of the answer as above recorded.)

Q. You do not know?

The Court: It would seem to be new.

Mr. Bergson: I question the witness' competency to [fol. 199] answer these questions.

Mr. Melchior: That is why I prefaced my remarks with the "if you know". He said he didn't so I didn't pursue it.

Mr. Bergson: I would like to ask counsel if he knows whether Channel Master was in existence in 1960?

Mr. Melchior: I was not referring to Channel Master. I think the time to ask the question is when Channel Master is on the stand.

The Court: Well, why not clear it up?

Mr. Melchior: Yes. It was in business.

Mr. Bergson: How about Aluminum Rigid Conduit Corporation?

Mr. Melchior: I can state that Aluminum Rigid Conduit is a very new company in the industry.

Mr. Bergson: How about Hazelwood?

Mr. Melchior: Hazelwood has been in the industry some years earlier. About three years.

Mr. Bergson: I also notice, Mr. Melchior, that in one of your other charts you have a list of companies manufacturing aluminum conduit that don't appear on the Nema list.

Mr. Melchior: May it please the Court I don't think I should be testifying in this case. And I would like to [fol. 199a] correct counsel; these are not my charts. They are Dr. Martin's charts.

Mr. Bergson: I am not asking you to testify. I am raising the question as to validity of the Nema total and these charts are your own and the book of material that you relied on indicates a complete inaccuracy of this chart.

Mr. Melchior: May it please the Court, as argument I would like to point out that the field of aluminum conduit is a very new field. Companies are just beginning to come into it. As a matter of fact when the merger took place Rome Cable didn't manufacture aluminum conduit. There has been little occasion in the industry, as near as we can determine, for the collection of statistical matter on aluminum conduit and as a result the Government has——

The Court: What you are telling me is that there has been little and this chart isn't much good to anybody.

Mr. Melchior: No, I don't think so.

The Court: It is the same thing. You tell me in one breath there is little opportunity to cover or gather the statistics.

Mr. Melchior: Prior to 1960. But our year is '60. We have the year 1960 as the first representative year.

[fol. 200] The Court: All right. Are those two companies counsel mentioned, are they included in this year 1960?

Mr. Melchior: I don't have that information before me. I have to ask the witness.

The Court: In other words, what in the world do I do with this chart? I am sitting back here trying to figure out what I will do with it. It is quite apparent from the remarks here that it doesn't accurately show this conduit manufacture, the amount of it. I suppose it doesn't do any particular harm but I can't do anything with it after I get it, can I?

In other words with this record standing as it is what importance can I place on that chart?

Mr. Melchior: I think Your Honor that reliance, great reliance can be placed on the Census reports. Now the census reports are collected by the United States Government——

The Court: I know. But this is the Nema chart that we are talking about. My question—I am not very disturbed about this, but sometime I have to lock the door and see what I can figure out, as they come along. I just don't think I can place very much reliance on it if it is a very im-

portant matter. I don't know how important it is to start [fol. 201] with.

Mr. Melchior: As far as what figures are included in the Census report——

The Court: We are not talking about census total. We are talking about this exhibit, which is the Nema. What can I do with the Nema report when it pretty near is—I won't say constitute—when it is pretty apparent that it does contain the prior date.

Mr. Melchior: We feel that the census report is authority ——

The Court: We are by the census report. Now we would like to discuss the Nema report.

Mr. Melchior: Since counsel reflected on the census report, the census total, we tried to find another universe that would be close.

The Court: I don't question your good faith or your effort. That is not the point at all. The point is what can I do with it as a judge?

Mr. Melchior: I feel that the totals as shown by Nema are so close to the census totals that if the census totals are reliable the Nema totals are probably reliable too. That is the argument we can make.

The Court: Of course it is quite apparent that they are not.

[fol. 202] Mr. Melchior: There are differences, yes sir, there are differences but we have given you what we believe to be the best universe in the form of census. And then we have given the only other possible universe in the form of Nema. I feel that there would be no doubt that you would give much greater weight to census but we feel some weight should be given to Nema.

The Court: I am not certain about that. I think I would give none to this. And whatever I can to census. Pretty near everybody concedes that it is not an accurate, true reflection of the situation. That would be my opinion of it. When you are getting down to percentages, sure they are reasonably small. If these percentages become important at all, I think they should be pretty reasonably accurate. I don't know how competent they are at all. You see you are going to argue that this 7.3 is not a minimal percentage. Of course maybe it isn't but when I am told that it doesn't

contain the whole situation why it may very well change from 7.3 to 5.3 or 2.3. I wouldn't know what it would change in to. You leave me entirely in the dark.

Mr. Melchior: It would be our purpose in calling this witness, Your Honor, to ask for their data for the years that are missing. And we can do it and supply it, but can't [fol. 203] do it at this time. This would be the best we can do short of subpoenaing everybody in the industry.

Mr. Bergson: Again I don't want to prolong this Your Honor but these are not the only three that are missing. The government has another chart, Chart 24.

Mr. Melchior: No.

Mr. Bergson: Conduit shipments.

Mr. Melchior: Have we offered that, Mr. Bergson?

Mr. Bergson: No. But I am using it to cast doubt, serious doubt upon the reliability of 456. The Anaconda Aluminum Company reported shipments are not included. The Harvey Aluminum Company are not—I beg your pardon, Harvey is, but there are seven companies names on your companies reporting to the Aluminum Association that are not named as companies reporting to Nema.

Mr. Melchior: Now if Your Honor wishes to discuss this next chart I will at this time, because I think counsel is completely in error as to the accuracy of this chart.

The Court: Go ahead.

Mr. Melchior: The second chart would be Government's Exhibit 464 for identification. I ask you to turn to that and still hold the chart we are talking about and you can immediately see the difference. They are not the same prod- [fol. 204] uct. We have been talking in 456 with respect to steel and aluminum conduit. Over here we are talking about shipments of aluminum semi-fabricated products for end use in the manufacture of rigid aluminum conduit. This is another conduit tabulation. These are the raw materials used in manufacturing conduit. So there is no relationship between the charts at all.

These companies listed in 464 are raw material suppliers to companies who manufacture conduit. Now maybe some of these companies do manufacture conduit but there is nothing in the record that they do. In fact many of them don't. They merely sell the raw material. They sell the semi-fabricated products.

Mr. Bergson: I accept that. I apologize.

Mr. Melchior: So you can't compare this chart to the other.

Mr. Bergson: I accept that: I apologize.

Mr. Melchior: That is quite all right.

Mr. Bergson: However I don't apologize for the inaccuracy of the Nema universe.

Mr. Melchior: The government won't concede it is inaccurate. The government will concede it is not complete. [fol. 205] The Court: You won't concede it but you do admit that conduit manufacturing companies figures are not all included.

Mr. Melchoir: I admit that.

The Court: All right, I am going to take it.

Mr. Melchior: We will try to add to the weight of it by further testimony.

The Court: See that you do. I will tell you frankly on the evidence up to date I will give it no consideration whatsoever. No probative weight. I will receive it.

(Government's Exhibit 456 for Identification received into evidence.)

Mr. Melchior: The government now offers Government's Exhibit 457 for Identification.

Mr. Bergson: Your Honor that is subject to the same infirmity. They use the same Nema total.

The Court: All right. Same disposition.

(Government's Exhibit No. 457 for Identification received in evidence.)

Mr. Melchior: Government now offers Government's Exhibit 458 for Identification.

The Court: That goes back to the Census figure.

Mr. Melchior: Yes sir, it does, Your Honor.

Mr. Bergson: Would you pardon me, Your Honor?

The Court: Sure. Go ahead.

[fol. 206] Mr. Bergson: We object to this on two grounds. One, the inadequacy of the Census figure, and two, on the ground of relevancy because we contend that aluminum conduit does not constitute a separate line of commerce.

The Court: All right, I will receive it.

(Government's Exhibit No. 458 for Identification received into evidence.)

By Mr. Melchior:

Q. Dr. Martin would you explain the import of Government's Exhibit 458?

A. Yes. This shows the volume of shipments of aluminum conduit in 1960 with the industry total as reported by the Census of Manufacturers. Compared with the shipments of Aluminum Company of America and Rome. The sales by Rome in 1960 are indicated in the answers to interrogatories to be sales made by Rome as agent for Alcoa. The breakdown between Alcoa and Rome shows Alcoa's sales exclusive of Rome agency sales and in the next category is the Rome sales which were made as agent for Alcoa. And then the two together on the third line give the total sales, giving the total sales of Aluminum conduit by Alcoa and Rome. The figures are in dollar value term.

Q. And these figures are based on figures of the Bureau of Census?

[fol. 207] A. Yes.

Q. The data on this. Not on Nema?

A. Not on Nema.

Mr. Melchior: Now the Government would like to offer as a group of three Government Exhibits 459, 460 and 461 for Identification, since I am sure counsel will have the same objection to these three, and these three are all based on Nema.

The Court: These all come back to that Nema report as a basis.

Mr. Melchior: I beg your pardon?

The Court: All of these last three exhibits use the Nema report?

Mr. Melchior: They do.

The Court: As the basis for their computation. Same objection, I take it?

Mr. Melchior: Yes, Your Honor.

The Court: Well, same ruling, I will receive it.

(Government's Exhibits 459, 460 and 461 for Identification received into evidence.)

Mr. Bergson: Plus the fact, Your Honor, that 459 and 460 are also objected to on the ground that the line of com-

merce is aluminum, which we contend to be an irrelevant [fol. 208] line of commerce.

The Court: All right.

Mr. Melchior: Of course we don't feel that is a valid objection, Your Honor.

The Court: Would this be a good place to stop? Recess until tomorrow morning, ten o'clock.

(Whereupon an adjournment was taken to Wednesday, February 7th, 1962 at 10:00 o'clock a.m.)

[fols. 209-210] [Title omitted]

Transcript of Hearing—February 7, 1962

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[fol. 211] Mr. Melchior: Dr. Martin, will you resume the stand?

DAVID D. MARTIN, resuming the stand, testified further as follows:

The Court: I guess we got down to 461.

Mr. Melchior: I think we had completed that, Your Honor. I was going to proceed with the next one.

Direct examination. (continued)

By Mr. Melchior:

Q. Dr. Martin, in connection with your work with the Anti-Trust Division have you had occasion to prepare a tabulation dealing with sales by ALCOA and Rome of steel and aluminum conduit?

A. Yes, I have.

Q. Would you identify it?

A. Government's Exhibit No. 462 for identification.

Q. Would you raise your voice a little better?

A. Government's Exhibit No. 462 for Identification, entitled Sales by ALCOA and Rome of Steel and Aluminum Conduit, 1954 through 1960 in the United States and in the eleven Western States."

[fol. 212] Mr. Melchior: The Government offers Government Exhibit for Identification 462 at this time.

Mr. Bergson: The Defendant objects to Government's Exhibit 462 on two grounds. One, that the defendant does not recognize the 11 western state area as an appropriate section of the country so far as conduit is concerned, and secondly, because while the footnotes tend to clarify it, the figures for 1959 and 1960 on aluminum conduit are misleading because they are stated twice. The figures ascribed to Rome are also included in the ALCOA figures, creating

the erroneous impression, No. 1, that there was more aluminum conduit sold than there actually was sold and, secondly, that Rome manufactured aluminum conduit, or manufactured any substantial amount of aluminum conduit.

The Court: Suppose I take the explanation of this exhibit from the witness before we go into the details of your objection.

By Mr. Melchior:

Q. Dr. Martin, would you explain to the Court first the source of the information contained in this tabulation?

[fol. 213] A. Yes. All of the information on this tabulation is taken from Defendants' answers to Plaintiff's interrogatories and Defendants' answers to Plaintiff's pre-complaint letter and some changes were made on the basis of the Defendants' objections to Plaintiff's proposed tabulations, and have been incorporated.

So all the information is that given to me from the documents from the plaintiff.

Q. From the Defendant?

A. From the Defendant.

Q. You mean, from the Defendant. Where were the changes? You refer to some changes being made. What was the source of your information as to these changes?

A. The original tabulation presented to the Defendants was based on information from the interrogatory answers which gave more than one figure for some of these years. And I had picked a figure that I thought was comparable. In one or two cases they presented some new figures at that point, which I incorporated in the amendment of the tabulation.

Q. And where did you get the new figures from?

A. From the Defendants.

Q. From the Defendants?

A. From the Defendants.

[fol. 214] Q. Now, Mr. Bergson mentioned in connection with this tabulation something with respect to an apparent overlap, I don't recall the precise phrase he used—duplication I believe; do you understand his reference to that and would you explain it to the Court?

A. Yes. The figures for conduit, aluminum conduit sales

after the acquisition given in the source material indicate that Rome sold aluminum conduit as the agent of Alcoa. The defendant's interrogatory answers presented figures for Alcoa sales, including Rome's agency sales. I did the same thing on the tabulation. The defendants in the interrogatory answers also in answer to the question: "Did Rome have any sales?" gave the Rome agency sales with the indication that these were included in the Alcoa figure. I did precisely the same thing on the tabulation, with footnotes indicating that the figure for Alcoa sales include the Rome sales and a footnote on the column marked "Aluminum" under "Rome" on the righthand side, where I give Rome sales, footnote No. 9, explains that Rome's aluminum conduit sales were made as agent for Alcoa and are included in the Alcoa figures.

The figures are exactly the way they were presented from the defendants.

Q. In other words, what you are saying is that the alleged duplication that counsel refers to is presented here in [fol. 215] exactly the same manner it was presented to plaintiff by defendants in their responses to interrogatories, is that correct?

A. Yes, I think so.

The Court: Well, what it all means is that the figures for 1959 and 1960 do not indicate the steel and aluminum conduit that was manufactured by Rome and Alcoa, that is, it doesn't separate them. Maybe they used the same sales force.

The Witness: I think, your Honor, that the aluminum conduit sales in 1959 and 1960 are intermingled in the sense that it is difficult for me to say precisely what was produced and sold by Alcoa, what was produced and sold by Rome. All I had to go on was the answers the defendants gave to the question, and they gave it in this form, Alcoa's total sales, a sub part of that what they labeled as Rome sales as agent for Alcoa.

By Mr. Melchior:

Q. In other words, subsequent to the merger, based on the information given to the Government by the defendants, it is difficult for the Government to tell precisely who was

making or shipping the conduit, whether it was Rome or [fol. 216] Alcoa.

A. That's right.

Q. But actually it doesn't make that much difference because at that time they had become one.

Mr. Bergson: I think, your Honor, we are being blamed because they asked us the wrong questions in the questionnaire.

The Court: The way you answered it doesn't affect the validity of their exhibit. If they have used your answers as indicating on an exhibit—if they aren't valid, it isn't valid no matter where they got the information.

Mr. Bergson: My point, your Honor, is this, that instead of breaking out of Alcoa's sales the sales that they charged to Rome, they included the sales of Alcoa and also plotted them for Rome. Now, the exhibit to have been a proper exhibit, it seems to me should have deducted the Rome sales from Alcoa sales or should have included the Rome sales in the Alcoa sales and not specified anything for Rome.

This was all product manufactured by Alcoa and Rome in those areas and Rome did act as sales agent.

The Court: Yes.

[fol. 217] Mr. Bergson: Now there is a duplication of figures in here and the duplication is the result of the way they asked the questions.

By Mr. Melchior:

Q. Now, Dr. Martin, do you cover this in the footnotes to this tabulation?

A. Yes, I think so.

Q. Is it clearly set forth precisely what you have done?

A. I think I have set it forth twice.

Mr. Melchior: We submit, your Honor, since it is set forth on the face of the document, that the document is not confusing and misleading.

The Court: It is a little confusing to me. What are you trying to show by the exhibit?

Mr. Melchior: As you know, your Honor, there are no percentages represented here. We are not trying to show the share of the market or the section of the country, we are trying to show in absolute figures what the sales were of

the respective companies. It is an absolute tabulation. There is no comparison made on here at all, and directing my remarks further to counsel's section-of-the-country [fol. 218] argument, we do not believe that all our tabulations will be limited strictly to a section of the country or line of commerce. We feel the impact of the merger goes beyond that.

The Court: I will have to handle that later, of course, but I am not quite convinced of the value of it. For instance, it shows, doesn't it, that in 1960, say, that Alcoa sold 4,258—am I right?

Mr. Melchior: Yes, of aluminum.

The Court: Dollars worth of aluminum?

Mr. Melchior: That's right.

The Court: And Rome sold how much, two million?

Mr. Melchior: Rome in steel sold—if you are talking about aluminum——

The Court: Talking about aluminum.

Mr. Melchior: It is in dollars, this table is in dollars, two million point three dollars, but the significant thing about this tabulation——

[fol. 219] The Court: Just a second. That does not mean, and I want that clear, that Rome manufactured and sold this amount of aluminum; does it?

Mr. Melchior: It means that either they did it or in their own name or under an arrangement with ALCOA.

The Court: All right. But how do I speculate about that! What can I do with the figure unless I know.

Mr. Melchior: Well, we do know, we do have the two figures as respects ALCOA and Rome separately.

The Court: Yes.

Mr. Melchior: And we do show by footnote that there is included in both of those figures the stated quantity that we can tell to which side it should belong. So I will admit a stated quantity that we can tell to which side it should belong. So I will admit to that extent there is a slight—we do try to cure that by a footnote. Now if we didn't completely cure it, it is because of the nature of it. We thought on the footnote we could indicate the problem we were faced with.

[fol. 220] The Court: I am at a loss to understand what I am supposed to do with this table. Am I supposed to com-

pare the amount of aluminum sold by ALCOA with the amount of aluminum sold by Rome?

Mr. Melchior: No. I think the significant thing about this table would be the one column under Rome where we show Rome's sales in steel conduit. The aluminum part of this is relatively unimportant in this field.

As you will recall, ALCOA made aluminum conduit prior to the merger, and Rome made only steel conduit. Elsewhere we will show, or have shown, what Rome's share of the total national market was in steel conduit.

Now this column under western states sale for Rome, the 3564 figure, indicates that Rome's, or the majority or the preponderance of the Rome's sales of conduit were in the western state area. Therefore, it is axiomatic that if the preponderant portion of Rome's sales are in the western states, it's share of the western states market must be larger than its share of the national market. And that is the only thing that this tabulation there is to show.

The Court: All right. I will receive it.

[fol. 221] (Government's Exhibit No. 462 for identification.)

Q. Dr. Martin, in connection with your preparation of these tabulations for this proceeding, have you prepared the tabulations relating to the sales of aluminum conduit produced at the Torrance, California plant and with respect to shipments of aluminum fabricated products?

A. Yes, I have.

Q. Will you identify them?

A. Government's Exhibit No. 463 for identification entitled "Sales of aluminum conduit produced at the Torrance, California plant after the acquisition." Government's Exhibit No. 464 for identification entitled "Shipments of aluminum semi-fabricated products for end use in manufacturing rigid aluminum conduit, 1960 and first half of 1961."

Mr. Bergson: No objection, your Honor.

Mr. Melchior: Now this was to 463 and 464?

Mr. Bergson: Oh, I beg your pardon.

Mr. Melchior: I have not offered it yet.

Mr. Bergson: I am sorry.

Mr. Melchior: I will offer Government's Exhibit No. 463 for identification.

Mr. Bergson: No objection.

[fol. 221a] The Court: Received.

(Government's Exhibit No. 463 for identification received into evidence.)

[fol. 222] By Mr. Melchior:

Q. Dr. Martin, would you explain the import of that document?

A. This exhibit shows the amount of aluminum conduit sold by the Defendants that was produced in the Torrance, California plant of the Rome Company. The figures were taken from the interrogatories answers and I have put in footnote precisely what Defendants said the figures were. In answer to the question of how much aluminum was produced, aluminum conduit was produced at the Torrance Plant, they said in general aluminum rigid conduit customers in the 11 western states are served from the Torrance Plant, and customers in other states are served from the Lafayette Plant. The sales figures were sales figures for the 11 western states, and it was represented to us by Defendants as their best estimate in the amount of dollar value terms as I understand it produced in that plant.

Mr. Melchior: This, again, Your Honor, as you can readily see is merely a statement of data. No comparison made. Off the record for a minute.

(Discussion was held off the record which the reporter was asked not to take.)

[fol. 223] Mr. Melchoir: At this time the Government offers GX-464 in Evidence.

Mr. Bergson: The Defendant objects to Government's Exhibit GX-464 on the grounds that it is irrelevant and immaterial because it relates to products not within any line of commerce contended for by the Government in this case. And, secondly, it is so incomplete and consequently so misleading as to have no value whatsoever.

The Court: Why don't I let the witness explain it and we will see what this is all about.

The Witness: Your Honor, this tabulation attempts to put together all the information that we obtained from the Aluminum Association, to which a number of companies reported their shipments of semi-fabricated aluminum products. And these companies report to the Aluminum Association all of their semi-fabricated aluminum products in a number of different categories. We have taken information for only one of these categories, the category labeled for end use in manufacturing rigid aluminum conduit. And we have the Aluminum Association figure for [fol. 224] the total of everything reported to it in this category on the last line of the table.

And the first line of the table gives the Aluminum Company of America shipments reported to the Association and their correction in the interrogatory answers. They were asked, "What did you report to the Aluminum Association in this category," and they gave us the figure indicated, indicating they had read it erroneously and gave what they presented as a correct figure, and we presented both figures as the corrected total to allow for this correction by ALCOA of its figures. In addition we sent letters to all of the companies that reported to the Aluminum Association and asked them the same question.

We obtained responses from some of them. From some of them we did not obtain responses. I have put all of the information into the table that we were able to gather on the report by these companies to the Association and have indicated where no reply came in, I have indicated that with a "No."

The percentage column shows the percentage division of the reported shipments among the various companies.

[fol. 225] Mr. Melchior: If I may——

The Court: What is the purpose of the Exhibit, Mr. Melchior?

Mr. Melchior: This exhibit relates, as Mr. Bergson says, not to one of our lines of commerce. As I indicated yesterday, Your Honor, in this field of aluminum conduit universe statistics, market statistics are very difficult to come by because this is an area which is still in its embryonic stage. Most statistics were not collected prior to the year 1960.

Since the Government has the burden in this proceeding it made every effort to gather together from any reliable

sources it could find statistics which would show some light upon the position of Rome and ALCOA IN the relevant fields. In this connection we contacted the Aluminum Association, which is a recognized association of aluminum companies, located in New York, to find out what information that Association had and whether they had information and data relating to conduit. They informed us that they did not collect conduit data, but they collected information [fol. 226] as to the semi-fabricated form of aluminum that conduit was made from. This being extruded aluminum pipe. They had data for a number of companies, these member companies having reported this information to the Association. The Association, however, as is generally the case, is reluctant to make individual company statistics available to the Government. At that time we wrote all of the members of the Association and asked them to supply to us their individual company statistics which most of them did.

We did this for the purpose of trying to show the relative position of ALCOA in this very important raw material field. This is the stage immediately preceding conduit. We have figures of ALCOA's position in the aluminum conduit field and we also have figures of ALCOA's relative position in the stage immediately preceding aluminum conduit, albeit we admit somewhat incomplete.

We do, however, feel that enough has been shown here since the major companies are listed, that there is an indication as to ALCOA's dominance. Now we do note, if you [fol. 227] recall the data in the other tabulations, that the percentage indicated there is very close to the percentage we have for ALCOA in the conduit field generally, as indicated by the Bureau of the Census and Nema, which we discussed yesterday.

Mr. Bergson: May I be heard further on this?

The Court: Yes. Yes.

Mr. Bergson: In the first place, your Honor, irrespective of this line of commerce argument, I don't think that the Government in attempting to bolster its case should be permitted to graph statistics partially related, somewhat related, incompetely related, and use them as evidence in a lawsuit of this kind.

Secondly, and I think much more importantly, in addi-

tion to the incompleteness of this chart, which shows that 51 per cent of this Aluminum Association figure is unaccounted for, many of the aluminum conduit manufacturers start from an entirely different product. Many people don't even report to the Association. And this figure is unrelated to reality whatsoever, and the chart in my judgment is absolutely worthless.

[fol. 228] Mr. Melchior: We feel counsel's remarks go to the weight of the document rather than the admissibility, your Honor.

The Court: Of course there is probably no question but what the figures you have shown here are probably correct from the information that you had, but it is of very doubtful value when half of the industry or half of the product is unaccounted for.

Mr. Melchior: We reluctantly admit that, your Honor, we don't think this has the authenticity that those do that are complete.

Mr. Bergson: I think it is more than half, that is only half of what is reported. There is a tremendous amount that is not reported.

Mr. Melchior: The only answer to this problem as we see it in Section 7 cases, if there is a burden upon the Government to supply 100 percent industry information, companies are reluctant to make it available to us in many cases and the only alternative is to subpoena everybody in the industry, and, as I mentioned yesterday, I hardly think this is the type of procedure that the courts and government should go through in proving a Section 7 case.

[fol. 229] Mr. Bergson: If the defendant is to be held liable, I think it ought to be held liable on the facts and not on the guesstimates of the Government.

The Court: I will take it with very much misgivings of its value for any purpose.

(Government Exhibit No. 464 marked received in evidence.)

By Mr. Melchior:

Q. Dr. Martin, in connection with your preparation for this proceeding did you have occasion to prepare tabulations relating to aluminum ingot capacity, locations of Alcoa,

Rome and Rea plants and monthly average prices of electrolytic copper? These are three tabulations.

A. Yes, I did.

Q. Would you identify them?

A. Government Exhibit No. 465 for identification, entitled "Aluminum Ingot Capacity existing or under construction at the end of 1960."

Government Exhibit 466 for identification, entitled "Location of Alcoa, Rome and plants producing aluminum ingot and wire, cable or conduit products 1960."

Government Exhibit 467 for identification, entitled "Monthly average prices of electrolytic copper, New York refinery, and ingot aluminum—" Correction; I think I have [fol. 230] got that wrong, "monthly average prices of electrolytic copper, New York refinery, and ingot aluminum at New York, 1940 through 1960."

Mr. Melchior. The Government offers Government Exhibits 465, 466 and 467 for identification into evidence at this time.

Mr. Bergson: No objection, your Honor.

The Court: All right, I will receive it.

(Government Exhibits 465, 466 and 467 marked received in evidence.)

By Mr. Melchior:

Q. Now, when——

The Court: Are you going to explain them at all?

Mr. Melchior: Yes, I am sorry, I guess I was a little precipitous.

The Court: Or do they require explanation?

Mr. Melchior: Yes.

By Mr. Melchior:

Q. Dr. Martin, would you explain to the Court the import of Government Exhibit 465?

A. This exhibit shows aluminum ingot capacity of the six companies which produce primary aluminum in the United States, and gives the total capacity of all of these firms [fol. 231] taken together, and the percentage that each is of the total. The source is the 1960 Minerals Yearbook,

published by the Bureau of Mines of the Department of the Interior.

Government Exhibit 466 is a map taken from the 1960 Alcoa annual report showing the location of certain plants of Alcoa, Rome and Rea Magnet Wire Company. The symbols indicate whether the plant is Alcoa, Rome or Rea, and whether it is a primary producing plant for aluminum ingot or whether it is one of the products, wire, cable or conduit.

The exhibit marked 467 shows prices of primary aluminum and of copper monthly from the beginning of 1940 to the end of 1960 in cents per pound.

The Court: How do you think, counsel, that I will use that last one?

Mr. Melchior: We are utilizing that to show that with respect to the question of price, that there is little similarity between the price of aluminum and the price of copper, first on an absolute basis, and secondly, on a trend basis. I think that you can observe that copper prices over the years are very sensitive and have fluctuated and vacillated quite a bit. On the other hand, aluminum prices have been generally more stable and not sensitive, and there [fol. 232] has been back prior to 1940, as you can see on the lefthand edge of the chart, a reduction in the price of aluminum, and then a long steady period, and then a gradual trend upward.

We also would show by this chart in conjunction with other information that the relationship between the price of copper wire and cable and copper is closer than between the price of aluminum wire and cable and copper wire and cable. In other words, we want to show that copper wire and cable prices are determined by the price of copper rather than the competitive material, and we will indicate that the price of aluminum wire and cable are governed more by the price of basic raw material than they are by the competitive effect of the competitive material.

The Court: All right.

Mr. Melchior: Now, your Honor, yesterday we did not introduce one tabulation which we would like to offer at this time. It is Government's Exhibit 454 for identification.

By Mr. Melchior:

Q. Dr. Martin, in connection with your work on this proceeding, did you have occasion to tabulate any shipment figures with respect to service drop cable?

A. Yes, I did.

[fol. 233] The Court: What is service drop table, do you know, Witness?

The Witness: To me as a statistician, Your Honor, it is a certain category of wire and cable, insulated or covered, that is used by the Census Bureau in collecting its information. The material is used by the Census Bureau and it was used in the interrogatory answers.

The Court: Probably somebody else could answer it.

Mr. Melchior: We will get that by testimony. I would be glad to explain it to you, if you would like.

Mr. Bergson: Are you offering that?

Mr. Melchior: The Government offers GX-454 for identification into evidence.

Mr. Bergson: The Defendants object to GX-454 on two grounds, one is that service drop wire and cable is not a proper line of commerce, it is just one product within the insulated wire and cable line of commerce, and it is an attempt to take from the line of commerce one construction and make an additional line of commerce out of that.

Secondly, we object on the ground that the Universe [fol. 234] figure is understated and that, therefore, the percentages shown are erroneously high.

Mr. Melchior: Although it is not our purpose to argue the line of commerce question at this time, we do urge that service drop cable is one of the Government lines of commerce. It is a line included within the broader line of insulated wire and cable, and as the Government conceives this particular line it is a line which includes both copper and aluminum. Service drop table, as we understand it, and we will get testimony on it, is the line which comes from the telephone pole to the individual residence.

The Court: It is a particular product used for a particular thing?

Mr. Melchior: That is our theory, yes, it is generally two insulated wires wound around a bare wire.

The Court: If that is a special line of commerce, couldn't

you possibly break up all the conductor into its particular uses and call them all separate lines of commerce?

Mr. Melchior: I think you could, Your Honor, but we are merely using this as an example of one of the lines in the [fol. 235] broader line, this is one of the lines we think the impact may be greater than in some of the other lines.

Mr. Bergson: Your Honor, it is our position, in addition to the line of commerce argument, that the figures quoted in the census category do not include all types of wire and cable that are used for service drop purposes. He is talking about this twisted wire cable triplex or quadraplex, but open line wire is used for service drop. There is a specially designated service drop cable with underwriters approval that is used. There is a special "K" type of cable that is used as service drop. There are many other kinds of wire and cable than the multiplex cable that he is talking about, and that is included within the census Universe that has —if he wants to break out, and we think improperly, service drop as a line of cable, he has to include in that all the products that are used for service drop purposes.

The Court: Yes, I think that is true.

Mr. Melchior: We differ with that. It is the old question of the Sherman Act versus the Clayton Act.

The Court: No, it is a question of your Exhibit. If this [fol. 236] purports to show service drop cable, it should show any kind of cable that is used for service drop.

Mr. Melchior: We think this tabulation does show service drop as it properly is, and as reported by the census.

The Court: I don't care about the census, you don't include all service drop cable, do you?

Mr. Melchior: We think we include all cable that is properly described as service drop. Now we will admit that other types of wire perhaps can be used for this purpose on occasions.

The Court: And is used?

Mr. Melchior: On some occasions is used.

The Court: This Exhibit to be any good or to prove it.

Mr. Melchior: If we are trying to prove a line of commerce by this Exhibit.

By Mr. Melchior:

Q. Dr. Martin, what was the source of your information, your statistical information for this tabulation?

A. The industry total comes from the publication entitled "1958 Census of Manufacturers." I have given in the foot- [fol. 237] note the special census code number for this product class. It is described by the census as service cable, including self-supporting but excluding service entrance cable, divided into two separate categories, rubber insulated and thermoplastic insulated, and those have been added together. The figures that are compared with this census total are figures from the Defendants answers to questions in the Plantiff's pre-complaint inquiry, and I think they correspond to it and are comparable with the industry total.

I have computed the percentage separately for Rome and ALCOA and for Rome and ALCOA put together.

Mr. Bergson: We don't question our own figures, Your Honor.

The Court: You may have to once in a while, but not now.

Mr. Bergson: Not right now.

Mr. Melchior: I think as to whether or not service drop cable and what we have included in this tabulation is actually service drop cable as a line of commerce.

The Court: I don't think it is, I don't think the Census can make a line of commerce just because it is put in a book. [fol. 238] Mr. Melchior: I think perhaps we would have to wait until we get testimony from the industry.

The Court: I think perhaps you would.

Mr. Melchior: We have nothing further to offer.

The Court: All right, I will receive it.

(Government Exhibit No. 454 marked for identification received into evidence).

Mr. Bergson: May I ask a question, Mr. Melchior?

The Court: Yes.

Mr. Bergson: I notice in this group of charts that you have given us there is another chart, your Exhibit 453. Is it your purpose to offer that now or offer it at a later date?

Mr. Melchior: We are not offering it at this time.

Mr. Bergson: You will offer it later?

Mr. Melchior: We are not offering it at this time.

Mr. Bergson: I was wondering if it was included in the Judge's notebook.

Mr. Melchior: I think it should be removed. That would be Government Exhibit 453 for identification, Your Honor. [fol. 239] We will have it removed.

The Court: All right.

Mr. Bergson: Are you finished with the witness?

Mr. Melchior: Yes, your witness, Mr. Bergson.

Cross-examination.

By Mr. Bergson:

Q. Doctor Martin, in qualifying you I think Mr. Melchior asked you whether you prepared these tabulations and you responded that you did or they were prepared under your supervision. Is that correct?

A. Yes.

Q. In the course of preparing these tabulations did you confer with counsel for the Government as to the type of chart they wanted and what they wanted in the chart?

A. Yes, I conferred with the Government counsel, I didn't do this independently all by myself, I didn't just go off and do the whole thing.

Q. They told you the type of chart they wanted and what they wanted you to develop in the charts?

A. They informed me of the areas that they thought would be relevant. I made the decisions myself as to what would go in the chart in all cases.

[fol. 240] Q. Did they in discussing this with you set any time periods for you to consider in the charts?

A. I certainly would not say they set any time periods for me. I made the decision on what data was in the chart.

Q. Did they suggest that you consider, say, a five year period before the acquisition, and then the period subsequent to the acquisition?

A. In which particular case?

Q. In respect to any situation.

A. I think that in most cases I used all the data that was available. If I had information on the certain number of

years, ordinarily I put it in unless there was some specific reason to leave it out.

Q. Now I notice that in some charts you went back to 1953 and in other charts you started with 1955, what was the reason for that?

A. I think that where I had 1955 as the beginning year, I didn't have information on all of the items that I needed to complete the chart, and also that I was covering enough years to give an adequate picture of the general structure of the market, which was what I was trying to show.

Q. In this much discussed chart this morning, No. 434, where you didn't have enough information adequately to complete the picture, you went ahead and used the figures [fol. 241] anyway, didn't you, those you had available?

A. Of course, it was not a matter of years.

Q. This was a question of a chart with availability of information or without availability of information, you didn't have much information available for that chart, did you?

A. I had the information, the basic information I had was the Aluminum Company information and the Aluminum Association total, and I think I might well have used that alone, but instead I went ahead because we were able to get some information from other companies to put in that.

[fol. 242] By Mr. Bergson:

Q. I see. But if you had not been able to get the information for the other companies you would have taken the Aluminum Association total and then put ALCOA's production in and made, determined the percentage of the total production for ALCOA?

A. I never made these decisions very quickly. I would say I would have considered that to have been a proper thing to do if it didn't claim to be anything that it was not.

Q. Right. Now, did you discuss with counsel whether or not you should use a chart with incomplete figures or should not use a period with incomplete figures?

A. I think that by and large I simply tried to make sure that I didn't purport to show anything in any of the charts that I didn't actually show.

Q. Well, now, in your first three charts, which are Gov-

ernment's Exhibits 434, 435 and 436, you start with the year 1955 and you end with the year 1959.

Now, why didn't you use 1954 and why didn't you use 1960 in those charts?

A. Well, I think there are a number of factors that entered into the decision of how to set up this chart, and our purpose was to show the structure of the market for aluminum conductor wire and cable in the period preced-
[fol. 243] ing the acquisition. I did——

Q. And subsequent?

A. I used the year 1959 even though part of the year was after the acquisition. If I had not used it, I would have been leaving out part of the years before the acquisition. And I didn't have this broken down on a monthly basis.

Q. On a what basis?

A. On a monthly basis. I had some part of the information, but I don't think I had quite all the information on everything. My basic reason here I had for showing these years is that I thought a period of five years was enough to avoid any distortion that might enter in from us having picked a year of recession or a year when the economy was declining or booming. By keeping the span to five years I thought that element of time would give the picture.

Q. Was not the purpose of this chart to show ALCOA and Rome's position, or these three charts, in various phases of the aluminum wire and cable industry both before and after the acquisition?

A. I think that on these three charts I was working with information that came from a number of companies who had written, responded to letters from the Department of
[fol. 244] Justice, that had been written at an earlier part of this proceeding, and to have gone further into 1960 would have required that I rewrite a letter to all of these companies to bring all of this information up to a recent point. This could have been done in many points——

Q. Had you had——

Mr. Melchior: May the witness finish the answer?

Mr. Bergson: I thought he had. I'm sorry. Had you finished?

The Witness: I was going to say I had to have an end point. What I did was to take the answers from the companies that we had and in some cases I had information

for different years, some of the letters had been answered more recently than others. I wanted to get a comparable study and I felt that it was relevant because it did come up through and including 1959, which was the year when the acquisition took place. I thought it went back far enough to get a picture of the situation prior to the merger, that would allow for any special circumstances which might have been for this one year.

[fol. 245] Q. You had figures for 1960 for the universe?

A. Yes, sir, I did, I believe.

Q. And you had ALCOA's and Rome's figures for 1960; didn't you?

A. Yes, sir, I think so.

Q. And you had Universe figures for 1954, didn't you?

A. My offhand recollection is that I did. I would have to check.

Q. I would think you will find that you did. And you had ALCOA's and Rome's figure for 1954 to 1960—I mean for 1954.

A. I think so.

Q. The Government was interested enough in these figures to that in their inquiry to ALCOA and Rome they put us to the trouble of furnishing those figures?

A. I think that the case was proceeding over a rather long period of time. The beginning of it an attempt was made to gather figures on a period that was starting earlier. As time went on, other figures came into the picture. We had figures from some places, questions had been asked in some cases for earlier years.

Q. You had figures from a lot of the companies for 1954?

A. I couldn't say from memory how many I had for 1954.

[fol. 246] Q. And you had figures for some of the companies for the first quarter of 1960?

A. I think so.

Q. Most of the companies that you have on this list?

A. I am not sure whether for most of them or not.

Mr. Melchior: May it please the Court, may I advise the witness that he can refresh his recollection by the book in front of him. I think I should point out that all of the raw material he used has been submitted to Defendent and they

are fully aware of any piece of raw material that is in that book. And the witness should refresh his recollection.

Mr. Bergson: That is why I am asking these questions, because I have the information that you furnished us right here.

The Witness: To answer the question of whether or not I had figures for the first part of 1960 and most of these companies, I will have to look at the letter from each of these companies to see if the figure was there for the first part of 1960. I remember a good number of these numbers but I don't remember that much to be able to say.

Q. But in any event your decision not to use them was [fol. 247] based on your decision that five years was enough?

A. It was based on that, along with consideration of all the data I had, whether I had it on all of them.

Q. It wasn't based on the fact that in 1954 ALCOA's share of the market was higher than it was in 1955, or that in 1960 it was smaller than it was in 1959; was it?

A. No, sir, it was not.

Q. You know for a fact whether or not Alcoa's share was higher in 1954 than it was in '55?

A. In all of the three lines? No, I don't know it as a fact. I don't recall it.

Q. Let's take Government Exhibit 434, which is your Chart No. 1.

A. Yes.

Q. Which relates to shipments of aluminum conductor wire and cable, 1955 to 1959.

A. I don't remember what ALCOA's share was.

Q. Maybe I can refresh your recollection.

A. I would have to have the interrogatory answers. I have the Universe figure and the source.

Q. What is the universe?

A. 172,175,000. Is that what you have? As to ALCOA's figure I can find it in the interrogatory answer.

[fol. 248] Q. Maybe I can help you and save a little time.

Mr. Bergson: May I have marked for identification as AR-1.

Mr. Melchior: May we have a copy of that exhibit?

Mr. Bergson: You have it.

Mr. Melchior: Will you designate it?

(Discussion held between counsel.)

Mr. Bergson: This is a chart, entitled "Shipments of aluminum conductor wire and cable by primary producers or affiliates including merged companies and other producers, 1954 to 1960."

Now, this chart has been submitted to Government counsel and they have not questioned the accuracy of the figures herein.

(Chart marked as Defendents' Exhibit AR-1 for identification.)

By Mr. Bergson:

Q. Now, would you look at that chart and see what percentage of the market it shows for ALCOA for the year 1954? This corresponds to Government's Exhibit 434.

Mr. Melchior: Counsel, you have not offered this yet? [fol. 249] Mr. Bergson: I am not offering it.

Mr. Melchior: Will you wait until we get it. We didn't know you were going to use this.

Mr. Bergson: I am just using it to save a little arithmetical computation by the witness.

A. Yes, 42.8 per cent.

Q. And what was Rome's share in 1954?

A. 1.1 per cent.

Q. As compared with 36.6 per cent and 1.3 per cent in 1955?

The Court: 1.5.

Mr. Bergson: 1.5. Yes. I am sorry. It is the wrong glasses.

Q. 1.5?

A. Yes, sir.

Q. Right?

A. Yes, sir.

Q. And what does that chart show as ALCOA's share of the market for the year 1960?

A. 25.4 per cent and for Rome 1.2 per cent.

Mr. Melchior: May it please the Court, what document are you referring to, Mr. Bergson. What pre-trial docu-

ment are you referring to, Counselor? Did you say D-13 [fol. 250] or D-14?

Mr. Bergson: I said D-13.

Mr. Melchior: Your Honor, according to our records, and we have a copy of our objections to their interrogatories, and our records indicate that we objected to Defendants' pre-trial D-13, which seems to be the same document that counsel now has designated as Defendants' AR-1.

Mr. Bergson: For identification.

Mr. Melchior: For identification.

Mr. Bergson: Your Honor, that objection——

The Court: What is the objection?

Mr. Melchior: I am trying to see what it is, Your Honor. Well, you may proceed with your interrogation, Counselor.

Mr. Bergson: Just so the record will be clear, that objection is based on the fact, Your Honor, that in making this chart we lumped with the primary producers the acquired companies in the years prior to the acquisition. But this has nothing to do with the figures I am referring to.

The Court: There couldn't be any dispute about what you are talking about now.

[fol. 251] Mr. Melchior: You are talking only about ALCOA and Rome?

Mr. Bergson: Yes.

Mr. Melchior: All right. Go forward.

By Mr. Bergson:

Q. So that, to get back to where we were, on your chart it shows, Government Exhibit 434, it shows ALCOA's and Rome's percentage of the market declining from 38.1 per cent in 1955 to 28.5 per cent in 1959.

The Court: Wait a minute. Are you talking about 434, Mr. Bergson?

Mr. Bergson. 434, yes, sir. That is the total for Alcoa and Rome.

The Court: Oh, the totals.

Mr. Bergson: Yes.

The Court: I beg your pardon. Go ahead.

By Mr. Bergson:

Q. Now if you had included the years 1954 and 1960, the range would have been from 43.9 per cent to 26.6 per cent; is that correct?

A. I haven't checked for sure on these figures, but taking them as proper arithmetic, yes.

Q. And since the last figure prior to the merger with the combined total was 29.1 per cent ALCOA's "dominant" position has declined from 29.1 per cent to 26.6 per cent; [fol. 252] is that right?

A. Between 1958 and 1960 it has declined, yes.

Q. A little bit more drastically than appears on your chart?

A. I didn't change anything about what happened in 1960 on my chart.

Q. I say the figures that I used showed a more substantial decline than your chart shows since the merger?

A. I don't see that we can compare what my chart shows with your chart.

[fol. 253] The Court: If you use 1960 the decline is more.

The Witness: Yes.

The Court: There is nothing to it. You can see it right away.

Q. It is a trend going down; isn't it?

A. Whether or not it is a trend is a question that I wouldn't be prepared to answer without an analysis of the sort I haven't gotten into. I would say I did not pick the figures with a view of leaving out in order to mislead. If I had wanted to do that, I would have left out 1955 when it was 38.1 and started with '56 when it was 26.5, and then shown it had gone up from 26.5 to 28.5 in 1959. I was not trying to do that. I was just taking a reasonable period.

The Court: Nobody is claiming that you were trying to do that.

Mr. Bergson: That is exactly what I was going to say, Your Honor. I hope that you don't feel I am trying to cast any aspersions on what you have done at all.

I would like to have marked as Defendant's Exhibit AR-2 for identification a chart marked "Shipments of A.C.S.R. and aluminum cable bare by primary producers or affili-

ates including merged companies and other producers, 1954 [fol. 254] to 1960."

(Chart marked as Defendant's Exhibit AR-2 for identification.)

Q. Now let's go back to your chart 2, Dr. Martin, which is Government Exhibit 435. And I show you Defendant's Exhibit AR-2 for identification, which is a chart dealing with the same products.

A. Yes.

Q. Now this chart has been submitted to Government counsel and they have not posed any objection to the accuracy of the Universe figures or the accuracy of the figures of ALCOA or Rome. Now looking at the year 1954 on that chart, what percentage of the market did ALCOA have?

A. 48.4.

Q. And what percentage did Rome have?

A. .2.

Q. And going to 1960 what percentage did ALCOA have?

A. 30.6%.

Q. And Rome?

A. One-tenth of one percent.

Q. So the total is 30.7% for ALCOA and Rome?

A. Yes.

Q. And, therefore, if you had used the period from 1954 [fol. 255] to 1960 you would have shown a decline in ALCOA and Rome's position from 48.6% to 30.7%; is that right?

Q. That's right.

A. And from 1932—I beg your pardon, 1958—I was looking at percentages—1958, the last year before the merger, a decline from 32.8% to 30.7%; is that right?

A. Yes.

Mr. Bergson: Another indication of ALCOA's "Dominance" in this field.

Would you mark as Defendant's Exhibit AR-3 for identification a chart entitled "Shipment of aluminum insulated or covered wire and cable by primary producers or affiliates including merged companies and other producers, 1954 to 1960?"

(Chart marked as Defendant's Exhibit AR-3 for identification.)

Q. I show you Defendant's Exhibit AR-3 for identification, which corresponds to your chart No. 3, which is Government Exhibit 436. I ask you what percentage that shows for the year 1954 for ALCOA?

A. 10.0.

Q. And for Rome?

A. 6.9.

[fol. 256] Q. Which is lower than the figure with which you started in 1955.

A. Yes, lower.

Q. Lower for ALCOA and the same for Rome.

A. Just the opposite from the situation I previously stated.

Q. In 1960 what does it show?

A. It shows ALCOA 10.6; Rome 4.2.

Q. So that is a decline from 1954 to 1960 from 16.9 to 14.8.

A. Let's see. For ALCOA it increased from 10 to 10.6 and for Rome it went down from 6.9 to 4.2. You add them together, you get a slight decrease, yes. The decrease would be greater if you started with '55 as I did.

Q. Right.

A. And if I were trying to show deliberately something, I would have used '54.

The Court: Witness, don't get the impression—I don't get it—that is not what he is driving at at all, I don't think.

Mr. Bergson: No, I am not trying to discredit Dr. Martin at all. I have a very high regard for him. He has provided me with some very interesting reading, as a matter of [fol. 257] fact.

Q. Now from 1958, the year before the merger, to 1960, two years after the merger, the ALCOA-Rome share declined from 16.3 to 14.8; is that right?

A. Yes.

The Court: Starting a new subject?

Mr. Bergson: Yes.

The Court: All right. Take a short recess.

Mr. Bergson: I am sorry to be so slow, but it is hard to handle all these charts.

The Court: That is all right.

(Whereupon, a recess was taken after which the Trial was resumed.)

[fol. 258] Q. Dr. Martin, would you please look at Government Exhibit 434, which is your Chart No. 1, I think. I notice on this chart you have set out the figures for the Okonite Company, which in 1959 represented one-tenth of one percent of the market, and I also notice that in your footnotes you refer to Circle Wire and Cable, Continental Wire and Cable—no, I guess it is not Continental Wire and Cable, Continental Copper and Steel Industries and the General Electric Company. Now you state that Circle Wire and Cable had three-tenths of a percent; Continental had one-tenth of a percent and G.E. had four-tenths of a percent in 1959; I wondered why you didn't include those on the face of the chart.

A. These firms were included in the general statement in the footnote that says that companies were required to report only if they shipped more than 10,000 pounds a month, which meant that if a firm produced less than 10,000 pounds a month it didn't have to report. We found in our letters from the companies when we wrote to them, all the companies that were in the list supplied by defendants in interrogatory answers as being in the business, that these companies had not reported. I put the information in on Okonite, it reported. I used as my criterion as to whether I put it on the face of the table whether it had produced over 120,000 pounds in any one year. Now, [fol. 259] Okonite had not done so in 1958 but it had in 1959, and the percentage differed for different years, but primarily I was trying to get on the face of the table what seemed to me the important information, but for completeness to be sure all the information was there someplace, I put some of these minor amounts in the footnotes.

Q. Wouldn't it have been a more graphic portrayal of what the industry situation was if you put these companies which in 1959 had more than Okonite, had more than Roebling, more than Western Electric which had 0.0 on the chart?

A. Mr. Bergson, what may be true for 1959 may not be true for 1955 or 1956 or other years. I made my decisions on these things with respect to the whole chart, as to

whether it would be more graphic I am not sure but what it might have been more confusing. I tried to simplify and to make it as clear as I could make it of the structure of the market with everything I had being put in——

Q. Well, don't——

A. —one place or another.

Q. These three companies alone represented eight-tenths of a percent of the market, don't you consider that an important percentage?

A. Well, I made the statement in the footnote that I had [fol. 260] considered them, I made the statement that the addition of these companies would change it no more than two-tenths of one percent. To put all of this in would have cluttered it up without adding anything significant.

Q. So it would have cluttered up the chart to put in the figure?

A. It wouldn't have been more graphic.

Q. It would have cluttered it up to put in two-tenths of one percent, but it wouldn't clutter it up to put in that the company was acquired by Kennecott.

A. It produced five-tenths of one percent in 1956.

Q. You put in a company like John A. Roebling which produced 0.0 percent in 1958, and 0.1 percent in 1959 and produced nothing in the years before that, you stuck that on the face of the chart, was that for the purpose of having a footnote on that so you could say they were acquired by Reynolds?

A. No, it was because first it report to BDSA, and secondly, it had shipments greater than 120,000 pounds in 1959, which was one of the years——

Q. One-tenth of one percent in 1959, Circle had three-tenths of one percent, G.E. had four-tenths, and they are not on.

A. That's right, they do not report to BDSA.

Q. In this case we are not trying to determine whether [fol. 261] people reported to BDSA, we are trying to set up what the industry structure is. The Government contends this is a line of commerce. You have omitted from this chart three companies producing eight-tenths of a percent of business, more than some of the companies you have on the chart, and more in some instances than the

Government claims is illegal so far as the acquisition of Rome is concerned. I don't understand that.

A. It seems to me, sir, that we are dealing here with a question of how much of it should go on the face of the chart or on the footnotes, not what has gone into it or what has been left out. I put some of it in the footnotes and some of it on the face.

Q. Why didn't you leave Roebling out?

A. Roebling reported and G.E. didn't. To a statistician that——

Q. When you put Roebling in you had to use a footnote.

A. I think I would have had to use a footnote to report that they did not report to BDSA, and they are not included in the total. I couldn't figure out any way to do this without a lot of footnotes and explanations.

Q. You had a lot of footnotes and explanations anyway, you have a whole page of them here.

A. That's right, they are there because I insisted on [fol. 262] completeness and honesty in everything I put in. It would be nice not to worry about footnotes, but——

Q. Wouldn't it have been just as easy instead of having this great big footnote on page 2 to have put Circle in and G.E. and say these companies didn't report to BDSA?

A. I would agree this is an alternative way of drawing up such a chart. I gave consideration to it. I had a number of alternative ways to draw it up. I picked one and this is it. All of them gave the same information.

Q. I suggest, Mr. Martin, this chart as it is constituted, because it leaves out certain companies, Circle with three-tenths of one percent and Continental with one-tenth of one percent and G.E. with four-tenths of one percent and puts in Roebling with 0.1 percent in 1959 and Western Electric with 0.0 percent in 1959, and Okonite 0.1 percent in 1959 does not present an accurate picture of this industry.

Now, we are talking here in this case, as you well know, Dr. Martin, in terms of minute percentages in the Government's line of commerce called ACSR and aluminum cable, bare, the percentage of the market that substantially lessens competition according to the Government was three-tenths of one percent, and yet you don't think it is important

[fol. 263] enough to put on the face of the chart eight-tenths of one percent.

Mr. Melchior: May I make a remark? I don't think that is the Government's contention at all. The Government is urging that as a result of this merger there may result a substantial lessening of competition, and this indicates market share, it doesn't indicate one point six percent of the competition is substantial, that is not the conclusion to draw from that chart.

Mr. Bergson: It is not the Government's position that the acquisition by Alcoa of Rome in your line of commerce, ACSR and aluminum cable, bare, by acquiring three-tenths of one percent will substantially——

Mr. Melchior: We think the merger will result in that standard.

Mr. Bergson: You don't intend to rely on that particular percentage?

Mr. Melchior: I think we stated the Government's position both orally and by brief.

Mr. Bergson: And both ways.

The Court: Well, about all that I see to it is that I think if these three companies were included on the chart it [fol. 264] would perhaps be more complete, give a better overall picture.

Would you say that I am right about that or am I wrong?

The Witness: Well, I would say it would be incomplete if I didn't have that information there. The chart consists of the page and the footnote. I hope the footnotes are read along with the chart, because if you read what is in the chart alone you wouldn't get the complete picture on almost any of them.

The Court: Judges are inclined to look at something that is easily readable, and they overlook the small print in the footnotes. I mistrust that is what they do.

The Witness: I would agree that it would have been nice to have had everything laid out simply, but I didn't find any way, and I studied it over for a long time as to the best way to put this together.

The Court: Let me ask you this, would the addition of those three companies, for instance, I think it is three, on the face of the exhibit change the percentage or your con-

clusion, the conclusion you seek to have the Court draw from [fol. 265] this exhibit?

The Witness: I don't think it would change the conclusion that would be drawn from the exhibit unless that conclusion were to hang on a very slight change, and I have indicated the leeway there, in the worst year, that is, the year where the change would be the biggest, it would be I believe I have said that in the footnote no more than two-tenths of one percentage point. This would be the maximum, and it would occur in the year with the smallest industry total for the firm with the largest figure. There you would get something under two-tenths of a percent change. In between it would have an effect that would be completely lost in the rounding of the numbers, but at the same time I wanted for completeness to put in the footnote so there would be no question that all the information was there.

By Mr. Bergson:

Q. Were you primarily interested in the statistics here?

A. Yes, my problem was to prepare statistical tabulations to present a mass of information in as concise a way as I could.

[fol. 266] Q. What has it got to do with the statistics that Okonite was acquired by Kennecott?

A. Well, the statistics have to be tied to particular firms or categories and in identifying and labeling these firms I have to have a separate firm for Reynolds, a separate category for Roebling; and I think it is relevant to point out that though they were one company after a certain date that they were separated for the period when the figures were given. That is the sort of thing I am trying to show. If someone reads this and knows that Reynolds and Roebling are merged and are one company, they might know that was not the case when I showed them as two separate companies.

Q. I asked you about Okonite.

A. I am sorry.

Q. Who on the face of this chart did Okonite merge with?

A. Well, let's see, Okonite——

Q. On the face of the chart.

A. I have to read my footnote.

Q. No, no, you just said you wanted the statistics to be understandable and you put the footnote in to tell that one was a successor company and the companies that appear on the chart were merged. I asked why did you put the footnote in for Okonite, there is no relation, Okonite has [fol. 267] no relation to any other company that appears on the face of this chart.

A. An alternate way might have been to put two lines, one for Okonite and then give the figures for 1955, 1956 and 1957 and then nothing thereafter, and another line for Kennecott and then the figures for 1958 and '59. I might have done it that way. Someone might say Kennecott has produced some wire and cable, Okonite Division, I don't have Kennecott on there. I wanted to show Kennecott and through its subsidiary Okonite in 1959 it is indicated here under the line "Okonite."

[fol. 268] Q. And this wasn't done for the purpose of getting a little testimony in on the chart?

A. I would say that my purpose was to be very careful to match up all the numbers with the right firms, identify them properly and completely.

Q. Let me ask you, did you consult with Counsel for the Government in the way this chart should be set up?

A. Yes, I think I did. I did discuss with them what my functions were to be as a consultant to them and that I was to be working on in the process. I talked about the material that was available and what they would like their statistician to prepare and put into evidence.

Q. Now in your Chart—it runs to 1959, doesn't it?

A. Yes.

Q. Do you know when Reynolds acquired Robling?

A. I am sure I have it in my footnote. March, 1961.

Q. Why did you have that footnote, then?

A. I think for the same reason that I had——

Q. This chart ends in 1959. You said a little while ago that you were trying to show the picture as it existed in each year. Now, in 1959 Reynolds and Roebling were as far apart as you and I were.

A. There was in my mind some confusion as to whom to attribute the production of labeling. During my effort to [fol. 269] get it set forth properly I found that this was

not an independent company. It was a subsidiary of Colorado Fuel and Iron Corporation from 1952 up until March, 1961, at which time the plants in question were transferred over. I put the information in——

Q. What has that got to do with the price of beans?

A. I suppose my chart may be over complete.

Q. Over something.

A. I always tried to guard against it being incomplete. I looked into the question of who the firms were to get the proper corporate names, to get the proper corporation connections puts them into footnotes so that in some cases it might have been less relevant. I did it in all cases. I think it was clearly necessary to talk about the Kaiser-Bristol acquisition, to explain the meaning and purpose. Then perhaps I could have left out any mention of them.

Q. I have not asked about the Kaiser-Bristol one.

A. You asked me about my policy with respect to labeling acquisitions.

Q. I can understand your policy as far as the Kaiser and Bristol are concerned. I can understand your policy so far as Southern and Olin Mathison, but I can't understand it on the others. And I suggest that the reason was that you [fol. 270] wanted to testify about these mergers in this chart.

A. My policy was to show all the information I had about corporate interconnections including the sale or purchase of plants which were involved in my figure.

Q. And in your desire to testify, we were not deterred by the insignificance of the percentages even though the percentages were smaller than the percentages of companies that you left off the face of the chart?

A. I have a very simple criteria by what I made of these decisions, as to what went into the face of the chart. I certainly will admit it would have been perfectly legitimate to leave out some I put in and put in some I left out.

Q. In this aluminum conductor lines of commerce that we are talking about in this case, except for the line of commerce that the Government has designated insulated and covered, we are dealing with infinitesimal percentages, and yet percentages that are more substantial than percentages that are involved in this acquisition are ignored. I don't

understand it, and I must say that I don't think you explained it to my satisfaction.

A. Well, sir if by ignored you mean put in footnote [fol. 271] instead of on the face of the chart, I would have to say yes. But they are not ignored in the sense of being not considered and left out altogether.

Q. Well, let's go on. Let's go to Chart 3. That is the next one that has footnotes. We will skip 2, because that doesn't have any footnotes. Oh, I beg your pardon, I would like to go back to 1, which is Government's Exhibit 434 for just a moment.

I would like to invite your attention to the figures for Southern Electrical Company for the years 1955 and 1956, and then for the years '57, '58 and '59, which is the period after their acquisition by Olin?

A. Yes, sir.

[fol. 272] Q. Do you feel or is it your view—let me strike that. Does this not show that Southern Electrical Company's share as an independent prior to its acquisition had diminished when it became part of an integrated company?

A. Well, I don't think I have ever asked myself that question, but looking at it I can see that the share of Olin-Mathison, 1957, '58 and '59, in all three years is less than Southern Electrical in '55 and '56, yes.

Q. And in '56 is it so that Southern Electrical as an independent had 8.1 and in '59 when it acquired the power of integration it had 5.0?

A. It had 5.0 in 1959, yes. 5.6 in '57. It fluctuated up and down and back up again.

Q. All right, now let's go to the footnote of Exhibit, Government Exhibit 436, which is your Chart No. 3. Strike this. I am trying to hurry and I am missing stuff.

The Court: Take your time.

Q. I would like to go back to Chart No. 2. "Shipments of ACSR and aluminum cable bare."

The Court: That is Exhibit 435.

Mr. Bergson: Exhibit 435. I beg your pardon.

Q. And I would like to invite your attention to the amount of business that Bristol was doing at the time it

[fol. 273] was acquired by Kaiser, put in your chart in 1956 at 0.0 percent of the market; is that right?

A. Yes.

Q. And it sold 91,000 pounds of ACSR and aluminum cable bare. And in 1955 it had 0.1 percent and sold 83,000 pounds of aluminum cable bare. This is one of the acquisitions that the Government referred to as a source of acquisition in the history of this industry that leads to concentration; is it not?

A. I am not sure about what the Government referred to. Where do you mean?

Q. Have you read the Government's brief?

A. Yes, I read the Government's brief.

Q. Didn't they refer to this acquisition?

A. I don't recall it in that much detail.

Q. Look now at the acquisition by Olin-Mathison Corporation of Southern Electrical Corporation. According to your chart at the time of acquisition Olin-Mathison wasn't even in the aluminum cable or ACSR line of commerce; is that right?

A. That's right.

Q. Now this acquisition took place in 1958, didn't it, the acquisition of Rome by ALCOA?

A. No.

Q. '59, I beg your pardon.

[fol. 274] A. '59.

Q. I notice here that in 1958 South Wire had 2.3 percent of the market. And in 1959 it had 5.0 percent of the market.

A. Yes, sir, that's right.

Q. Does that suggest to you that in 1959 Southern Wire had been hurt by this acquisition?

Mr. Melchior: I think that is an improper question.

The Court: No, overruled. I want as much understanding of these charts as I can get.

A. I am not sure what your question is talking about—South Wire.

Q. South Wire in 1958, the year before the acquisition, had 2.3 percent of the market. South Wire is one of the non-integrated companies, an unconcentrated company.

A. Yes.

Q. It in 1958 had 2.3 percent of the market; 1959, which

was the year of the Rome-ALCOA merger, which took place in 1959, it had 5 percent; is that right?

A. Its percentage was 5 percent in '59.

Q. And Nehring Electric, which is one of the independents, is it not?

A. Yes.

[fol. 275] Q. And it in 1958 had .6 percent, and in 1959 it had 2.2 percent; right?

A. Yes, it had 2.6 in '57 and dropped down in '58 and back up in '59.

Q. We are talking about since the period immediately before and immediately after the Rome acquisition. Certainly the Rome acquisition couldn't have anything to do with this dropping from 2.6 in '57 to 0.6 in '58?

A. Likewise it may have had nothing to do with its going up afterwards.

Q. I am not sure it did.

Mr. Bergson: Your Honor, I think that concludes my examination on Government's Exhibit 435. I have an awful lot more of this witness. Would you care to suspend for lunch now?

The Court: Well, I guess, yes. I guess I held you pretty tight yesterday. You don't need this on the record, Mr. Jordan.

(Discussion off the record.)

The Court: I guess I had better let you go until two o'clock.

The Clerk: Court is in recess until two o'clock.

(Whereupon at 12:35 p.m. an adjournment was taken until two o'clock p.m. of the same day.)

[fol. 276] AFTERNOON SESSION

APPEARANNCES: Same as Morning.

The Court: All right, gentlemen.

Mr. Melchior: May it please the Court, we have become a little concerned about some of our witnesses and the time schedule involved, and it occurs to me perhaps we could interrupt the examination of Dr. Martin so some of the witnesses who have been here for some time could go home,

and I have discussed it with defense counsel and they seem to be in agreement. So with your permission——

The Court: All right, we will suspend the Cross Examination of Dr. Martin.

A. Jackson Reeves, called as a witness on behalf of the Government, being first duly sworn, was examined and testified as follows:

Direct examination.

By Mr. Wertheimer:

Q. Will you please state your full name and position please?

A. Andrew Jackson Reeves. I am Chief of Civil En-
[fol. 277] gineering Design Branch, Division of Power, Tennessee Valley Authority.

Q. How long have you been with the Tennessee Valley Authority, Mr. Reeves?

A. 28 years.

Q. What jobs have you held with the T.V.A. prior to your present one?

A. Well, my first job with the Tennessee Valley Authority was Field Location Engineer. From that I was transferred to the Design Office in Transmission Design work. After that I was transferred to the General Engineering Office, and from that position I was elevated to Chief of the Branch.

Q. I see. What are the responsibilities of your present position?

A. The responsibilities of the present job is the total responsibility of transmission design, transmission location, acquisition of material, developing construction specifications for all the transmission work under the Tennessee Valley Authority Program.

Q. About how many dollars worth of new construction were you responsible for last year?

A. Last year's transmission design work covered about twenty-five million dollars.

[fol. 278] Q. Are you a professional engineer?

A. I am, registered with the State of Tennessee.

Q. Have you written in your field?

A. I have written some articles that appeared in the Trade Journals. The most recent article, I am co-author in the feature article of the Electrical World issue of January on the five-hundred thousand volt transmission-line.

Q. Mr. Reeves, could you generally describe the size of the T.V.A. system?

A. Yes. The Tennessee Valley transmission system covers eighty thousand square miles. The generating capacity of the present system is about twelve million kilowatts with three and half million kilowatts under construction. The generating plants are connected with some twelve thousand miles of transmission line.

Q. Would you describe the area that the T.V.A. system covers?

A. The T.V.A. system covers all of Tennessee, part of Kentucky, parts of Mississippi, part of Alabama, part of Georgia and part of North Carolina.

Q. How does the T.V.A. rank in comparison with electrical power systems in the United States?

A. T.V.A. is probably the largest integrated power system.

[fol. 279] Q. On your transmission network, what is the range of voltages?

A. Our system is connected with three primary voltages, forty-six thousand volts, sixty-nine thousand and one-hundred sixty-one thousand. In certain instances transmission is made by thirteen thousand volt lines to large customers on short sections of line.

Q. Prior to World War II what conductors did T.V.A. purchase for its transmission lines?

A. Prior to World War II T.V.A. purchased A.C.S.R. conductor exclusively for transmission lines.

Q. And A.C.S.R.——

A. (Interrupting) Aluminum—cable steel reinforced conductor.

Q. At that time were alternate bids solicited for copper and aluminum cable?

A. During the period from 1933 to World War II it was our policy to take alternate bids each time we were buying transmission cable.

[fol. 280] Q. What were the results of taking alternate bids?

A. Well, the results confirmed our position as to the economics of our design and the best cable to use, which in each instance proved to be ACSR without exception.

Q. What were the comparable costs of copper and aluminum at that time?

A. Well, in those days, or in 1936, the cost of copper conductor stranded into cable of say 400,000 circular mils would be about 13½ cents a pound. The equivalent ACSR cable would be 636,000 and it cost about 15½ cents a pound.

Q. In other words, the aluminum cable, the ACSR, was more expensive than the comparable copper cable, on a comparable basis?

A. That's right.

Q. Why did you then use aluminum?

A. The differential in material even over the difference in cost was less. The equivalent copper conductor of the size referred to would be 50 percent heavier than the ACSR cable, and even on a cost ratio of 13½ cents for copper and 15½ cents for ACSR for an average line of 50 miles there was still probably fifty thousand dollars to be saved in material alone.

[fol. 281] Q. During World War II what were TVA's buying practices?

A. Well, during the period of the emergency of the war we were restricted to products approved by the War Production Board and the material that we used for our construction was alloted by the Government from materials available.

Q. Then the choice was not an unfettered one?

A. That is exactly right. We were told what we could use and the amounts we could use.

Q. In the period since World War II what have been TVA's procedure in regard to conductor?

A. Of course, in the intervening period the cost of copper and the cost of ACSR has changed, but it still proves economical to design and build transmission lines out of ACSR conductor.

Q. Since World War II have you scrapped any of your copper lines?

A. Yes. At one period in around '56 or '57 the cost of

scrap copper went up to approximately 46, 47 cents a pound. At that time we were able to remove some copper on transmission lines that we acquired from existing power facilities in the Valley; we increased the capacity of these lines at no additional cost to the Authority. In one instance we [fol. 282] removed a large copper conductor on a 15-mile section of line, put in aluminum conductor and made a quarter of a million dollars net.

Q. In general terms, Mr. Reeves, how much copper conductor have you on your system now?

A. Well, our system is something over 12,000 miles, and the amount of copper conductor in the system would be in the range of 3 to 5 percent.

Q. I see. What are the reasons for your use of aluminum conductor?

A. Well, as stated, first the cost of the bare material favors the ACSR for a foot of equivalent conductor. Also the cost of handling, hauling, favors the lighter conductor, being the ACSR. The design advantages of ACSR due to its high strength qualities permits me to use less struetures per mile and that in turn is a real saving in transmission design and in turn the installed cost of the line.

Q. I wonder if you could give us an example of the savings both on the conductor and on the installed cost of the completed line.

A. Well, as a typical representative line of 161,000 volts, single circuit construction, the cost per mile in that type line using an aluminum conductor of 795,000 ACSR would [fol. 283] be $33,335. The equivalent copper conductor in that line of 500,000 copper would cost us $39,228 per mile, or some $6,000 more per mile for the same type line.

Q. In terms of percentages what would the difference be?

A. Well, just the bare material or the conductor cost alone, there is some 10 percent greater cost of the conductor, but the installed cost of the line complete, ready for operation, there would be approximately 18 or 19 percent additional cost.

Q. In addition to the economic considerations which you just outlined, are there any additional reasons for using aluminum conductor?

A. Well, as stated before actually the weight has a bearing on cost, the handling of it, the shipping, the hauling, the

direction. It also has advantages in higher voltages as it has advantage in corona.

Q. Would you please define corona for us, Mr. Reeves?

A. Corona is the loss of electrical energy into the air and small cables under high voltage have larger loss of corona than the larger cables. The equivalent aluminum cable being larger in diameter thus has less loss due to corona.

[fol. 284] Q. Would you compare these conductors in terms of corrosion problems?

A. Well, in terms of corrosion ACSR naturally oxidizes as soon as it is made, and then it protects itself from further oxidation. Copper as a metal continues to corrode or erode throughout its entire life.

Q. How does this affect the electrical system?

A. Well, the effect could be from contamination, from some chemical plant or atmospheric conditions, which would hurt one and not harm the other. That is the primary effect.

Q. How does TVA buy its electrical conductor, Mr. Reeves?

A. Well, being a government agency——

Mr. Adler: If he knows your Honor.

The Court: Yes.

Mr. Adler: This witness has not testified that he buys.

Mr. Wertheimer: I thought he said he was responsible for the design.

The Witness: I am also responsible for the acquisition of the material.

Mr. Wertheimer: Will you repeat the question to Mr. Reeves.

(Last question read by the reporter.)

[fol. 284a] A. We determine our needs. We write field requisitions covering the amounts required. The requisitions are put on invitations to bid and sent to prospective bidders. The bids are returned to my office. We review the bids, determine the low bidder, make recommendation for award.

[fol. 285] Q. Can any company producing, let's say, ACSR, bid on a TVA job?

A. Our policy for conductors only permits those com-

panies to bid on conductor who have been inspected by our technical team and put on the acceptable list.

Q. Did Rome Cable Corporation prior to its acquisition request such TVA approval.

A. Rome Cable called our materials branch requesting inspection of their facilities, at which time I was called and asked to mark my calendar to make a trip to Rome Cable plant.

Q. What would be the purpose of such a trip, Mr. Reeves?

A. To inspect the facilities, to get acquainted with the personnel and to know about their quality control within the plant.

Q. In other words, to approve Rome as a bidder on ACSR?

A. That's right.

Q. What happened subsequent to this request?

A. Well, within a couple of months I was called, this being about the first of 1959, was told to remove the tentative inspection of Rome Cable plant from my calendar, that it would not be made, that they were not interested in supplying or bidding on our ACSR requirements.

[fol. 286] Q. How many qualified bidders does TVA presently have for ACSR?

A. Six or eight, there is six or eight qualified bidders.

Q. Would TVA like more?

A. We encourage all qualified bidders to get our paper, invitations to bid, and submit bids.

Q. What has been TVA's experience in regard to the prices received on ACSR invitations?

A. Our experience has not been too good for the fact that over the 25 or more years we have been purchasing aluminum cable the bids in most instances have been equal bidding.

Q. Have there been any deviations therefrom?

A. Minor deviations, particularly one company has been successful bidder time and time again just by the one-half per cent discount he offers with his bid. However, he would increase his price to a small amount above the published price, thus giving him the business with the one-half per cent discount.

Q. Let me see if we can make that a little clearer. The price he bids is above the list price of others?

A. Slightly above.

Q. But with the one-half of one per cent discount it drops slightly below?

[fol. 287] A. Yes.

Q. By this means he has gotten TVA bids?

A. Considerable.

Q. What is the name of this corporation, Mr. Reeves?

A. Nehring Electrical Works.

Q. Why would TVA like more bidders in the field?

A. Well, naturally we believe in the more participation in the bidding the better chance it is for us to get competitive, real competitive bids and material at a cheaper price. We have found that so in all the other fields with the exception of one or two.

Mr. Wertheimer: Thank you sir. That's all.

Cross-examination.

By Mr. Adler:

Q. Mr. Reeves, your TVA transmission system about which you testified uses as you said ACSR, the cable product is ACSR?

A. Right.

Q. Is that bare?

A. Yes, overhead transmission construction is bare cable.

Q. Is any covered or insulated conductor used?

A. Not in overhead transmission construction by the Tennessee Valley Authority.

Q. So your testimony on the use of transmission cable [fol. 288] and the switch which occurred from copper to aluminum was related to bare ACSR cable.

Mr. Wertheimer: I don't believe Mr. Reeves testified to any switch.

The Court: Well, it is all the same thing. Go ahead.

The Witness: We have never switched from copper to aluminum cable. From the beginning of the authority, the conductor that we have bought of our own accord has been ACSR cable for overhead transmission construction.

By Mr. Adler:

Q. Now, when did you start using that?

A. In 1933.

Q. 1933?

A. Yes, sir.

Q. All right. The transmission cable which you use is the bare ACSR cable.

A. Or all aluminum in some instances. It is still bare cable.

Q. And the testimony which you gave regarding the reasons for your preference for such cable related entirely to bare overhead transmission cable?

A. That is my responsibility, for transmission construction which uses only bare cable.

[fol. 289] Q. You were not testifying at all about insulated or covered wire and cable products in your testimony?

A. No, I am testifying bare aluminum or ACSR cable in overhead transmission construction.

Q. Now, in 1933 when your system was established and you went to the use of ACSR bare cable in your transmission system, how many suppliers did you have of that product?

A. Only one.

Q. Only one. And how many did you testify you have today?

A. Six or eight.

Q. Had you in your position of responsibility with TVA and in the transmission cable field heard that Rome Cable was an important supplier of ACSR bare cable?

A. No, I had not heard. I knew the company by name. I was told to prepare for an inspection of their plant.

Q. Had TVA purchased other products, insulated or covered products from Rome Cable?

A. My office had not. It was not on the acceptable list.

Q. And you had not heard that Rome was a supplier of ACSR bare cable?

A. I had been told that they had requested inspection of the plant to be an acceptable supplier of our needs.

[fol. 290] Mr. Adler: All right. Thank you. That's all.

Mr. Wertheimer: No further questions.

The Court: Just one question, Mr. Reeves. In prepar-

ing this acceptable list, do you wait for applications to come from the manufacturer or do you go out to broaden your source of supply to ascertain yourself those that may be acceptable?

The Witness: Your Honor, the normal procedure is the company sends their representative by our office. They are interested in our business. Then we tell them the sequence of the conditions.

The Court: What I am getting at is that if you are short suppliers, or if you don't think you have a fair number of bidders, you could seek, if you wish, the larger number of suppliers that might go on your acceptable list, couldn't you?

The Witness: I believe we have followed the industry pretty close, we are acquainted with the potential suppliers. Their representatives call on us and in turn request inspection.

The Court: Yes, I understand all that, but mine is a [fol. 291] rather simple question. You don't go out and seek to expand your source of suppliers?

The Witness: No, sir.

The Court: So that you wait for the manufacturer, for instance, to come to you to establish himself within that class that you term acceptable?

The Witness: Right, sir, it is a highly specialized field.

The Court: So your list of six or eight does not represent the number of acceptable suppliers of ACSR, the number that might be acceptable, I should say?

The Witness: The number that might be acceptable could be greater.

The Court: All right.

(Witness excused.)

ROBERT LATANE WARE, called as a witness in behalf of the Government, being first duly sworn, testified as follows:

Direct examination.

By Mr. Mahaffie:

Q. Mr. Ware, will you state your occupation, please?

A. I am employed by the Virginia Electric & Power [fol. 292] Company as manager of transmission and distribution.

Q. Where is the Virginia Electric and Power located?

A. The general office is located in Richmond, Virginia.

Q. Thank you. What is your educational background?

A. I was graduated from Virginia Polytechnic Institute with a B.S. degree in Electrical Engineering in 1926.

Q. And what has been your engineering or business experience since then?

A. Sir, I started with the Virigina Electric and Power Company the day after graduation as a student engineer, and after serving as student engineer I worked in the relay department of the company in the system transmission department and in the system engineering department, and in May of 1931 I was transferred to Suffern, Virginia as superintendent of the Meter and Installation Department.

In 1933 I was made District Superintendent of that district, and in 1938 I was transferred to Norfolk, Virginia, as head of the engineering department of Norfolk District. I worked in Norfolk until March of 1942, when I was called into the army.

I stayed in the army for four years as an officer in the army, and I guess my most important assignment was when [fol. 293] I was given the mission of running the main line of communication for the Third Army commanded by the late General Patton.

After the war I returned to the States in March, 1946, and went to Norfolk, Virginia as Assistant District Superintendent of the Norfolk District.

In 1947 I was transferred to the Potomac District of the company at Alexandria, Virginia, as assistant superintendent of the Potomac District and I stayed——

Q. (Interrupting) Where is that?

A. Alexandria. I stayed in Alexandria until September of 1954, when I was transferred to the Richmond general office to organize a system distribution department. In January of 1956 I was made manager of transmission and distribution for the Virginia Electric and Power Company, the position that I now hold.

Q. What other responsibilities of your present position, sir?

A. I am responsible for the proper maintenance and operation of the transmission and distribution department and also responsible to see that they are operated in an efficient manner.

[fol. 294] Q. Have you ever had the job of designing transmission or distribution lines?

A. Yes, sir. In Norfolk, Virginia. In charge of the engineering department there from '38 to '42 I was directly responsible for the design of distribution and what some companies call sub-transmission. Everything below 66,000 is considered as distribution.

Q. By the way, Mr. Ware, is that 66,000 volts the breaking point between transmission and distribution a standard breaking point throughout the country?

A. No, sir, it is not. Everything over 66,000 and above is transmission, and the voltage below that, which we have in our system is classified as distribution.

Q. Now, Mr. Ware, what is generally the nature of the business of the Virginia Electric Power Company?

A. The Virginia Electric Power Company is an electric utility in business to sell electrical energy.

Q. Now I am going to ask you to state the size of the company, first, Mr. Ware, in terms of customers served.

A. Well, the figures I am going to give you will be figures as of December 31, 1960, which were included in our annual report for 1960. At this time house customers on December 31, 1960 was 761,700.

[fol. 295] Q. All right, sir. Now, if you have it as of the same date, what is the total system output of the Virginia Electric and Power Company?

A. Well, in 1960 our total output was 9,460,236 kilowatt hours.

Q. And once more, sir, as of that date, and if you have it,

how many miles of electric lines did the utility have in operation?

A. As of that date we had 31,800 miles of electric line in operation.

Q. What is the approximate size of VEPCO in relation to other United States electrical utilities?

A. Well, we rank thirteenth or higher. The last time I heard the rating, we were thirteenth from the top.

Q. Mr. Ware, what kind of localities are served by your company?

A. Sir, we serve from Norfolk, Virginia, across the state of Virginia, Norfolk is along the seacoast and we served on up into the Alleghany Mountains to Clifton Falls into North Roanoke, West Virginia. We serve communities of many types.

Q. I believe you said Norfolk?

A. We serve Norfolk, Hamden, North Richmond, Charlottesville, Virginia and any number of small towns.

[fol. 296] Q. Do you serve rural areas?

A. We serve 68 counties in Virginia and a good part of that consists of rural areas. We also serve a part of eastern North Carolina and a part of West Virginia.

Q. I see.

A. I can give you the number of counties if you want.

Q. I don't think it is necessary, sir. Would you describe generally, Mr. Ware, the transmission and distribution system of the Virginia Electric Power Company?

A. Yes. The transmission system extends from down in Elizabeth City in North Carolina to Norfolk, Virginia, Hamden, Virginia, Richmond, Virginia, back down to Charlottesville and then to Clifton Falls and Hamden, West Virginia.

Q. What is the purpose of the transmission system? What does it do?

A. The transmission system is to handle or transfer large blocks of electrical energy from points of generation to points of distribution.

Q. What is the purpose or function of the distribution system?

A. The distribution system is to get the energy from the points of distribution that I spoke of to the customer, ultimately to the customer.

[fol. 297] Q. Does the company use both overhead and underground lines in its transmission and distribution?

A. In transmission and distribution it uses both overhead and underground, but we have no underground lines in transmission.

Q. You do have them in distribution?

A. Yes, we do.

Q. Why do you use underground lines? Where do you use underground lines?

A. The underground lines on our system are used mainly in downtown areas of cities such as Norfolk, Virginia, Richmond, Virginia, Alexandria, Virginia and some in Arlington, Virginia.

Q. Mr. Ware, would you state the different general types of electrical conductors that are used by VEPCO in its distribution system?

A. We use bare conductor. We use covered conductor and we use insulated cable.

Q. How does bare conductor fit into the system? What is it used for?

A. Bare conductor is used 100 percent on transmission. All of our transmission is bare conductor. That is 66,000, 110,000 and 235,000 volt lines.

Q. And is it also used in distribution?

[fol. 298] A. It is used in distribution also, yes, sir.

Q. What about covered conductor?

A. Covered conductor is used only in distribution and is used on the primary lines only where it is required by city ordinance or where we have special tree conditions or such as that on primary lines. It is used quite extensively on secondary lines.

Q. Would you state the difference between a primary distribution line and a secondary distribution?

A. On our distribution system we have a number of high voltage primary lines. We have lines of 44,000 volts; 34,500 volts; 22,000 volts, but the most part of that distribution which gets energy out to the customer is either 7,212,-470; 7,620,132.

Q. I am not sure the Court understand nor I understand those last two terms that you used.

A. All right, sir.

Q. Now, the last two voltages that you described are secondary distribution voltage?

A. No, they are not secondary distribution voltages; no, sir.

Q. They are primary distribution voltages?

A. They are primary distribution voltages that run from our distribution substations out. Out to where our cus-
[fol. 299] tomer is located, at the location of the customer where we will have a step-down distribution transformer that will step the voltage to the utilization voltage of the customer.

Q. And that is secondary?

A. That is what we call secondary.

Q. Where does VEPCO use insulated cable in its system?

A. Well, it uses insulated cable in its underground system.

Q. Does the company use a product known as a service drop cable?

A. Yes, sir.

Q. And where does that fit into the system?

A. Well, sir, the way we install these transformers at the location or adjacent to where the customer is, we step from what I call a primary distribution voltage down to utilization voltage and that is where we run secondaries. So we run from the secondaries to the residences or places of business, if it is a small business, with a triplex cable.

Q. Would it be correct to say, sir, that is the line which runs from the pole outside my house to my house?

A. To the point of attachment on your house, yes, sir.

[fol. 300] Q. What conductor metals are used by the company, sir?

A. I am sorry?

Q. What conductor metals are used by the Virginia Electric Power Company?

A. Conductor metals?

Q. Yes, sir.

A. We use both copper and aluminum.

Q. Now, since you have been with the Virginia Electric Power Company, I believe you said since 1926?

A. That's right, except for four years in the Army.

Q. In that time has there been any change in the relative

use of copper and aluminum in overhead transmission and distribution?

A. Yes, sir.

Q. Would you describe the change or changes and when they took place?

A. The first transmission line that I know of on that property that was built using ACSR was started in 1928. It extended from Long Rapids in North Carolina to a point between Long Rapids and Hendersonville. That was 336,400 ACSR.

Q. When you say 336,400 ACSR, what term of measurement is that?

[fol. 301] A. That is in circular mils.

Q. And is that a standard measurement of each conductor?

A. Yes, sir.

Q. Thank you, sir, proceed. Go ahead.

A. Well, then from that time on we had a gradual trend from copper to ACSR conductor on our transmission lines. At the present time our transmission system is being constructed of aluminum ACSR just about 100 percent, and the reason I say that, sometimes where we take down some copper and we have to make a short extension, we use copper taken down from other circuits. But other than that we are 100 percent ACSR at this time.

Q. Are you talking now of transmission, sir?

A. Yes, transmission lines.

Q. What about distribution lines?

A. Distribution. Back in the early thirties when we started with an extensive rural program, we tried several different types of conductors. Up to that time we had used copper. We tried copper-weld-copper, we also experimented with——.

Q. What is copper-weld-copper, Mr. Ware?

A. Well, it is a steel conductor coated with copper and it may be used with bare copper conductors.

[fol. 302] Q. Thank you, sir. Now you were describing the change in distribution.

A. Well, it was not too long after we started this extensive rural program before we were using ACSR conductor on it 100 percent in rural areas, and we continued that way until 1948, is when we started to use ACSR and

straight aluminum conductor in that area, and on our secondary networks, that is on the secondaries, and residential areas and in towns.

Q. You say you started using aluminum in 1948?

A. 1948.

Q. Was any significant change made thereafter?

A. Well, sir, it took approximately a year and a half, two years to change from the use of copper to aluminum, and the reason I say that it took a while for us to put all of our crews and men doing the work with tools suitable for use with aluminum. And we also had a program of training our people to know how to put aluminum up so it wouldn't give trouble. So it did take two years or a little over to get into 100 percent use of aluminum. And by 100 percent, I say this is in the areas that we use aluminum transmission, rural distribution and on secondary systems. But I do want to clarify one thing that I said.

[fol. 303] Q. Yes, sir.

A. We do not use aluminum everywhere on our system.

Q. Now in what areas do you not use aluminum, sir?

A. We have some areas along the seacoast down around Norfolk, Virginia, Hampton, Virginia and along the coast of North Carolina where we tried to use ACSR conductor that we were not successful, so we then had to continue with copper.

Q. Are these the areas defined as——

A. Yes, sir.

Q. —seacoast areas?

A. Yes, sir.

Q. And within those areas do you use any aluminum at all?

A. No. The policy of the company, which is the stated policy, is that no aluminum will be used in those areas.

Q. In these areas what kind of conductor do you use?

A. We have to use copper.

Q. Do you have any maps which will show these areas?

A. Yes, sir. Here is one showing the area of Norfolk, Virginia and the section that we use copper in.

Q. Would you produce the others?

A. Here is one showing a section of Carolina and there [fol. 304] is one showing a section of Hampton.

Mr. Mahaffie: I am going to ask that this be marked as Government's Exhibit for identification. Mr. Reporter, would you mark these documents as 469, 470 and 471 for identification, please.

(Three maps marked as Government's Exhibits 469, 470 and 471 for identification.)

Q. Now, Mr. Ware, these documents have been marked as Government's Exhibits 469, 470 and 471 for identification.

Mr. Mahaffie: Your Honor, I would like to hold these up, if I may. This need not be on the record.

(Discussion off the record.)

By Mr. Mahaffie:

Q. Mr. Ware, I am going to show you, I am going to unfold and show you Government Exhibit 469 for identification and ask you to describe it and explain it, if you would, sir. Excuse me, Mr. Ware—strike that. Mr. Ware, was this, who prepared this map, sir?

A. That map was prepared by the head of the engineering department in Norfolk, Virginia. I requested him to send me a map showing exactly where we still use ½ copper [fol. 305] line.

Q. And does this gentleman work under your supervision?

A. Indirectly. He works in the Norfolk Division as manager of transmission and distribution. The head of the distribution, of that department, comes under me.

Q. Does this map correctly reflect the area of your system within which as you have described you only use copper conductor?

A. Adjacent to Norfolk, Virginia.

Q. And do the lines on this map correctly reflect that so-called copper area of your system?

A. Yes, sir.

[fol. 306] Now Mr. Ware, are those facts also true of the other two maps that we have out here?

A. They are, sir.

Mr. Mahaffie: Well, Your Honor, at this time I would like to offer Government Exhibit 469, 470 and 471 for identification into evidence.

The Court: Why don't you open up 470 and 471 so we can see what it is.

Mr. Adler: You are offering them in evidence?

Mr. Mahaffie: Yes, I am.

Mr. Adler: Could we just take a look at them?

Mr. Mahaffie: Sure.

(Documents shown to counsel)

Mr. Adler: No objection.

The Court: All right, I will receive them.

(Government Exhibits 469, 470 and 471 marked for identification received in evidence.)

The Court: On this last one, 471, is that area also marked in red? It is a smaller area there, is that it?

Mr. Mahaffie: It is outlined in red, Your Honor, the [fol. 307] actual color is closer to a salmon color.

The Witness: I guess it is.

The Court: All right. I will receive them. I guess I can understand them.

Mr. Mahaffie: Now, Mr. Ware—does the Court desire an explanation on these?

The Court: I think they are pretty plain. I don't think you need much explanation. The parts that are in red are the parts in which copper is used exclusively, is that right?

The Witness: Right, sir.

By Mr. Mahaffie:

Q. Mr. Ware, the Exhibits—well, I will strike that out. The Exhibits show what they cover on their face. Mr. Ware, in what other circumstances, that is, in circumstances other than the sea coast areas we have just discussed, would the Virginia Electric Power Company use a copper conductor overhead?

A. You say would we?

Q. Let me rephrase that, would the Virginia Electric Power Company use a copper conductor in overhead transmission and distribution in any areas of its system other than those areas outlined in red on these maps?

[fol. 308] A. Let me ask you a question. You say would it use, and we would not use unless we had some industry

would move in there that had some contamination that they would find aluminum wouldn't stand up, then we would probably try copper. But I know of no place that we need copper other than along the sea coast, if that answers your question.

Q. Yes, sir, that is fine. What conductor metal does the company use in its underground cables?

A. It uses copper a hundred percent on underground.

Q. Why is this?

A. Well, on the underground systems, as I said, in downtown Norfolk and downtown Richmond and Alexandria and Arlington, we would be faced with a lot of problems if we tried to make extensions off those copper systems with aluminum. It would mean that we would have to have tools different from the ones we now have; we would have to train our personnel and all and I don't think at this time we could consider using aluminum.

Q. Are there any differences, significant differences in training and experience required for crews working with aluminum as opposed to crews working with copper?

A. Yes, we think crews have to be better trained to work with aluminum. Aluminum is softer, is easily damaged and [fol. 309] all, so we have had to pay more attention to the training of those crews.

Now aluminum is a metal that oxidizes very fast, so we have to make sure that the metal is clean and that the connector is coated with no oxide, what most people call it, and it is used immediately so it won't oxidize and tend to make a poor connection.

Q. Do you use the same connectors for aluminum as you do for copper?

A. No, sir, we do not use the same connectors, we have gone to where we use aluminum to more or less a hundred percent compression connectors. We also use compression connectors on copper, but they are not of the same metal.

Q. Not the same product?

A. No.

Q. Mr. Ware, is the purchase of conductors by the Virginia Electric Power Company governed by any internal rules of the company?

A. Yes, sir.

Mr. Adler: May I have that question again?

(Reporter read back the last question as above recorded)

Mr. Adler: Your Honor, this witness has not been quali-
[fol. 310] fied I don't believe to testify on rules for purchasing. He is Manager of Transmission and Distribution, which I understand is an operating rather than a purchasing responsibility.

Mr. Mahaffie: Well, I will ask a different question to meet the objection.

Mr. Mahaffie:

Q. Mr. Ware, have you in connection with your work participated in the drafting or promulgation of any internal recommendations of the Virginia Electric Power Company which govern the purchase of conductors by the company?

A. Well, sir, no equipment or material is purchased by our company unless it is approved by what is known as the Standards Committee, and as head of the Transmission and Distribution Department I have representatives on that Committee. So the Purchasing Department has to purchase in accordance with our standards, and our standards call for aluminum to be used in the areas other than those shown as shaded on these maps, and in those areas we use copper.

Q. And does the Purchasing Agent have any discretion under these rules?

[fol. 311] A. You mean can he swap one metal for the other?

Q. Yes.

A. No, he cannot.

Q. Mr. Ware, what are the factors which cause the Virginia Electric Power Company to use aluminum instead of copper in overhead applications?

A. Well, we use aluminum instead of copper in overhead applications mainly from an economical standpoint.

Q. And what facts make it more economical for the company to use aluminum instead of copper?

A. Well, aluminum is lighter, it is stronger, and, of course, we have to take into consideration its conductivity and the price that we pay for it.

Q. Now can you give an example of how these factors work out in actual practice, that is, how the price of

aluminum and copper conductors plus the weight difference, plus the conductivity difference works out in actual practice, that is, in final cost of conductors?

A. I think we would have to use conductors that had equivalent current carrying capacities in order to compare one metal with another. Now the Friday before I left down in Virginia on Monday, I checked with our Purchasing Department to see if they had purchased any copper this year, and I found out that they had purchased some No. 4 [fol. 312] bare solid copper in January. So I inquired as to what we paid for it, and they said it was 37.85 cents per pound. Now that conductor weighs 126 and four-tenths pounds per thousand feet, which means that a thousand feet of the conductor costs approximately $47.84. Now the equivalent current carrying capacity of A.C.S.R. would be No. 2 A.C.S.R. That weighs 91 and six-tenths pounds per thousand feet. It costs 29.34 cents per pound, $26.87 for a thousand feet. That means that the copper would cost us 178 percent of what the aluminum cost us to do the same job.

Q. That is, to achieve equivalent current carrying capacity.

A. That's right.

Q. Thank you, sir. Mr. Ware, is the Virginia Electric Power Company planning any particularly significant new developments in transmission or distribution?

A. Yes, sir, we have had a very large construction program for several years. In 1961 I believe our appropriation was 85 million dollars, and they have a project which is already on the way to build a mine mouth plant, a plant up in the coal fields of West Virginia, near Petersburg, West Virginia, and from that plant we plan to build a five hundred thousand volt line down to Northern Virginia, that is, [fol. 313] adjacent to Fairfax and Alexandria, and we plan to complete a loop down to Richmond, Virginia and back around down by Staunton and down into the line where it comes in.

Q. This line is to operate at a half a million volts?

A. Yes, sir, five-hundred thousand, a half a million volts.

Q. Do any other utilities in the country have some lines operating at that voltage?

A. They have some experimental lines, I think, at T.V.A., I think they have an experimental line.

Q. This line is not to be experimental.

A. No, sir.

Q. What kind of conductor metal is going to be used on that line?

A. The exact size, etc. has not been decided, but in discussing it with the Manager of the Systems Engineering Department last Friday I was assured it would be A.C.S.R.

Mr. Mahaffie: Thank you, Mr. Ware.

That's all.

Mr. Adler: No questions.

(Witness excused)

[fol. 314] WILLIAM R. JOHNSON, called as a witness on behalf of the Government, being first duly sworn, was examined and testified as follows:

Direct examination.

By Mr. Melchior:

Q. Would you state your full name and the name of your employer?

A. I am William R. Johnson, employed by the Pacific Gas & Electric Company.

Q. What is the title of your position, Mr. Johnson?

A. Chief, Electric Generation and Transmission Engineer.

Q. How long have you occupied such position?

A. Since 1951.

Q. What position did you hold prior thereto?

A. I was Assistant to the Chief.

Q. Mr. Johnson, would you state what your educational background is?

A. I received the B.S. Degree in Electrical Engineering from Georgia Tech in 1937, and the Electrical Engineer Degree from Stamford University in 1940.

Q. Are you licensed in the State of California?

A. I am a licensed professional Electrical Engineer in the State of California.

Q. Are you a member of any electrical organizations or [fol. 315] Fellowships?

A. I am a Fellow of the American Institute of Electrical Engineers.

Q. Would you state the type of business that Pacific Gas and Electric is engaged in?

A. Pacific Gas and Electric is engaged in both gas and electrical business from the standpoint of production, transmission, distribution and sale.

Q. Where is it located?

A. It is located in the northern and central portion of California, serving an area of approximately 90 thousand square miles.

Q. Can you give me the approximate installed generating capacity?

A. As of the end of 1960 it was approximately five million six-hundred thousand kilowatts of installed capacity owned by the company, and approximately four-hundred seventy thousand kilowatts available from other sources.

Q. Can you give me an idea as to the size of P.G. and E. compared to other utilities in this country?

A. By most methods of measurement P.G. and E. is the largest investor-owned electric utility in the United States, and I believe in the world.

Q. Would you describe briefly the climatic conditions [fol. 316] that are found in the area in which your company operates?

A. Our territory includes a variety of terrain, including coastal, mountain, desert, semi-arid regions. On the whole the climate is quite mild.

Q. Do you consider this to be quite a variety of climatic conditions from an engineering standpoint?

A. Yes, I do.

Q. Now specifically what function does your company engage in in the field of electricity?

A. We generate, we transmit, distribute and sell to the consumer electric power.

Q. What are the sources of energy utilized by your company?

A. We have five energy sources. These include, No. 1, hydro-electric power from falling water and four sources of thermo energy used to operate steam turbine generators.

These four sources are natural gas, oil nuclear reactors and geo-thermo power from underground sources.

Q. Now could you in a very general way describe the means by which your company generates electricity and transmits and distributes it to the ultimate consumer?

A. Now I can——

Q. (Interrupting) Now I would like you to do this as [fol. 317] though you were explaining this to a layman as opposed to a technical approach.

A. Well, power is generated in quite a number of different plants located on different parts of the system. A typical plant might have several large generating units, say, of one-hundred thousand kilowatt capacity. Immediately after generation the power—it is generated at a voltage of twelve to, say, eighteen thousand volts. Immediately after it leaves the generator it is stepped up by a transformer to a transmission voltage. In our case this would normally be 220 thousand volts. The 220 thousand volt transmission system or bulk power system, as it is sometimes called, consists of several thousand miles of transmission lines interconnected covering the area of the system. Power is transmitted over these lines to particular load areas and stepped down at transmission sub-stations to intermediate voltages of, say, 110 thousand or 60 thousand volts. These intermediate voltage lines further traverse the local load areas and from them power is further stepped down and at distribution stations it is stepped down to, say, 12 thousand volts, 12 thousand volts being a typical distribution voltage such as we see carried on lines on the city streets. [fol. 318] From these distribution lines individual transformers step down again to the customers voltage of either 110 or 220 volts. This is very briefly the general picture of power generation, transmission, distribution.

Q. Now Mr. Johnson, would you state very generally what the duties of your own position are?

A. I have responsibilities covering two general functions, namely, planning or system planning and design. The design function includes specification and detailed design. Under these two headings I have responsibility for electric generating plants, high voltage transmissions lines, that is, lines which are 60 thousand volts or more—lines of lower voltage are considered distribution and come under a differ-

ent responsibility—transmission sub-stations which step down the voltage from the high voltage transmission to intermediate voltage, and high voltage underground cables. These are the main areas of my responsibility.

Q. Are you generally familiar with the type of the electrical conductors purchased by P.G. and E. for the transmission of the electrical energy?

A. I am.

Q. Could you state generally what type of conductor [fol. 319] P. G. and E. purchases for overhead transmission?

A. For the last at least six or eight years we have purchased nothing but either A.C.S.R. or all aluminum conductor for overhead transmission lines.

Q. Now would you state why you purchase aluminum entirely?

A. This is a matter of economics consistent with satisfactory service. Very briefly and simply, one-half pound of aluminum will perform electrically equivalent to one pound of copper if it is fabricated into conductor, and therefore, one could afford to pay roughly twice as much per pound for aluminum as for copper to break even. This is an oversimplification, but it is a pretty good rule of thumb, and the economics are overwhelming in favor of aluminum conductor at the present time.

Q. Now with respect to overhead transmission I believe you mentioned two types of aluminum cable, you spoke of bare aluminum cable and A.C.S.R.; would you distinguish the two insofar as use for overhead transmission is concerned in your system?

A. I spoke of all aluminum, not bare, aluminum, and A.C.S.R. We use all aluminum conductor throughout the major portion of our system where we have light loading conditions, that is, we have no snow or ice load to contend with. In the mountainous areas or areas where we may [fol. 320] have exceptional weather conditions from the standpoint of wind or ice or snow, we will use the A.C.S.R. conductor which has a steel core and is therefore stronger.

Q. Now is the all aluminum conductor and the A.C.S.R. conductor that you use for overhead transmission lines insulated or bare?

A. It is entirely bare.

Q. Now are you familiar with the type of conductors that are purchased for underground transmission by your company?

A. I am.

Q. Would you state the type of conductors you purchase for underground transmission?

A. We use entirely copper conductor for underground transmission.

Q. Now is this copper conductor that is used for underground transmission bare or insulated?

A. It is insulated.

Q. Now can you state why you use insulated copper conductor underground for transmission purposes exclusively?

A. This is as compared to aluminum?

Q. Yes, as compared to aluminum.

A. The answer lies in both economics and technical [fol. 321] factors. The equivalent aluminum conductor, equivalent electrically is larger in diameter. A large portion of the cost of an insulated underground transmission cable is in the insulation, which consists of a great many layers of specially prepared and applied paper. Therefore, due to the larger diameter of the aluminum it requires a considerably larger amount of insulation to be applied in the case of aluminum conductor, and this tends to offset some of the savings that might otherwise result from the use of aluminum. In addition to this there are technical factors that have not yet been satisfactorily resolved for the use of aluminum for underground high voltage cable. Some of these have to do with connections, possible chemical reactions of oil and other material used in the insulation.

Q. Now Mr. Johnson, are you responsible for the procurement of any of these conductors for transmission purposes?

A. No, I am not, I am responsible for the determination of specifications under which conductor may be procured, but the procurement is the responsibility of the Purchasing Department.

[fol. 322] Q. In other words, your group draws or you yourself, the specifications which are binding upon your procurement officials.

A. Yes.

Q. Now are you generally familiar, Mr. Johnson, with the

suppliers of your company for aluminum and copper conductors for transmission purposes?

A. Generally speaking, yes.

Q. Would you state for the record who your suppliers are in the field of aluminum for transmission purposes?

A. We have bought conductor from ALCOA, Kaiser, Reynolds, Anaconda, General Cable and perhaps Olin Mathieson, I am not too certain on that one.

[fol. 323] Q. Do you know which companies supply copper transmission conductors to PG&E?

A. Yes. We have bought underground copper cable from General Cable, from Okonite and from General Electric. The latter is no longer a supplier.

Q. Now, in connection with the services of these aluminum and copper conductors to your company for transmission purposes, are there any services which these companies provide to your company?

A. Yes, there are.

Q. Would you generally describe the type of services you receive from these companies in connection with the aluminum conductors which you purchase?

A. Yes. I would say that there are perhaps four general categories of service. The first would be the supplying of information on the sag and tension and conductor creep. Aluminum conductor, and I am speaking particularly of all aluminum will stretch with time and it is important in installing this conductor to know how much it will sag ten years from now and we obtained information from the supplier as to the characteristics of this long-term creep or sag, so that we can install a conductor initially to the proper sag and tension so that it will have a proper ultimate sag.

[fol. 324] The second category——

Q. May I interrupt you a moment?

A. Sure.

Q. Mr. Johnson, now you speak of this creep and sag characteristic of aluminum conductors. Do you have this same problem in connection with your copper transmission conductor?

A. You are speaking of the underground or the overhead?

Q. Well, you only use copper underground?

A. No. You do not have the same problem, because the copper underground is lying in a conduit. It is under no tension after it is installed. It is quite a different type of problem of installation.

Q. Are you familiar with the characteristics of copper to such an extent as to tell me whether you know as whether this same problem that you have mentioned in connection with aluminum is also present in connection with copper, were copper used for overhead purposes?

A. To a much lesser extent. There is much less creep in copper than there is in aluminum.

Q. Now, you may go on to the second.

A. The second category of engineering service that the aluminum conductor manufacturer of supplies has to do with the problem of vibration. Are all overhead conductors [fol. 325] subject to certain amount of vibration caused by the wind and aluminum conductor or aluminum as a metal is more susceptible to fatigue failure from this cause, and it is necessary to use what is known as vibration dampers, or protective armor rods at the points of support to reduce the possibility of cracking from fatigue failure due to vibration. And we look to the manufacturers of the conductor to supply information as to how best to — this.

The third——

Q. Now, before you go to the third one, from your knowledge of the characteristics of copper were copper used for overhead transmission purposes, to what degree would this second problem that you speak of affect the copper conductor?

A. To a lesser degree. It is still present but to a much lesser degree.

Q. Now, you may go to the third.

A. The third category of problems would be in the field of corrosion where aluminum conductor particularly in coastal areas may be subject to corrosion effects due to salt fog, and we seek the advice and obtain help from the manufacturers on the best methods of inhibiting corrosion by the use of corrosion inhibiting greases, or the best techniques in the make-up of connections and footings.

[fol. 326] The fourth category——

Q. May I interrupt you again before you go to the fourth one?

A. Sure.

Q. From your knowledge of copper and its characteristics, were it used in your system as an overhead conductor, to what degree would this same problem be present in copper as an overhead conductor?

A. In general the corrosion problem is much less with copper than it is with aluminum.

Q. And this is because of basic differences in the character of the two methods?

A. It is the chemical reaction differences in the two metals.

Q. I see. Now, you may mention the fourth.

A. And the fourth item I would mention is in the physical problems of construction, of handling the conductor, the problem of stringing it, of preventing damage to the conductor, types of reels, stringing equipment, what one might call the practical problems of field installation. Here again aluminum is more easily damaged because it is a softer metal than copper and thus requires more care in handling.

[fol. 327] Q. Now, all these problems that you have mentioned in connection with aluminum, I believe you said that your suppliers render guidance and advisory services and similar services to you in connection with these problems; is that correct?

A. They do.

Q. Do all of your suppliers render these services?

A. To varying degrees.

Q. To varying degrees?

A. Some more so than other.

Q. Some more so than others. Is this a valuable consideration?

A. It is.

Q. Does the fact that these services are offered to you by these companies in any way have a tendency to shape your recommendation as to who the successful bidder may be?

A. We definitely make recommendations to our purchasing department regarding this type of service and its value to us, so that purchasing may have its recommendations in guiding them in making purchases.

Q. Does ALCOA render services to you as a supplier in this connection?

A. They are outstanding in this respect.

Mr. Melchior: They are outstanding in this respect. [fol. 328] No further questions. No further questions. Your witness.

The Court: Take a short recess.

(At this point a recess was taken after which the trial was resumed.)

Cross-examination.

By Mr. Adler:

Q. Mr. Johnson, in your testimony describing the transmission system of Pacific Gas and Electric Company, you were referring exclusively to bare cables used in the transmission, in overhead transmission.

A. Yes, in the overhead lines, that is correct.

Q. So far as the overhead transmission is concerned, you are not referring in any way to covered or insulated products?

A. No, sir.

Q. Is that correct. In your testimony you referred to several of your suppliers of overhead cable, ACSR. Was the Rome Cable Corporation prior to April of 1959 one of your suppliers of that product, based on your knowledge?

A. Not to my knowledge. Certainly not in any major way if they were.

Mr. Adler: No further questions.

[fol. 329] Mr. Melchior: No further questions from the Government.

(Witness excused.)

Mr. Melchior: I suppose we can resume with Dr. Martin now, if it please the court.

DAVID D. MARTIN, resuming the stand, testified further as follows:

Cross-examination (continuing)

By Mr. Bergson:

Q. Mr. Martin, when we adjourned for lunch this noon we had finished discussing Government Exhibit 435, and I would now like to invite your attention to Government's Exhibit 436, which is your Table No. 3, I believe?

A. Yes.

Q. Which is entitled "Shipments of aluminum wire and cable, insulated or covered, 1955 to 1959." And again I would like to invite your attention to the explanatory notes on page 2. I note that in footnote 1 you refer to four companies which had shipments of insulated or covered aluminum conductor in 1959. One of them is Circle Wire and Cable, which you said had one per cent in 1959. Continental [fol. 330] which you said had approximately .4 of a per cent. G.E., which had 1½ per cent. Triangle, which had .1 of a per cent, or less than .1 of a per cent.

Now, I would like to ask you again why you didn't include those companies on the face of the chart when you included companies which in 1959 had .6 per cent or even a company which had 0.0 per cent.

A. My answer is the same, I think, as I gave earlier in respect to No. 1. Now, the firms listed on the face of the table itself all reported to Business Defense Services Administration. The table shows the total industry shipment report to B.D.S.A., and the breakdown of this as far as possible into the forms, reports on their shipments as reported to be B.D.S.A.

[fol. 331] The Court: A little louder.

The Witness: The shipments that you referred to by these four companies were not reported to the BDSA even though in some specific years they appear to have produced more than 10,000 pounds per month. I noted that in the footnote and gave the percentages on them. I might have put it in the table. I considered putting it in the table. I had a number of alternative ways to set the table up. I could have had several categories of firms, and I think that

possibly if I were doing it over again I would do it somewhat differently, but I chose at the time I made the decision to list on the front here the firms reporting to BDSA and to explain what other information was available to me in the footnote.

I indicate that if I had chosen to add these into the total and computed the percentages on that basis, that the market share on that table would have been changed by more than six-tenths of one percentage point.

By Mr. Bergson:

Q. You don't consider six-tenths of one percentage point [fol. 332] significant?

A. I thought it was small enough since that was the maximum, it would not be that not for all of them, that would be the worst situation, that would be the largest sales in the years with the smallest totals, and this for most of them would be considerably less than that. In other words, I placed a maximum amount of error in leaving those shipments off, and it seemed to me to be small enough that I was justified in doing it.

Q. If that six-tenths of one percent is twice the three-tenths of one percent that Rome had in ACSR, bare, in 1958, the year immediately prior to the acquisition——

A. That is certainly true, Mr. Bergson, but let me point out that the six-tenths that I am talking about would not be on a figure that is three-tenths plus or minus six-tenths, it would be on a figure that is 22 percent or 26 percent. The amount that the market share would be affected would depend on the magnitude of that market share.

Q. I understand that, but the three-tenths which would be added to ALCOA's is the same sort of three-tenths that would be affected by one of the largest ones, isn't it?

A. It would be added proportionately, however, to all [fol. 333] the figures in the picture.

Q. I am sure that that is so, but what I am trying to point out is that the six-tenths of one percent——

A. It would be reduced, I might say, it wouldn't be added.

Q. Whatever it is, it is six-tenths of one percent and that is twice the percentage that Rome had in the Government's line of commerce ACSR aluminum cable, bare, which

is charged by the Government to be a significant factor in determining whether or not this merger substantially lessened competition, yet it isn't significant enough for you to put on a chart.

A. The six-tenths that I am talking about in the footnote is the maximum amount by which any figure, any percentage figure on the face of the chart would be reduced if the industry total were increased by the amount of those shipments.

Q. All right. ALCOA——

A. Not the same sort of thing as the shipments of ALCOA, it is a margin.

Q. ALCOA had the largest share, right?

A. In 1959?

Q. In 1958 or in your Chart No. 2, Exhibit 435.

A. Well, I thought we were talking about 436.

[fol. 334] Q. I am trying to relate the relative importance of these percentages. Now you have six-tenths of a percent of the total; you have companies that you don't report on the face of the chart whose combined total was three percentage points?

A. I don't think these are comparable. You are comparing in the one case the upper limit on an error that might be in the percentage; the other case, the magnitude of shipments of a company compared with the base, and if I were stating that there might be a six-tenths of a percent error in a figure the size of this three-tenths, that would be another matter, but the error on those figures would be very, very much smaller than that. I have placed an upper limit. I certainly don't claim that these figures are exactly right. Certainly they have to be taken with some possibility of a little change. You see, that is the basic reason for having five years instead of one year, to get the picture of the market. They vary from year to year. They might be a little different if we had taken fiscal years ending June 30 instead of December 31. In that footnote I am trying to indicate the degree to which the shipments of these companies that did not report to BDSA would affect the structure picture I am giving on the other page, and I don't [fol. 335] see that one can evaluate the significance of a percentage, six-tenths, in one context and carry that over to a completely different context.

Q. Did this three percent here on the back, did you take the trouble to increase the BDSA total by that three percent?

A. You mean on table——

Q. On Table 3, you have the total industry shipments reported to BDSA as 100 percent.

A. Did I take the trouble to take the General Electric and Circle and those figures and increase the total?

Q. Yes.

A. I did, yes indeed, I increased it.

Q. You mean these figures you used aren't the BDSA figures?

A. No, they are the BDSA figures. I thought you asked did I in working up the table take the trouble to see what happened.

Q. You had figures for Circle, Continental, G.E. and Triangle which were in addition to the BDSA totals.

A. I might have added them on.

Q. And if you had added them on, the percentages of Rome and ALCOA would be smaller?

[fol. 336] A. The percentages would be smaller, the maximum amount that any percentage could be smaller would be six-tenths of a percent. That is what the footnote is for. I think of that margin of error, or from that source of error I have a possible error that I have stated the limits of in the footnote.

Q. Here in this chart we are talking about percentages that are even greater than the percentages that we were talking about this morning. For example, we have a whole percentage point so far as Circle is concerned, and a percent and a half so far as G.E. is concerned, and yet on this chart, sir, you have several companies with less than a full percentage point for 1959.

A. Well, I think, Mr. Bergson, that one of the reasons why this occurred was that I was not drawing the chart just for 1959, I was drawing the chart for several years in order to get a broader base and a better picture of the market structure. If I had only been doing it for 1959 I would have done things differently, I am sure.

One of the percentages, for example, for 1959 is zero. The shipments were zero. This was for Westinghouse, but for 1957 it had a larger amount; for 1956 it had a differ-

ent amount. It reported it. The reason it is in there is that [fol. 337] it had more than 120,000 pounds in 1956.

Q. Let's take Westinghouse for example, you have three-tenths of a percent as a maximum for Westinghouse in any one year, that was in 1956; you have two-tenths of a percent in 1957 and you have nothing in 1958 and '59. Now, if you applied the same reasoning, why wouldn't Westinghouse go into the footnote too?

A. I had two criteria that were relevant and were used as to which I put in the chart and which ones I put in the footnote. One of these was whether or not the firm reported to BDSA; the other one was did it report that it produced more than 10,000 pounds per month. If in no year—I applied this, however, for each year. If it reported to BDSA it went into the face of the chart unless it had reported something less than 10,000 pounds per month, less than 120,000 pounds in any year.

Those were the bases on which I made the decision. I am quite willing to grant I might have done it another way, and I imagine that if I had done it another way you may well have asked why I didn't do it this way.

Q. It would have presented a different picture of the industry, wouldn't it?

[fol. 338] A. I don't think so, I don't think the picture of the industry was affected by the decision I made on this point.

Q. You have tucked away in a footnote a company which is one of the major industrial concerns in the United States, with vast resources, General Electric Company, which produced 1.5 percent of the product covered by the chart in 1959. You also have tucked away in a footnote a firm which is a subsidiary of one of the great copper producers in the United States, Circle, which is a subsidiary, as you know, of Cerro de Pasco, and that is not on the chart. Now I just can't escape the conclusion that this chart was designed for the purpose of maximizing out the position of ALCOA and Rome without giving true effect to what the industry structure is.

A. Well, I don't agree with that conclusion. I tried to design the chart so as to do two things: one, take a very big mass—and I assure you it was a very big mass—of letters and materials and Government publications and *interratory*

answers and try to pull out of this what I thought was the meaningful, useful information in looking at the market structure of this broad line, and that was one thing. The other thing was to pull it out so it would be as clear and [fol. 339] simple as possible. I wanted to be absolutely sure I made it as complete as possible. I would be most derelict in my duty here if I had not put into the picture General Electric's shipments in 1959.

You say I tucked them away in a footnote. Perhaps I made a mistake when I made this decision, but I did it with the assumption that people read footnotes, and particularly lawyers.

Q. And that, of course, is why you put Roebling on with only 2 percent and .6 percent, because when they read the footnote they would have found it was acquired by Reynolds Metals Company.

A. I put them on because in 1959 it produced more than 120,000 pounds, and it also reported that to BDSA.

Q. Well, let me ask you this question, do you think that this chart, No. 3, Government Exhibit 436, on its face accurately portrays the industry position of the companies in the industry?

A. I think it does. I am not sure what you mean by on its face. I think the footnotes are part of the chart. The footnote numbers are on the chart. They refer to notes which are there, and I certainly would have been most unwilling to have submitted the table without the footnotes, [fol. 340] and I would certainly urge that anyone reading the table read the footnotes.

Q. Why did you put that note on about Roebling?

A. You mean why did I——

Q. Since in 1959 Roebling was unconnected with Reynolds or any other primary producer of aluminum, why did you put that footnote on?

A. Well, you asked me this morning and I answered it, I am not sure exactly what I said.

Q. Well, let's never mind what you said this morning, tell us what the fact is.

A. I have been thinking about it as a matter of fact since you asked it this morning, and when I think back over it as to the process that went through my mind, the first thing that I encountered was in trying to put the names of the

companies on that I had as one company the very clumsy name, from the standpoint of putting it on the chart, of the John A. Roebling Sons, Division of Colorado Fuel and Iron Corporation, and I got to thinking how shall I do that, and shall I call it Colorado Fuel and Iron Corporation or shall I call it John A. Roebling Sons Division, and stop at that point, and then I realized that I had to look into the question of what was the name of the firm that produced and [fol. 341] shipped these shipments during the years that I had them included, and I found that though this plant was at one time part of Colorado Fuel and Iron, it was at the present time, the time at which I made the chart, a part of Reynolds Metals. So I thought the best thing was to put the whole story in the footnote.

Q. Why didn't you put Western Electric, a subsidiary of AT&T in if you were so concerned about those things?

A. Well, I don't think that it occurred to me. I should have.

Q. Wasn't the real reason that there was an acquisition involved, Dr. Martin?

A. An acquisition is certainly relevant, because an acquisition being involved brings up the problem of how to describe the shipments.

Q. It was an opportunity to testify on the chart.

Mr. Melchior: Your Honor, I think the witness has answered this question.

The Court: He has. It is an absolutely gratuitous statement and of no value, a statistical chart, it doesn't belong in [fol. 342] there. If he was giving statistics for this company for 1959 the company was alone, was operating alone, he had the statistics, and the addition of those few words is gratuitous and adds nothing to the chart, except this, it is a little dig, that's all, it isn't going to affect me one way or the other.

[fol. 343] By Mr. Bergson:

Q. Dr. Martin, addressing yourself to the face of the chart and your footnote 4, Olin Mathison acquired Southern Electric Company in 1957—'56 or '57—1957. This chart shows that prior to its integration Southern Electric had a greater percentage of the market in 1956 than it has ever

had as a part of the integrated Olin Mathison Chemical Company; is that right?

A. Yes.

The Court: Are you going to leave that exhibit?

Mr. Bergson: I think so, your Honor. I just want to check to see if I left out anything. Yes, I am finished with that exhibit.

The Court: Just one thing, Mr. Martin. I am not certain that I understand this .6 of one per cent of these companies that you left out. Your note says, "The addition of the shipments to BDSA." What is BDSA?

The Witness: That is the first line, industry total as reported to be BDSA.

The Court: The total would change my market share by more than .6 of one percentage point. Now, does that mean [fol. 344] changed in either direction?

The Witness: Change it down for all firms. It would pull ALCOA down a little bit; it would also pull Anaconda down a little bit and Kaiser down a little bit and every other one down just a little, because we would be dividing by a bigger base. Some of them would go down very small amounts. The largest they could possibly go down would be .6.

Q. That change, then, that you refer to in your footnote, is a change in any market share by no more than .6. That would be the reduction change, in reducing the amount of the firm's share in the market.

The Witness: Yes, sir. Perhaps I can explain it this way. If you put all of these companies together for 1959, the combined shipments of these companies range from one per cent in '55 to 2½ per cent in '59. Now, this 2½ per cent——

Mr. Bergson: Three.

The Witness: Is it three? It would have to be taken off of the companies that are on the face of the chart.

The Court: So that there may be, if I understand you right, an error in aluminum, in ALCOA and Rome? Does that apply to every year?

[fol. 345] The Witness: Yes, sir. It would apply to every year, but the biggest effect would be in '59.

The Court: I see.

The Witness: Because that is the year that the biggest amount was unreported to be BDSA.

Mr. Bergson: Your Honor, one of the reasons I want to bring this out, and I am sure it is apparent to you, that in one line of commerce ALCOA is accused of substantially lessening competition by ALCOA .3 of one per cent. And yet the .6 of one per cent is not sufficient to have in a chart.

The Court: I think I understand it. But the change would always be downward, would be a lessening of the share of the market rather than an increase of the share of the market.

The Witness: Yes, sir. It would be downward for a percentage less. It would be one to three per cent, sir, from these other firms. The bigger the firm the more it would go down. The smaller the firm the less it would go down. [fol. 346] The Court: So, if you apply it to ALCOA, which is apparently is one of the larger—well, I guess there are some others larger—well, it is one of the largest, that effect would be greater than if it was applied to Rome, which is one of the smaller ones.

The Witness: Yes, sir. In the case of ALCOA in 1959 it would drop to from .1 to .2, I would roughly estimate, to maybe 11.9, or 12.1, whereas in the case of Rome it would drop it from maybe 4.4 to 4.3.

The Court: All right.

Mr. Bergson: Well, your Honor, I can skip Chart 4.

The Court: Good.

Mr. Bergson: Chart 5.

By Mr. Bergson:

Q. Government's Exhibit 438. In that chart, Dr. Martin, if I am going to characterize it as shipments of aluminum conductor wire and cable accounted for by integrated producers 1955 to 1959, I would like to ask you why you didn't include 1960?

A. I think that my reason for not including 1960 is that I took the first chart and took information off of it and made this one. It is the same reasoning. This was taken [fol. 347] right from the first part, this part of the chart put together, and I took the years I had there.

Q. The information for 1960 was available, wasn't it?

A. I am not sure the industry total was available. The

breakdown between non-integrated and integrating companies. I think it was available, yes.

Q. Now, let's look at 1958 where the non-integrating companies had 18.4 per cent; right?

A. Yes.

Q. And that 18.4 per cent, according to your chart No. 1, Rome represented 1.6 per cent; is that correct?

A. 1958? 1.3 per cent, it would be.

Q. Is it? Defendants' chart No. 1?

A. Talking about 1958 in aluminium conductor wire and cable, 1.3.

Q. 1.3. I am sorry. Now, if you subtract that 1.3 from the total of the non-integrated, that would leave for the remaining integrated——

Mr. Adler: Non-integrated.

Q. Non-integrated, I mean, 17.1; right?

A. Yes. No. Yes, that's right.

Q. Now, the merger took place in 1959, in April of 1959. So in your 1959, I think footnote 7 says that you have in-
[fol. 348] cluded Rome for the whole year in ALCOA's shipment; is that correct?

A. That is correct.

Q. So that the remaining independent share of the market increased after the merger from 17.1 per cent in 1958 to 19.9 per cent in 1959; right?

A. Right.

Q. And that is not accounting the .8 of a per cent which you omitted in Chart 1, which was in the footnote?

A. I am not sure just how that would have been divided between the two.

Q. None of them were integrated?

A. That's right.

Q. So that it would make the non-integrater's share in 1959 20.7, if you included that.

A. Yes.

Q. As against 17.1. Now, I show you Defendants' Exhibit AR-1 for identification, which has previously been discussed with you and the figures in which—it has been previously shown to the Government's attorneys and the figures of which have not been disputed and I ask you what the per-

centage of the market was enjoyed by the non-integrated producers in 1960?

A. In 1960? 20.5, I think.

[fol. 349] Q. So that since the merger, if you took Rome out of 1958 so that we are concerned only with the remaining non-integrated, their share, and let's forget these other companies which we have no figures on for 1960, their share was 17.1 in 1958; it increased to 19.9 in 1959 and it further increased to 20.5 in 1960; is that right?

A. That is the shares of the companies not counting Rome.

Q. That's right. Now, I invite your attention to Government's Exhibit 439, which is your chart No. 6, I believe?

A. Yes.

Q. And I suppose your answer as to why you didn't include 1960 is the same as the reasons you have given me before so I won't go into that all over again.

A. Yes.

Q. Now, in 1958, when Rome was included with the non-integrated, the non-integraters had 13.7 of the market; right?

A. Yes.

Q. And Rome had .3 of one per cent in 1958?

A. I have to check that.

Q. I think that is your chart 2.

[fol. 350] A. ACSR?

Q. Chart 2, I think.

A. Yes.

Q. So that if you excluded Rome in 1958, the non-integraters would have 13.4; right?

A. Right.

Q. In 1960, 1959, according to your tabulation the share of the non-integraters rose to 16.3; correct?

A. Yes, sir.

Q. Now, just so that we will complete the record on this, I show you Defendants' Exhibit AR-2 for identification and ask you what share the non-integraters had in 1960?

A. 16.2.

Q. Right. So that in bare aluminum conductor, ACSR, the integrated share, the non-integrated share, excluding Rome in 1958 was 13.4; in 1959 it was 16.3 and in '60 it was 16.2; right?

A. Yes, sir.

Q. Now, I invite your attention to Government's Exhibit 440, which is your chart No. 7, which is in abbreviated terms, shipments of aluminum wire and cable, insulated or covered, accounted for by integrated producers 1955 through 1959," and again I suppose your answer for not including 1960 is the same?

[fol. 351] A. Yes.

Q. The material was available to you but because of the manner in which you prepared the other charts you chose not to bring this up to 1960?

A. That's right.

Q. Now, in 1958 Rome's share of the non-integrated producers was 4.7; is that right? Refer back to Chart 3, I think.

A. 4.7, yes, sir.

Q. So if you eliminated Rome the share of the remaining non-integrateds would be 29.9?

A. Yes, sir.

Q. In 1959 the share of the other non-integraters had increased to 31.9; is that right?

A. That's right.

Q. And now I show you Defendants' Exhibit AR-3 for identification and ask you to state the percentage of the non-integraters for 1960?

A. 32.7.

Q. So that from 1958, the year preceding the merger, the share of the non-integraters has gone from 29.9 to 31.9 in 1959 to 32.7 in 1960?

A. That's right, the share of the non-integrating excluding Rome.

[fol. 352] Q. Right. Now, I would like to invite your attention to Government's Exhibit 442.

Mr. Melchior: May I interrupt a minute, Counsel, before you proceed to the next tabulation? Now, with respect to Government's Exhibit 438, 439 and 440, I take it you are not challenging the accuracy of any data contained thereon; is that correct?

Mr. Bergson: We told you we didn't.

Mr. Melchior: I just wanted to make it clear.

Mr. Bergson: We are challenging the use that is made of the data.

Mr. Melchior: One more question, Counsel.

Have you asked the witness with respect to the year 1960, whether or not he had complete information on that year, so he could have done what you have had him do on the basis of your tabulations? Have you asked him that question?

Mr. Bergson: I have asked that question and the witness responded, I believe, that he had.

Mr. Melchior: Was that your answer?

The Witness: Yes.

The Court: That is my understanding.

[fol. 353] The Witness: My answer was that I made these tabulations from the other tabulations on which I did not have complete information. But parts that are actually on here I think I could have gotten for 1960.

Mr. Melchior: For the year 1960 for all companies concerned.

The Court: Now listen. I don't know what we are getting at. I don't think you ought to start examining the man now. As I understand it, for the last two or three charts the witness says the reason he didn't give 1960 was the reason as he explained a couple of charts before that. And he started it with Chart 1 from '55 to '59 and he kept it that way. That is all there is to it.

Mr. Bergson: But then he did have information available——

The Court: Yes.

Mr. Bergson: —for 1960.

The Court: Yes.

[fol. 354] By Mr. Bergson:

Q. Let me ask you if there is any doubt about this, let me ask that document entitled United States Department of Commerce, Business and Defense Service Administration, Aluminum and Magnesium Division, dated November 8, 1961, be marked for identification as defendants' exhibit AR-4:

(Document above identified marked as Defendants' Exhibit AR-4 for identification.)

Q. I show you defendants' Exhibit AR-4 for identification, which is dated November 8, 1961, and ask you whether you have a copy of that document?

A. Yes, I do.

Q. And did you have a copy of it at the time it was issued?

A. I am not sure just when I got it.

Q. Did you have a copy of it before you prepared your charts?

A. Not all of them, no.

Q. Before you prepared this chart?

A. I am not sure. This was one of the first charts I prepared.

Q. These charts were submitted to defense counsel in January.

[fol. 355] A. I had this release, yes, before I submitted my charts to you. That publication was cited in some of my other sources.

Q. I think it is too. Now——

A. If I may, Mr. Bergson, I did not think I did have for 1960 the individual company information that I put on this chart for all the other companies.

Q. But you had the information for the total?

A. For the total, although not the individual companies.

Q. Broken down, integrated and non-integrated?

A. Yes. If I had put 1960 on I could have given that information but not anything, of course, for the other years.

Q. You could have shown this percentage figure without giving a detail as to the companies?

A. Yes, I could have done that. I might say I couldn't have done that until the point in my work after I had already done considerable work on this. I could have gone back and changed it, I suppose.

Q. This is a lawsuit, Dr. Martin.

A. Sure.

Mr. Bergson: Will you please mark as defendants' Ex-
[fol. 356] hibit AR-5 for identification a document entitled Directory of Aluminum Suppliers, Revised April 1, 1961, put out by the United States Department of Commerce, Business and Defense Service Administration.

(Document above identified marked as Defendants' Exhibit AR-5 for identification.)

By Mr. Bergson:

Q. Dr. Martin, addressing your attention to Exhibit 442, which I think is your Chart 8-A——

A. Yes.

Q. —I show you defendants' Exhibit AR-5 for identification and ask you if this is the directory of Aluminum Suppliers to which you referred in that chart?

A. Yes, it is.

Q. I would ask you to look at this directory and tell us how many suppliers of aluminum wire and cable are listed in that directory.

A. Well, the directory lists——

Q. I think you will find it on page 18.

A. Thank you. Two categories, suppliers of ACSR and aluminum cable, bare, and suppliers of wire and cable, [fol. 357] insulated or covered. The directory lists 11 producers of ACSR and aluminum cable, bare. 29 producers of wire and cable insulated or covered.

Q. Thank you. In your work as an economist and statistician, Dr. Martin, are you quite familiar with the business in Defense Services Administration of the Department of Commerce?

A. Well, I am not sure I know just what you mean by "quite familiar."

Q. Do you know how it is broken down by divisions and so forth, aluminum division, copper division?

A. Aluminum-magnesium are the divisions with which I have been concerned in my work on this case.

Q. And do you know the purpose for which the aluminum and magnesium division was created?

A. I am not sure that I could answer that question without making a study of the legislation or executive order that set it up.

Q. Well, if you don't know——

A. I don't know.

Q. —I won't pursue it, I will go to something else.

The Court: Just before you go, let me ask about this 442. [fol. 358] This is an exhibit which shows the companies

listed as producing aluminum conductor wire and cable. I take it from the way you talk and one look at it, it doesn't look as if it is complete. I don't mean that your exhibit is not complete, Mr. Martin, because probably it is, because you say it is, but do you mean to say that these three companies are the only companies—no, I am wrong, these are only the ones that were not listed.

Mr. Bergson: In 1955. My purpose in inviting Dr. Martin's attention to the directory was to eliminate any misapprehension that there were only a few companies in this field, and I am glad you asked your question, your Honor, because I did overlook a question and I don't know whether you know the answer to this, and if you don't know it I won't press it, but do you know how many companies were manufacturing so-called aluminum wire and cable products in 1950?

[fol. 359] The Witness: No, sir, I don't know.

The Court: Well, again I come back, being a little selfish I gauge all of these exhibits as, all right, what am I going to do with them? I suppose—is this the purpose of the exhibit, to show that three companies stopped manufacturing this particular item during that six-year period?

The Witness: No, sir. You want me to answer the question?

The Court: I don't care who answers it. Honestly, I don't know, what about it?

The Witness: It is just the opposite, it is to show that insofar as the BDSA directory gives us evidence on this question, there were only three that came in and began to produce. The footnote indicates this is not quite the case, however, because of the three that in 1961 the BDSA listed as being producers, two of them were already producing earlier, Olin was listed because it had acquired South Wire and they changed the listing from South Wire to Olin; [fol. 360] Circle for some reason began to report to BDSA, became known to BDSA and was put in the directory, although our own inquiry indicated it was producing right along but wasn't reporting. They began to report and were put in the directory.

Mr. Bergson: It is barely possible there are others who have not yet reported to BDSA.

The Witness: That is possible.

By Mr. Bergson:

Q. Such as those companies who were referred to in the footnote to Exhibits 1 and 3. Circle is one of them.

A. Circle is one of them.

Q. How about G.E., was G.E. on this list? I don't remember.

A. G.E. was on the list.

Q. Was on the BDSA list, yet not included in the share?

A. Not a list of companies that reported, a list of companies that BDSA thought produced the product, right, and there could be many more. There are some on there that [fol. 361] possibly don't produce the product.

Q. And it is quite possible there are others who do who are not on it?

A. It is possible.

Mr. Melchior: If it please the Court, I might say that the defendants' Exhibit for identification AR-5 does indicate that General Electric Company is on the list.

Perhaps I could clarify this tabulation for your Honor. If you would look at this tabulation absent the footnote, it would indicate that in 1961 there were only three new companies in the directory that were not already in the business in 1955. So at first blush it would appear that over that roughly six-year period there were three new entrants into the aluminum wire and cable field, which is bad enough. However, when you take the footnotes into consideration you will find first that actually Circle is not a newcomer because Circle in 1955 was already producing it and was not [fol. 362] in the directory in 1955. On the other hand, Olin-Mathison Chemical Corporation is really not a newcomer either, because they acquired Southern Electrical Company, which was in the 1955 one. So actually according to this tabulation there is only one new entrant to the field. That is the purpose of the tabulation.

The Court: All right.

Mr. Bergson: According to BDSA, since 1955.

Mr. Melchior: Precisely.

The Court: All right. Recess until tomorrow morning at ten o'clock.

(Whereupon at 4:58 p.m. the trial was adjourned to Thursday, February 8, 1962, at ten o'clock a.m.)

[fols. 363-364] [Title omitted]

Transcript of hearing—February 8, 1962

* * * * * * *

[fol. 365] The Court: All right, gentlemen, I guess we can go ahead.

Mr. Melchior: May it please the Court, if we could indulge your patience a little longer, and defense counsel has expressed no objection, if we could put three witnesses on the stand before we resume the cross-examination of Dr. Martin.

The Court: All right.

William A. Hickson, Jr., called as a witness in behalf of the Government, being first duly sworn, testified as follows:

Direct Examination.

By Mr. Wertheimer:

Q. Will you state your full name and position, please?

A. My name is William A. Hickson, Jr., I am the manager of the Distribution System, Design Division of the Distribution Engineering Department of Long Island Lighting Company.

Q. How long have you been with the Long Island Lighting Company?

A. I have been with the Long Island Lighting Company fifteen and a half years.

Q. What was your job prior to the present one?

[fol. 366] A. I have been in my present position two years, and prior to that I was manager of The Materials and Methods Division, which is the other half of the Distribution-Engineering Department.

Q. In the Materials branch what were your responsibilities?

A. I was responsible for evaluating the performance of existing materials that I used in our gas and electric distribution system, and reviewing and determining the characteristics or improved materials for possible use on

the system. This includes establishing purchase and test specifications for the purchase of these materials, and qualifying the products for engineering approval. It also includes the preparation of construction standards to insure proper and uniform application on the system.

Q. What are your responsibilities in your present job, Mr. Hickson?

A. In my present job we reviewed the gas and electric system conditions on a continuing basis to insure its overall orderly development, and this includes the establishment of design objectives for the distribution system as regards the quality of service, electric service, for example, that we give the customer, such as the type of voltage, voltage regu- [fol. 367] lation, the minimum interruption to service, and adequate research capacity. These objectives together with load density and environmental conditions that we have will determine the mechanical and electrical characteristics of the distribution system components, and these components include the poles, the wires, transformers and the meters.

Q. In other words, in your present job you design distribution lines for the Long Island Lighting Company?

A. Yes, I do.

Q. About how many dollars worth of additions for your electric distribution system were you responsible for last year?

A. For 1961 we designed approximately sixteen million dollars in addition to our distribution system, electric.

[fol. 368] By Mr. Wertheimer:

Q. Have you any academic degrees, Mr. Hickson?

A. I have a bachelor of science degree in physics and engineering from Hofstra College.

Q. I wonder if you could describe in general the size of the Long Island Lighting Company.

A. Long Island Lighting Company supplies most of Nassau and Suffolk Counties in addition to the Fifth Ward of Queens County. We are adjacent to the City of New York on the westerly boundary and we extend easterly to Montauk Point, entirely surrounded by water.

Q. About how many square miles would be included in this area?

A. Our electrical service area is approximately 1100 square miles.

Q. How many customers do you have for electricity?

A. At the end of 1961 we had approximately 600,000 electrical customers.

Q. What was your peak demand?

A. Our peak demand was 1,780,000 kilowatts.

Q. On the system as you have described it to us do you [fol. 369] have any commercial areas?

A. Yes, we do. We have large shopping centers and large business areas in the westerly portion which is adjacent to the New York City line.

Q. Do you have any rural areas?

A. Yes. As our territory extends easterly it becomes progressively less populated to where we get out to Montauk Point which is definitely rural in character.

Q. Have you any areas bordering the seacoast?

A. Yes. Our service area except where we abut the New York City line is entirely surrounded by water. The Atlantic Ocean on the south shore and Long Island Sound on the north shore.

Q. Do you have distribution and transmission lines both overhead and underground?

A. Yes.

Q. Turning to your overhead transmission lines, what kind of conductor do you use thereon?

A. We use aluminum or ACSR conductors. All are aluminum in our transmission lines at the present time.

Q. Do you use them throughout your system?

A. Most of our new construction is in the use of alumi- [fol. 370] num. We do have some transmission lines which are subject to severe corrosion and if we had to replace those lines we would use copper conductors.

Q. Do you have any maps indicating those areas of your system in which you use aluminum and in which you use copper?

A. Yes, I do.

Q. I wonder if I could have the map.

A. (Witness hands map to counsel.)

Mr. Wertheimer: At this time I would like to mark as Government's Exhibit 472 for identification two maps of the Long Island Lighting Company, the first marked "Dis-

tribution, General; Map showing copper and aluminum areas." The second identified as Distribution, General Map showing copper and aluminum areas in Great Neck."

(Map above identified marked as Government Exhibit 472 for identification.)

Q. Now, Mr. Hickson, do these maps accurately indicate those areas of your system labeled zoned for aluminum and those zoned for copper?

A. Yes, they do.

[fol. 371] Q. Were these maps prepared by your department?

A. Yes. These maps are prepared by our department and they are—although I am in the distribution department, the same zoning is used by our engineering department that designed the transmission lines.

Q. In other words, the areas indicated on these maps would be accurate for both your transmission and distribution lines?

A. Yes.

Mr. Wertheimer: At this time the Government would like to offer GX 472 for identification into evidence.

Mr. Adler: No objection.

The Court: Received.

(Government's Exhibit No. 472 for identification received in evidence.)

Q. From this map it appears, Mr. Hickson, that your aluminum area includes most of your territory. I see your area called your copper area on the title of this map borders the seacoast; is that correct?

A. Yes.

Q. I wonder if you could explain why.

[fol. 372] A. When we first started to use aluminum conductors exclusively for distribution our prior testing and experiment indicated that we would have problems that we had not yet solved in this area along our shores where the environment was such that the aluminum unprotected or a bare conductor would be subject to corrosion due to salt fog, salt spray and sand blast. Therefore it became expedient for us to take a conservative approach zoning the sur-

rounding area in which we could use aluminum and thereby also zoning the area where we would only use copper.

Q. What were the problems of salt water in regard to the use of aluminum?

A. The problems that we have as far as the salt water is concerned are really one of a lack of advancement in the art as far as connectors are concerned. We have a real problem with the salt water on the conductors, either due to fog or spray injuring the reliability of the conductors themselves. One of the problems of using aluminum is to insure a good connection around salt water. We have not yet learned how to use it economically and we are afraid of the salt water contamination.

[fol. 373] Q. Now I wonder if you would explain the problems of sand blast with aluminum conductor?

A. The aluminum conductor has a property of oxidizing almost immediately when it is exposed to air, and it forms a protective covering that is very good, but it is rather easily removed. The very reason that it forms the protective covering, usually within 60 seconds when it is exposed to the atmosphere, is the reason we have problems in connectors. But the aluminum oxide that is formed over the aluminum conductor is very easily removed unless there is some type of covering on the conductor, and sand blast which we get from the sand dunes that predominate along our south shore will very easily knock this aluminum oxide off, and it immediately reforms again and in the process will use up some of the material of the conductor. And as this process is accelerated very soon you will have no conductor left and you will have a conductor failure much sooner than what we would anticipate where our lines are constructed to last 30 or 35 years before they would be replaced.

Q. Have you the same problem with sand blast in copper?

A. No, because the copper conductor does not form the oxide as readily, nor is it as easily removed, and we have lived with copper in the seashore areas for 50, 60 years [fol. 374] and had a lot of experience on how to handle it.

Q. And have you the same corrosion problem due to salt water with copper?

A. It is not as severe.

Q. I see. In your aluminum area, as it is designated on the map, Mr. Hickson, can you use only aluminum?

A. No. The reason that we developed aluminum for our distribution conductors was because of its economic advantages as far as material was concerned, and when the overall economics became evident, which would include installing it and all the problems with connectors and everything, it became necessary for us to zone those areas where we could use it if the economics indicated that it was a superior substitute to copper.

Q. Is this aluminum area expanding on your system?

A. Yes, it is. The map which was put in evidence as one of our construction standards was just recently revised to include an area on the north shore of the island because we had extensive reconstruction going on there, and the use of aluminum conductor would save us a considerable amount of money. So that although we had established the zone somewhat further from the shore line initially, our experience had indicated that we could safely move this [fol. 375] conductor further to the shore area, and we are in the process now of further expanding the aluminum zone so that it will include approximately 90 percent of our system. The zoning as it now stands is about 80 percent of the area rezoned where we can use either aluminum or copper, and about 20 percent where we use copper only.

Q. In other words, in the aluminum area you can use aluminum or copper, but you do use aluminum.

A. We have been using aluminum in this area since about 1953. It has always been the most economic conductor for us.

Q. Directing your attention to your overhead distribution lines, sir, are they covered or are they bare?

A. Our overhead distribution lines are both covered and bare, depending upon the environment in which they are installed.

Q. Can you give us a general breakdown of what percent of your system, or your overhead distribution system is bare and what percent covered? Let me ask it this way, on your aluminum distribution system overhead, what percent is covered?

A. We have zoned an area also for covered conductors on our system, because we are exposed to—we have a

great deal of trees in our area which causes interruptions [fol. 376] to service and which can be minimized if the conductors are covered. This would prevent faults, and we have recently zoned approximately 60 percent of our area where this is mandatory, that all new conductors be covered, and the remaining 40 percent it is optional based on the amount of trees that happen to exist in that area. So I would say as an approximation that about 60 percent of our new conductors are covered.

Q. And these would be aluminum in the area designated as your aluminum area.

A. That's right, and also would apply to the copper area, too. We cover the copper conductors, too, because of this problem with service continuity.

Q. What type of conductor do you use on your underground lines, Mr. Hickson?

A. On our underground lines we predominantly—we are predominantly an overhead company, we do have underground in areas of very high load density, but in our underground construction we use copper conductors insulated cable?

Q. Why is that?

A. When we first went into the aluminum program for distribution, we experimented with underground installa- [fol. 377] tions on street lighting because we were getting a large volume of business that required that the street lights be underground. We had very unsatisfactory operating results with the aluminum conductor for street lighting and, therefore, we discontinued that after about four years experimentation. We relied on our neighboring utility, Con Edison, whose system is mostly underground that carry out experiments as far as the use of aluminum as an economic substitute for underground distribution, and the results of their tests indicated that the problems in the course that would be associated with aluminum would outweigh the material advantages that you have in price between copper and aluminum, and there the net economic result would indicate you should use copper at the present time for underground distribution. So we use copper in our underground distribution.

[fol. 378] Q. How about underground transmission?

A. Same thing applies to underground transmission, the same reasoning.

Q. Copper is used for underground?

A. Copper is used for underground transmission.

Q. What type of conductor do you use for service drop on your system, Mr. Hickson?

A. Our service drop is one of the components of the distribution system, the portion from the pole to the building, and in the aluminum area we are now using exclusively aluminum triplex service drops.

Q. Will you describe the triplex construction?

A. The Triplex is the ordinary residential service, and we are primarily suppliers of residential customers. It is a three-wire assembly, the neutral wire is usually bare and the two power legs are usually insulated.

Q. What type of service drop do you use in your sea coast areas, your copper area?

A. We use a copper triplex in those areas, same type of assembly but the base material is copper.

Q. Is it much of a problem, Mr. Hickson, to switch from aluminum to copper or copper to aluminum in the distribution area of your system?

A. Our requirements each year include both aluminum [fol. 379] and copper, because we do have a zone where we have to use copper only, and because aluminum has been favorable in the areas where we could use either, we do get a continual price comparison as far as materials are concerned and we are ever on the alert to see if this price comparison would change, but it would require that if the price of copper should approach aluminum that we would be assured that it would be relatively stable for a period of time, because there are other problems such as stocking, inventory, training personnel, the incompatibility of the two in any one area, that you would not flip back and forth from one conductor to another. You would have to be reasonably sure that the economic favoritism would be maintained for a period of time.

Q. Do you anticipate any shift to copper?

A. There is no indication from the comparisons that we have been keeping that copper will become competitive at the present time.

Q. In regard to——

A. Aluminum. We would continue to use aluminum. There is no indication that we would switch back to copper.

Mr. Wertheimer: Thank you. That's all.

[fol. 380] Cross-examination.

By Mr. Adler:

Q. Mr. Hickson, referring first of all to Government's Exhibit 472, do you have that before you?

A. Yes.

Q. The designation "aluminum area," on each of the two maps, means that this is an area in which aluminum may be used? I believe that was brought out on your direct.

A. Yes. I should say this. This particular map is a construction standard and this is put out for the guidance of the many people that are concerned with the actual building of the lines, and it means that at the present time we are using aluminum in this particular area. It is designated as an aluminum area. If we should want to change back to copper, then we would have to change this construction standard to indicate that——

Q. This is a——

Mr. Wertheimer: Let the witness answer the question.

By Mr. Adler:

Q. I believe he did finish. This is a zone within which either copper or aluminum could be used from a technical standpoint?

[fol. 381] A. That's right, and referring to the exhibit here, we are presently using aluminum in that zone and that is why it is made up as an instruction to our people, and if we did change back to copper we would change this construction standard to reflect that.

Q. With respect to what is here called the aluminum area, and which is an area in which either copper or aluminum could be used——

A. Yes.

Q. You testified, I believe, that you periodically revaluate the requirements of your distribution system?

A. Yes, that is true.

Q. How frequently is that done?

A. Well, it is done every time that our company personally goes out for bids for requirements for conductors, the prices of the conductors both copper and aluminum are made available to us and we plot this in the form of graphs so that we will know the differential and the point at which we should undertake further investigation in preparing programs for a change from one to another.

[fol. 382] By Mr. Adler:

Q. I believe my question was how often do you make this reappraisal of your system.

A. We do this every time that our company purchases any quantities of either. We keep up to date.

Q. Would that be something done every six months?

A. It certainly is done at least every year and usually oftener. I think we try to purchase our requirements on an annual basis. You are not always able to forecast them accurately and you are usually going in for additional purchases in and over your annual requirements. Further than that, if we don't happen to be purchasing material at that time we do know from the rest of the industry where we freely exchange information we would be aware of a price change if it should occur. Even though we were not buying at that particular time.

Q. So that you are making these annual or periodic re-evaluations or at other times during the year you are alert and are aware of prices of cable?

A. Oh, yes.

[fol. 383] Q. Either copper or aluminum?

A. Yes.

Q. Now, in making your determination as to whether, and here we are speaking principally of your covered distribution conductor products, cable, making your determination as to each type of cable to buy during the ensuing period, you have before you first of all the prices of the cable?

A. Yes.

Q. Now, are there other economic factors that are taken into account in determining whether the total economic picture favors one as against the other?

A. Yes. Of course, there is the labor, the installation

which may vary depending upon the areas in which we are going to install the majority of our conductor. There is a differential in cost that would exist in other components of the system such as conductors, and we use copper connections with copper conductors and aluminum connections with aluminum conductors. And you do have other considerations as far as differences in the characteristics of the two metals. Sometimes they are favorable to copper under certain applications and sometimes they are favorable to [fol. 384] aluminum.

Q. You have no rigid rule in your company that in this so-called aluminum area nothing but aluminum overhead distribution cable can be used?

A. At any one time for the purpose of uniformity and the purpose of matching the construction to the material that we have ordered we do have a rule. In other words——

Q. Excuse me. That would be during the particular purchasing period?

A. Period.

Q. But when your next yearly purchasing period commences and you re-evaluate your requirements, then again it is based upon choice?

A. It could be open, yes. But we would be——

Q. Well——

A. Well, all right.

Q. Now, do you find in your overhead system that particular requirements may affect the relative advantages of copper or aluminum? For example, in a situation I believe you refer to the low density as a factor that may affect the type of cable that would be purchased?

A. Yes.

[fol. 385] Q. By that I take it you would get into the heavier conductor—perhaps you better explain what you mean by that.

A. Generally speaking in overhead construction the heavier the low density or the larger the conductor you use the more favorable it would be toward aluminum. You do have in the light or low density areas, we have a minimum size conductor that can be installed because of its strength and it may be as far as its physical properties are concerned, it may be much in excess of what the electrical requirements would be. Therefore you would have a minimum size just for strength. And in these areas because

aluminum, the property of aluminum is that it is not as strong as copper, we do have to go to an aluminum alloy in order to gain the strength requirement, and we do pay more for the aluminum alloy than you would for an all aluminum conductor, because of the pricing.

Q. And that would bring your economic relationship there to copper close if not in——

A. It does affect it. In other words, it is not the greater consideration. The more sophisticated the conductor is away from the bare conductor, the less the differential is [fol. 386] between copper and aluminum, because basically the coverings or insulations are the same for either conductor and it means copper has a greater conductivity than aluminum. Its cross-sectional area is smaller and the covering in aluminum has to be greater.

Q. That is one factor that would tend to favor the copper cable in your overhead system?

A. Well, it tends to make the copper more competitive if you will.

Q. Now, in this total economic picture that when you consider the cost of making connections, that would be a factor there?

A. It is a factor. I don't want to attach any more significance to what it is, but this was one of the problems that we had in using aluminum to begin with. Suitable connections were not available at all. You have to be slow in going to use a conductor to make sure you have the associated equipment that goes with it.

Q. And in some situations in your overhead system you have more connections than others, and this would become a greater factor?

A. Yes. I am sure that this is the reason why aluminum [fol. 387] was used on transmission for many, many years because there are few connections involved.

Q. When you say transmissions you are referring to bare ACSR?

A. Yes, in both distribution of power, there are few connections because there are fewer customers fed off of these transmission lines. When you come to distribution even in small houses and conductors are magnified a thousand times, you really have problems on connections in

distribution systems that you do not have on transmission systems because of the mulitiplicity of the connections.

Q. Can we sum up your testimony that this decision with respect to covered distribution conductors is a complex one in which you weigh the multitude of economic factors and reach your final decision as an engineer on the basis of these factors?

A. Yes.

Q. You testified on your direct examination that you are always on the alert for change in economic relationships.

A. Yes, I have.

Q. You must be?

A. Yes.

[fol. 388] Q. You also testified that you didn't anticipate any change in these price relationships, but you have not —is that a guess on your part?

A. Being responsible for this sort of thing I am rather familiar with the trends. We do keep current on these things, of course, and we know where the thing lies unless, of course, something which I cannot personally see, I wouldn't expect to change in relationship to our using copper in our present, where we are presently using aluminum. That is what I meant by that.

Q. If this change which you have no reason to expect occurred, if the price of the copper cable came down, if for some reason the price of aluminum cable went up, if the other economic factors involved worked out in such a way that copper, that would be advantageous to your company to use a copper covered cable, you would do so?

A. Yes, definitely.

Mr. Adler: Thank you. No further questions.

The Court: So that performance of the copper and performance of the aluminum is somewhat similar.

[fol. 389] The Witness: Yes, your Honor. It is part of our design objective that these have to be equivalent conductors before we would compare them economically. We do have economic acceptable levels and we may evaluate some superior qualities, but they have to be accepted.

The Court: Your difference between the two is based on economics rather than performance?

The Witness: All other things being equal, yes.

Redirect Examination.

By Mr. Wertheimer:

Q. When you say the price of copper would have to be less than the price of aluminum before you would consider shifting back, do you mean price per pound or price per foot of equivalent conductivity?

A. I always talk about the comparative prices for equivalent conductivity. You get into this bit on aluminum and copper, that the weights are different, the aluminum for conductivity is probably half the weight of copper, so we are talking always in terms of price per foot of equivalent conductivity.

[fol. 390] Q. Do you presently use any copper in the area described on your map as your aluminum area, for overhead transmission or distribution?

A. For new construction or reconstruction, no.

Q. In recent years has your aluminum area increased or decreased?

A. Our aluminum area was initially very conservatively select and we are in the process of expanding the zone to take advantage of the better economies, and based upon our tests that we continually conduct, which indicate we can use aluminum in areas where we had originally excluded it.

Q. In any area zoned for aluminum therefore you have not returned to copper?

A. Yes.

Q. In response to one of Mr. Adler's questions you mentioned generally the greater sophistication of the conductor the less advantageous would be the use of aluminum. Where does the sophistication of insulation make the use of aluminum uneconomical?

A. It is certainly, I have already testified when we come to an underground type of conductor which is insulated and shielded and installed below ground, that we have already come to the conclusion that this level of covering or [fol. 391] insulation, the copper is favorable. Now somewhere between that and the bare conductors where you would reach the break-even point at present price levels of materials, and it would be the particular type and size of conductor and type of covering and application that would determine it. But in general the more additional refine-

ments you add to the bare conductor the closer the two will come together because you are introducing costs which are either similar for both conductors or are perhaps a little greater for aluminum and for equivalent conductors, the aluminum is a larger conductor, and anything you put around it takes more material.

Q. I see. But for your overhead covered conductor the economics still favor aluminum?

A. Yes. For any of the designs that we are using in our company the aluminum still is the economic conductor, no matter how sophisticated it is.

Mr. Wertheimer: Thank you.
Mr. Adler: No further questions.
The Court: That is all.

(Witness excused.)

[fol. 392] Mr. Mahaffie: Mr. Walter Probst.

WALTER F. PROBST, called as a witness in behalf of the Government, being first duly sworn, testified as follows:

Direct Examination.

By Mr. Mahaffie:

Q. State your full name, Mr. Probst.
A. Walter F. Probst, P-r-o-b-s-t.
Q. What is your occupation, sir?
A. I am president of Essex Wire Corporation.
Q. Where is the Essex Wire Corporation located?
A. The home office is 1601 Wall Street, Fort Wayne, Indiana.
Q. How long, sir, have you been president of the Essex Wire Corporation?
A. April of 1959.
Q. Excuse me?
A. Since April of 1959.
Q. And how long have you been with the Essex Wire Company?
A. It will be 20 years in June.

Q. Mr. Probst, what is the approximate size of the Essex Wire Corporation in terms of annual sales, approximately, sir?

[fol. 393] A. Well, let me say it would be in excess of a hundred million dollars sales per year.

Q. And how many manufacturing plants does the corporation have?

A. I think it is 32.

Q. Now, Mr. Probst, would you state, please, the manufacturing divisions of the Essex Wire Corporation?

A. We divide our operations into an attempt to arrive at production lines and each of these are separate divisions. We have an automotive division. Do you want some information on the type of products on that?

Q. I will ask you that specifically.

A. The magnet wire division, wire and cable electronic, which is a subdivision of industrial controls; automatic switch division, which is a subdivision of automotive, and plastic extrusions.

Q. All right, sir, would you very briefly state what type of products is produced by each of these divisions?

A. The automotive division is principally the supplier of automotive wiring, harness and attachments for the automobile industry.

Q. What is an automotive harness?

A. It is a collection of wires assembled with terminals, [fol. 394] connectors, sometimes relays and switches, various attachments and molded parts so that they are ready to install in a vehicle on the assembly line.

Q. It would be fair to say that electrical system of a motor vehicle?

A. Yes.

Q. Go ahead, please.

A. The magnet wire is just what it says. It makes all types, sizes and types of magnet wire.

Q. Mr. Probst, what is magnetic wire?

A. It is a type of electrical conductor coated with a resin or varnish or epoxy or liquid type coating put on the wire after it is drawn.

Q. What is it used for, sir?

A. It is used to wind motors, coils, transformers, that type of usage.

Q. Would you proceed, please?

A. The wire and cable division is anything in the wire industry that we make other than magnet wire. The electronic division is principally small transformers for home entertainment. Also filters, chokes, small parts. They have a control division which specializes in industrial control, relays, industrial switches and control. And the automotive switch division, part of the automotive division, [fol. 395] specializes in automotive light switches, door switches, turning signals. That type of product.

Our plastic extrusion division is principally shapes and extrusions in plastics of some kind or other.

Q. Now, sir, with reference to the automotive division, I believe you said that the division manufactures automotive or automobile wiring. May I ask this. Do you manufacture battery cables in that division?

A. Yes.

Q. What kind of conductor metal is used in your automotive wiring and battery cable products?

A. Today it is all copper. One time we tried some aluminum in the battery cable field, but that was given up.

Q. Why did you give that up?

A. Principally it could not meet the test requirements of flexing that the cable gets and the use in a car, and it wouldn't stand up.

Q. It wouldn't stand up under flexing?

A. Right.

Q. Do you use any aluminum in the automobile wiring other than battery cable?

A. No, we do not.

Q. Have you ever used any aluminum?

[fol. 396] A. Not that I know of.

Q. And why not, sir?

A. I think the engineers will tell you that it won't take the wear and tear that an automobile or vehicle gives to the wiring in a vehicle. It just won't take the beating, and the flexing that copper will take.

Q. All right, turning to the wire and cable division of the corporation and the magnet wire division, would you state what approximate percentage of ethics total business is accounted for by these two divisions?

A. Combined, I would say approximately 45 per cent in total volume.

Q. And the remainder is accounted for by your other divisions that you have described?

A. Yes.

Q. What products are produced by these two divisions in general terms?

A. Wire and cable and magnet wire?

Q. Yes.

A. Well, I have given you the magnet wire.

Q. Yes, sir.

A. Wire and cable covers practically a full range of what we call building wire.

[fol. 396a] Q. Yes.

A. And cord sets, cordage wire and the aluminum wire described here except for the larger size of ACSR.

[fol. 397] Q. Well, is there a general term that can be used to describe the wires other than building wires and cordage and cord sets?

A. If there were a term, I suppose it would be utility cable.

Q. Utility cable?

A. Yes.

Q. So it would be fair to say that the wire and cable division manufacturer's building wire, cord sets and utility cable.

A. Yes.

Q. Is magnet wire—is the magnet wire division, does that manufacture magnet——

A. (Interrupting) Only.

Q. All right, sir. Now first of all, Mr. Probst, what is building wire?

A. Well, it is just what it says, I guess, any of the type of wire that is used in building construction, wiring houses, industrial buildings, and usually in terms of 600 volts or less.

Q. Used indoors?

A. Indoors.

Q. Well, let's get at it this way, what products are included within the utility cable grouping?

A. Well, we stop at about 15,000 volt capacity, carrying [fol. 398] capacity cable in the covered, and we make

A.C.S.R. in small quantities in the smaller sizes. We make covered aluminum and make service drop, service entrance, both in copper and aluminum.

Q. How about underground cables?

A. Yes.

Q. Now what conductor metal is used in the cordage and cord sets manufactured by you?

A. Copper.

Q. Do you produce any cord sets that use aluminum as a conductor metal?

A. No.

Q. Why not?

A. I don't know if it has ever been tried. I think we produce what the customer wants, and the Customer Engineering Departments have never specified it.

Q. Do you expect there would be any demand for aluminum in the field of cord sets?

A. I don't think so. Again it is a mechanical problem. You have heard before here as to what stress and strain aluminum will take as against copper.

Q. Would it be fair to say it is the same type of mechanical problems you described when you were talking about automobile wire?

A. That's right.

[fol. 399] Q. What conductor metal is used in the building wire manufactured by you?

A. We make only copper building wire.

Q. Have you ever produced aluminum conductor building wire?

A. Not that I recall.

Q. And again, sir, why not?

A. Well, there are so many problems connected with using it, both in installation and teaching people to use it, and the question of its durability, that I don't believe it will in my personal opinion ever be a substitute for copper. There is some aluminum building wire made by some other companies.

Q. All right, sir. In Essex's line of magnet wire, do you produce aluminum magnet wire?

A. Very, very small quantities.

Q. And again, sir, may I ask why not?

A. I would say the engineers just haven't been able to design it into the product economically.

Q. Do you expect there will be an increasing demand for aluminum magnet wire?

A. Personally I don't think so.

Q. All right, sir. In the field of utility cable which you have described as A.C.S.R., covered wire, service drop—I believe you included service entrance.

[fol. 400] A. Yes.

Q. What conductor metal do you use, sir?

A. Mostly aluminum in the overhead type; in the service drop the greater percentage is aluminum; the service entrance, the trend is to more and more aluminum.

Q. Has there been a trend in this direction in these products in recent years?

A. Very definitely.

Q. Trend in favor of aluminum?

A. In favor of aluminum, yes.

Q. Mr. Probst, with respect to the total market for the products of Essex's wire and cable division and Essex's magnet wire division would you say aluminum and copper compete with other as conductor metals?

A. No, I wouldn't use that term. Where aluminum at present price levels is feasible engineerwise and mechanicalwise it just takes over, it is cheaper to use.

Q. What do you mean by "It just takes over"?

A. Well, it is a substitute for copper because of its price advantages.

Q. Well, in a particular application does it substitute for part of the copper used in that application or all of the copper?

A. Usually it takes over all and substitutes for all of it.

[fol. 401] Q. What would you say is the field in which aluminum conductor is and can be successfully used today in the electrical wire and cable?

A. I think you heard it here before from some of the technical witnesses who are better qualified than I am, but I would say in overhead lines for the utility use where they have no other problems of weather, etc., they have taken over almost exclusively, and in service drop it is rapidly taking over because of its economics, and I think it is doing the same thing in service entrance.

Q. Would you say there is a comparable field in which copper predominates as an electrical conductor?

A. Well, it dominates in the entire building wire industry as such, dominates in the underground cable.

Q. How about magnet wire?

A. It dominates in the magnet wire field today.

Q. Do you make any aluminum underground cable?

A. Not that I know of.

Q. Now in your experience, Mr. Probst, when aluminum has been introduced into a new application in electrical conductor wire and cable applications and has been able to perform satisfactorily, what has been the result?

A. It is substituted for the copper usage if it can meet [fol. 402] all the requirements based on today's price levels.

Q. Completely?

A. Usually completely.

Q. Now Mr. Probst, since 1959 has there been any change in the volume of Essex's production in sales of A.C.S.R.?

A. Yes, there has been.

Q. Could you state approximately what the change has been?

A. Well, in 1958 I would say that our total aluminum production was probably about two and a half percent of our wire and cable.

Q. This is in 1958?

A. 1958.

Q. Yes, sir.

A. I would say by 1960 that had dropped to less than one percent.

Q. And was there a decline in one product that accounted for the drop?

A. In the heavier size of A.C.S.R., bare, that was our principal decline.

Q. Why is your production of A.C.S.R. declining?

A. We couldn't make any money selling it.

Q. Does the Essex Wire and Cable Company produce either copper or aluminum rod?

[fol. 403] A. We roll our own rod from rod bars.

Q. Is this copper?

A. Yes.

Q. Do you produce aluminum rod?

A. No, we do not.

Q. Do you have facilities for production of aluminum rod?

A. We have a Properzi machine.

Q. Would you state what that is?

A. It is an aluminum rod rolling mill from ingot, from aluminum ingot to rod.

Q. Is that a process which uses the casting method or rolling method?

A. It is a casting method.

Q. Now you have this machine, you do not use it, why not?

A. Two reasons, the time we went out of the heavy A.C.S.R. business we had a fire in our Properzi mill and we closed it down, and knowing we were not going to have the demand for the volume we decided it wasn't economical to put it back in operation, so we put it in mothballs.

Q. Really a question of volume?

A. Yes.

Q. Growing out of the drop in A.C.S.R. preceding the [fol. 404] fire?

A. It was almost at the same time. I was trying to find the date the other day, and as I remember it, we had made the decision to go out of A.C.S.R. at the time the fire took place, and it was the early part of 1959.

Q. Independently of the fire.

A. Right.

Mr. Mahaffie: That's all I have.

[fol. 405] Cross-examination.

By Mr. Bergson:

Q. Mr. Probst, you said you went out of the larger sizes of ACSR in early 1959?

A. We actually stopped production about March 1 of 1959.

Q. Did the ALCOA-Rome acquisition have anything to do with that decision?

A. No, sir.

Q. Isn't it a fact that at the time you made the decision—where is the plant in which you made the ACSR located?

A. We were making that in Birmingham, Alabama.

Q. Do you have other plants for making wire and cable?

A. Yes.

Q. Are there more than one?

A. There is more than one, yes.

Q. Where?

A. Marion, Indiana, Jonesboro, Indiana, Sycamore, Illinois, Tiffin, Ohio.

Q. The larger sizes of ACSR, were they made exclusively in Birmingham?

A. Yes.

Q. At the time you made the decision to close the ACSR production in Birmingham, did you close the Birmingham [fol. 406] Plant?

A. Yes, we did.

Q. At that time were there any other factors that entered into your decision other than the fact that you gave that you weren't making as much money as you would like?

A. Well, yes, there were. We had quite a gamit of products at Birmingham and we weren't sure that that may not have contributed to our inability to make it pay out, and we were having a lot of labor troubles at Birmingham besides.

Q. You were having labor troubles and that contributed to it?

A. I think it was a lot of circumstances contributed to it.

Q. One of the circumstances was not the Rome-ALCOA acquisition?

A. That's right.

Q. Now, after you closed the Birmingham plant you continued to make the smaller sizes of ACSR in one of your plants, and you also made covered or insulated products of both aluminum and copper?

A. Right.

Q. And in your production of those covered products did [fol. 407] you have separate machines for drawing and stranding and covering of aluminum and copper?

A. At Birmingham we had separate drawing equipment; the insulating and covering equipment was not separate.

Q. But in your Tiffin plant, for example?

A. In Tiffin we ran both on the same equipment.

Q. You run both aluminum and copper on the same machine?

A. Yes.

Q. You draw on the same machine?

A. Yes.

Q. You strand on the same machines?

A. Right.

Q. You insulate on the same machines?

A. Right.

Q. If you had an order for insulated aluminum conductor you insulated you do it on the one machine, if you have an order for insulated copper conductor you use the same machine?

A. Not five minutes later, but that is basically right, yes, sir.

Q. Now, I noticed Mr. Mahaffie asked you about your production in ACSR and asked you whether that had gone down in 1950, but I don't think he asked you about what [fol. 408] happened to your insulated and covered aluminum conductor products since 1958. What was your production in 1958 if you have the figures?

A. Of covered?

Q. Of covered.

A. 3,116,000 pounds.

Q. What was it in 1960?

A. 3,191,000.

Q. So that has gone up?

A. Yes, sir.

Q. Now, you stated on your direct examination that you shut down your Properzi machine coincidentally with the closing of the Birmingham Plant, I guess it was?

A. About the same time.

Q. And also coincidentally with the time of the fire, or not so coincidentally with the time of the fire, prior to the time you shut down the Properzi machine what product did you buy for use in the Properzi machine.

A. Bought aluminum pig, electric grade.

Q. Who did you buy it from?

A. We bought a lot of aluminum from Aluminum, which is ALCAN, Aluminum Company of Canada.

Q. Would you say you bought the majority of it from them?

[fol. 409] A. I think for a good deal of the time we had a the Properzi running it was ALCAN pig.

Q. Since you shut the machine down you buy aluminum rod?

A. Right.

Q. Who is your principal supplier of aluminum rod?

A. South Wire, Georgia.

Q. Let me show you Government's Exhibit 444, which is an exhibit, entitled "Sales by Domestic Primary Aluminum Producers of E.C. aluminum pig and ingot and E.C. aluminum rod and sale to non-integrated producers of aluminum conductor wire and cable and to other firms," I ask you if you see on this chart prior to the time you shut down the Properzi machine the name of your principal supplier of pig and ingot, which you testified was Aluminum, Ltd.?

A. I don't see it on the exhibit.

Q. And since you closed the Properzi in early 1959 you bought your rod from Southwire Company?

A. Right.

Q. Do you see Southwire's name on the suppliers of rod?

A. Not on this exhibit.

Mr. Melchior: Counsel, was that GX-444?

Mr. Bergson: Yes, sir.

By Mr. Bergson:

Q. Now, you testified that you made service drop, service [fol. 410] entrance cable with aluminum and copper as the conductor?

A. Right.

Q. And are you in a position to meet any demand for that product in whatever conductor the demand is made?

A. So far we have been able to.

Q. And if a customer comes to you and orders so many feet of service drop cable in aluminum you furnish it to him in aluminum; if he asks for it in copper, you furnish it to him in copper and it is all made on the same machine?

A. Right.

Q. And the same is true with service entrance cable?

A. Right.

Q. Mr. Probst, were you subpoenaed to appear here as a witness?

A. Yes, I was.

Q. Were you served with a subpoena duces tecum?

A. Yes, I was.

Q. Do you have a copy of that subpoena duces tecum here?

A. Yes.

Q. May I see it?

(Paper handed to counsel by witness.)

[fol. 411] Q. I notice that in this subpoena duces tecum—let me read it with you.

A. I have a photostat of that attachment.

Q. You were asked to bring with you all the written communications between the Essex Wire Company and others since January 1, 1957, referring or relating in whole or in part to difficulties experienced by the Essex Wire Company in securing an adequate profit return by the reason of the relationship between the prices of conductor metal purchased by the Essex Metal Company and the prices of finished wire and cable products excluding communications to or from the United States Department of Justice; did you bring any such communications with you?

A. I did not.

Q. Were there any such communications?

A. I wasn't able to find any.

Q. Do you recall whether there ever were such communications?

A. Not that I know of.

Q. Now, you were also asked to bring all written communications between the Essex Wire Company and others since January 1, 1955, referring or relating in whole or in part to difficulties experienced by the Essex Wire Com-[fol. 412] pany in securing adequate supplies of aluminum to be used in the production of aluminum wire and cable products; did you bring with you any such communications?

A. No, I did not.

Q. Why not?

A. Couldn't find any.

Q. Do you know whether there were any?

A. Not of my own knowledge, I don't know of any.

Q. Now, Mr. Probst, as a producer of wire and cable

products I am sure you were aware of the fact that in 1956 Kaiser Aluminum Chemical Company—1957, acquired the United States Rubber Company's Bristol plant?

A. That's right.

Q. Did that acquisition hurt you in your business?

A. No.

Q. And you are aware of the fact that in the same year Olin Mathieson acquired Southern Electrical Company?

A. Yes, sir.

Q. Did that acquisition hurt you in your business?

A. No.

Q. And of course you are aware of the fact that in April of 1959 ALCOA acquired Rome Cable?

A. Yes, sir.

[fol. 413] Q. Did that acquisition hurt you in your business?

A. No.

Q. Did all three acquisitions put together hurt you in your business?

A. I don't believe so.

Q. Since you have been asked about reasonable expectations here, let me ask you this, do you have any reasonable expectation that these acquisitions will hurt you in the future?

A. No, I do not.

Mr. Bergson: Thank you. No further questions.

Redirect examination.

By Mr. Mahaffie:

Q. Mr. Probst, the three acquisitions which Mr. Bergson just mentioned to you, in each case the acquiring corporation was a producer of aluminum, was it not, sir?

A. Yes.

Q. Approximately what percentage of the total business of Essex Wire Corporation is accounted for by aluminum?

A. Of the total of Essex's business?

Q. Yes, total business of the corporation?

A. Less than half of one per cent.

[fol. 414] Q. Now, when the corporation was producing the larger sizes of ACSR and other products at the Birm-

ingham Plant did you draw both aluminum and copper on the same machines?

A. At Birmingham we did not.

Q. Why did you not?

A. I think costwise with the volume we had, it was better to keep it on separate equipment.

Q. If the volume at the Tiffin Plant today was the same volume in aluminum as the volume that the Birmingham Plant had, would you be drawing aluminum and copper on the same machine?

A. One machine wouldn't do it, if you had two it would be better to separate them.

Q. What kind or grade or type of aluminum rod do you buy, Mr. Probst?

A. We buy electric grade aluminum rod.

Q. That is referred to as E. C. grade?

A. Right.

Q. Now, one further question, sir. Now, with respect to the documents which were called for in paragraphs 2 and 3 of this subpoena, you stated that you, to your knowledge, did not know of any, I believe?

A. That's right.

Q. Does the Essex Wire Company have what is some-[fol. 415] times called a record reduction policy?

A. Yes, we have.

Q. What is that policy, roughly speaking?

A. Referring to correspondence we have a corporate policy of discarding all the correspondence other than the current year and the previous year.

Q. One further question, sir. Mr. Probst, I am showing you a copy of Government's Exhibit 444, this is the same document which Mr. Bergson showed you on cross-examination. I wonder, sir, if you would read the title of the chart?

A. Sales by Domestic Primary Aluminum Producers of E. C. aluminum pig and ingot and E. C. aluminum rod and sale to non-integrated producers of aluminum conductor wire and cable and to other firms.

Q. Thank you, sir. Now, is the South Wire Corporation a producer, is the South Wire Corporation a primary aluminum producer?

A. No.

Q. Is ALCAN or Aluminum a domestic primary aluminum producer?

A. No, they are not.

Mr. Mahaffie: No further questions.

Mr. Bergson: May I have a few on recross-examination?

[fol. 416] The Court: Yes.

Recross-examination.

By Mr. Bergson:

Q. Mr. Probst, you said that one-half of one per cent of your total business was in aluminum conductor?

A. He asked me aluminum sales in relation to total Essex sales.

Q. Yes. Let's relate it to the wire and cable business, part of the business, the wire and cable division, which I think you said accounted for 45 per cent of the sales of the company, and then let's further relate it to the product category that you and Mr. Mahaffie developed as utility sales, utility cable sales, I think you called it.

A. I don't think I could give you even a rough guess on that, I don't have the figures with me.

Q. Well, let's see. You had 3,191,000——

A. (Interrupting) Pounds.

Q. 3,191,000 pounds in covered aluminum conductor in 1960?

A. Right.

Q. And you said that practically all of your aluminum sales were in the utility cable category?

A. Right.

[fol. 417] Q. And you also said that in the overhead field aluminum seemed to be taking over quite substantially?

A. Right.

Q. So would it be a moderate estimate or would it be an over estimate or would it be an under estimate to say that in the utility cable field your sales of aluminum as a percentage of your total sales as conductor in the utility cable field was better than 50 per cent?

A. I doubt if it is that large percentagewise, we sell a lot of copper to the utility industry.

Q. You do?

A. Yes.

Q. Well, would it be—do you have any area——

A. (Interrupting) If I had to makr a wild guess, I would guess it would be 25 to 30 per cent.

Q. A little bit more than half of one per cent or one per cent?

A. It depends on what you relate it to.

Mr. Bergson: Thank you. That's all,

Mr. Mahaffie: The Government has no further questions.

The Court: That's all.

(Witness excused.)

[fol. 418] Edward J. Simmons, called as a witness in behalf of the Government, being first duly sworn, testified as follows:

Direct examination.

By Mr. Melchior:

Q. State your name and place of employment.

A. Edward J. Simmons, I am vice-president in Charge of Marketing of the Triangle Conduit and Cable Company, New Brunswick, New Jersey.

Q. How long have you held this position?

A. Approximately one year.

Q. What was your position before this?

A. Director of Sales of the Electrical Division.

Q. About how long have you been connected with Triangle Conduit?

A. As of this morning, exactly 25 years.

The Court: A fine way to celebrate your anniversary. Just in honor that we will take a five-minute recess.

(Whereupon a short recess was taken, after which the hearing was resumed.)

[fol. 419] By Mr. Melchior:

Q. Mr. Simmons, would you state generally the type of business activity Triangle Conduit and Cable Company is engaged in?

A. We are manufacturers of electrical wires, cables and conduits, copper tubing, plastic pipe and fiber pipe.

Q. What are your approximate annual sales of these products?

A. Approximately 60 million dollars.

Q. What are your approximate assets?

A. Approximately 30 million dollars.

Q. Now, directing your attention to the conductor wire and cable products that your company manufactures, would you state generally the type of copper, would you state generally the type of wire and cable products that you do manufacture?

A. We manufacture primarily products which are known as building wire products, power and control cables and lighting cables.

Q. Now, are these generally made from copper or aluminum or both?

A. We are presently manufacturing only copper.

Q. Now, directing your attention to the conduit which [fol. 420] you manufacture, would you state precisely what conduit is?

A. Conduit is an electrical raceway system made out of either rigid steel, aluminum or plastic or fiber to carry wires to the distribution system.

Q. What type of wires?

A. Building wires primarily.

Q. You mean conductor wires?

A. Conductor wires.

Q. Now, directing your attention to conduit, would you state briefly the type of conduit your company manufactures?

A. Well, I am repeating. Rigid and thin wall steel conduit, aluminum rigid conduit, fiber conduit and plastic conduit.

Q. Do you manufacture rigid and thin wall steel conduit?

A. Yes, we do.

Q. And what is the raw material that you purchase in order to manufacture thin wall steel?

A. We buy our pipe from Wheeling Steel Company and our scelp from Weirton Steel Company for our thin wall conduit.

Q. Do you manufacture aluminum conduit?

[fol. 421] A. No, we do not.

Q. Do you sell rigid aluminum conduit?

A. Yes, we do.

Q. What is your source of rigid aluminum conduit if you do not manufacture it?

A. We purchase on contractual basis from Kaiser.

Q. Would you identify Kaiser for the record?

A. Kaiser Aluminum and Chemical Company or Kaiser Aluminum Company.

Q. What do you purchase from Kaiser?

A. We purchase a complete fabricated product which they furnish in our name.

Q. And then you resell it?

A. Yes.

Q. So you are not a manufacturer of aluminum conduit?

A. That's right.

Q. You are a seller of aluminum conduit?

A. Yes.

Q. Do you manufacture and sell plastic and fiber conduit?

A. Yes, we do.

[fol. 422] Q. Now, in a general way, Mr. Simmons, would you distinguish for me and point out the differences, if any, between rigid steel conduit and rigid aluminum conduit, from a use standpoint.

A. Well, of course, claims are made that they both can be used for the same applications. There are, of course, differences of opinion as to the quality of rigid steel as against rigid aluminum, and there are some recognized differences in each system.

Q. Well, now, in your sales program or your advertising program do you point out the advantages and disadvantages of one of these? For example, what advantages would you point out in connection with steel conduit?

A. It has greater mechanical protection. It has a proven history. Over twenty-five, thirty years on installations. It presents less problems as far as fittings are concerned.

Depending upon its type of manufacture. It has better corrosion qualities under certain conditions as against the aluminum installation.

Q. Now, you mentioned some connection problems.

A. Yes.

[fol. 423] Q. Would you go into a little more detail on that?

A. Of course, this is strictly a technical piece of the business, but it has been found by qualified contractors that because of the nature of the metal——

Mr. Bergson: I don't like to interrupt, your Honor, but it seems to me he is testifying as to hearsay now.

The Court: Well, yes. I really don't——

Mr. Bergson: I really don't care.

The Court: I was going to say that I am not certain that this case turns on this kind of testimony. He just mentioned that—overruled, I will take it.

Q. Mr. Simmons, in attempting to sell steel conduit, and you have been in the business for twenty-five years you said——

A. Yes.

Q. And you have been in the sales end for most of that time?

A. That's right.

Q. You have an opportunity to talk to your various cus-

[fol. 424] tomers and prospective customers?

A. That's right.

Q. And you have secured their comments from time to time and their complaints?

A. That's right.

Q. With this as a background, would you state to me what you consider to be and what you use as your sales talk, shall we say, with respect to aluminum conduit, what advantage does aluminum conduit, or what disadvantage does aluminum conduit have over steel conduit?

A. Well, I would have to say our sales policy hasn't been to go into promoting the sale of aluminum conduit, but as and of itself there are claims made as far as aluminum conduit is concerned, it is lighter in weight, produces lower installation costs, it is easier to cut. I believe that would be the major asset.

Q. Are there disadvantages in connection with the use of aluminum conduit?

A. From what we have found out in the market, there are. It is harder to pull wires through aluminum conduit than it is through the steel conduit. It is claimed that it [fol. 425] presents bending problems because of the temper of the aluminum. It is a delicate metal. The threading is damaged in transit. Characteristics such as that have been publicized.

Q. Now, I believe you testified that you also manufacture plastic and fiber conduit; is that correct?

A. That's right.

Q. Since you are in the sales end of this business, do you feel it is desirable to have a relatively good line of conduit products to sell?

A. Yes. We have established a policy of trying to service our customers with the widest range of products that we possibly can.

[fol. 426] Q. Now you feel this helps you in your sales effort to have three generally different types of conduit?

A. Yes.

Q. One made of steel, one made from aluminum and the other from plastic.

A. That's right.

Q. I believe you stated that your company manufactured copper wire and cable. What is the raw material used by your company in manufacturing wire and cable?

A. Copper.

Q. Copper. In what form do you buy this copper?

A. We buy copper wire, bar and roll it into rod.

Q. You roll it into rod?

A. We roll it into rod, from which we draw it into conductor size.

Q. And then do you insulate it?

A. And insulate it.

Q. Now who are your suppliers of copper wire bar, your major suppliers?

A. To name a couple, I don't know them all, with the Phelps-Dodge Copper Products.

Q. Would you identify that company?

A. That is Phelps-Dodge.

Q. Is this company a producer of primary copper?

A. They are a basic mining company. Kennecott.

[fol. 427] Q. Would you identify them by their full name?

A. I don't know their full name except as Kennecott. They are a basic producer of copper. And A. S. and R., American Smelting and Refining Company, among others.

Q. You stated that these were your primary suppliers?

A. To my knowledge.

Q. And I believe you stated earlier——

A. So as not to offend anybody I better include American Metals Climax.

Q. Do you know whether they are a primary producer of copper?

A. They are.

Q. I believe you stated that your supplier of aluminum conduit was Kaiser.

A. That's right.

Q. The sole supplier?

A. That's right.

Q. Now would you tell me generally, Mr. Simmons, what type of customer, what category of customer you sell your copper wire and copper products to?

A. We maintain what we term a one-hundred percent distributor policy. We sell primarily to electrical wholesalers.

Q. Do you sell to any national chains of electrical wholesale houses?

[fol. 428] A. We do. One.

Q. Now would you identify the type of customer or customer category that you sell your aluminum conduit to?

A. To the exact same type of distribution.

Q. Do you sell any of these products directly to the user?

A. Only on rare occasions. Where we would sell to a utility whose practice it is to purchase direct, and only direct from the manufacturer.

Q. Now would you state for the record, Mr. Simmons, who you consider to be your most significant competitors in the field of copper wire and cable, that you know?

A. Without giving any rank, Phelps-Dodge Wire and Cable; General Cable; Anaconda Wire and Cable; Paronite Wire and Cable; Crescent Insulator; Hatfield Wire and Cable. There are others.

Q. Are any of those—strike that please. Now would you

state for the record those companies who are your competitors in the field of aluminum conduit?

A. Kaiser——

Q. This is the same Kaiser Aluminum and Chemical Company from whom you buy your aluminum conduit?

A. That's right. ALCOA. Reynolds. Harvey.

Q. Would you identify that company a little more?

A. Not knowing its full name, it is Harvey Aluminum [fol. 429] Company, somewhere out on the West Coast. To continue, H.K. Porter. Clifton, a division of General Cable. Walker Brothers. Pittsburgh Standard Conduit Company. I couldn't name any more at this particular time.

Q. And all of these companies you consider to be your competitors in the field of aluminum conduit?

A. That's right.

Q. Do you know whether any of these companies are merely resellers of aluminum conduit such as yourself?

A. I know that several of them are on the same contractual basis that we are with Kaiser. I can't say definitely what each company might have in its own operation.

Q. In other words, these companies purchase conduit and resell it.

A. Yes.

Q. They do not manufacture and fabricate it.

A. No.

Q. Can you identify those that you mentioned who merely buy. Would you like to have the list read back?

A. Clifton for one buys from Kaiser. I would only be guessing as to some of the others. I wouldn't want to make a definite statement, as to their source of supply.

[fol. 430] Q. My question is not directed to their source of supply. My question is directed to which of those that you know purchase aluminum conduit for resale rather than fabricate it themselves.

A. To my knowledge all the companies that I named there, outside of the basic aluminum producers, are purchasers of fabricated conduit.

Q. Walker Brothers you think purchases for resale?

A. Yes, sir.

Q. Rather than for fabrication?

A. Yes.

Q. H. K. Porter?

A. Yes.
Q. They purchase for resale other than fabrication?
A. Yes.
Q. Did you mention Wheatland?
A. Wheatland, yes.
Q. And they purchase for resale?
A. That's right.
Q. How about Clifton?
A. They purchase for resale.
Q. They purchase for resale?
A. That's right.
Q. They do not fabricate to your knowledge?
A. No, sir.
[fol. 431] Q. How about Pittsburgh Steel Conduit?
A. To my knowledge they purchase for resale. I could not make a definite statement of it. I don't know whether they have changed their setup.
Q. Did you mention Channel Master?
A. No, I didn't. I think they are producers of aluminum conduit.
Q. They are a producer?
A. That's right.
Q. By a producer do you mean they fabricate the aluminum conduit from aluminum pipe.
A. They are extrusion people. They extrude lots of shapes and forms of aluminum product, including rigid aluminum conduit.
Q. They extrude?
A. That's right.
Q. Rigid aluminum conduit?
A. Rigid aiuminum conduit.
Q. Now Mr. Simmons, where does your company sell its wire and cable products, from a geographical standpoint?
A. We have a national distribution policy.
Q. You sell throughout the nation?
A. That's right.
Q. Now how do you sell your aluminum conduit from a geographical standpoint?
[fol. 432] A. On the same basis, on a national basis.
Q. Do you sell to the West Coast?
A. Yes, we do.
Q. Do you sell very much?

A. I couldn't give you any definite percentage of our business that we attribute to the West Coast. I would say since our, in relation to our overall conduit business, it is not substantial.

Q. Could you give me in the round figures the dollar figure or poundage?

A. I really don't have those figures available.

Q. Now I believe you said, Mr. Simmons, that your company presently draws and insulates their own copper wire and cable; is that right?

A. That's right, sir.

Q. Has your company ever fabricated aluminum wire and cable?

A. Yes, we have.

Q. You have?

A. Yes, we have.

Q. When, about what period of time did you commence fabricating aluminum wire and cable?

A. I don't know specifically when we started. It was a matter of necessity for a period during and after the War, when copper was not available. But since that short-[fol. 433] age of copper disappeared we went back to manufacturing copper cable.

Q. You say it was some time following World War II that you began manufacturing aluminum wire and cable?

A. That's right.

Q. Can you give me an idea as to about how many pounds you sold in any of those years?

A. I presume I can refer to——

Q. Yes, you may refer to some notes if necessary to refresh your recollection.

A. In pounds specifically based on this chart which starts in 1955.

Q. May I interrupt you for a minute, Mr. Simmons? This chart that you are referring to, did you prepare this chart yourself or was it prepared under your supervision?

A. It was prepared under my supervision by our cost production people.

Q. And it is drawn from company records?

A. That is right, sir. And they are available. In 1955 we produced a 217,000 pounds; in '56, 368,000 pounds; in

1957, 345,000 pounds; in 1958, 60,000 pounds; in '59, 22,000 pounds; in '60, 2,000 pounds; and in '61, nothing.

Q. In other words, you are no longer in the aluminum [fol. 434] wire and cable business.

A. That is correct.

Q. Now would you explain to the Court why, if you can, you are no longer in that business?

A. The company decision was arrived at that we would not produce or sell aluminum wire and cable since we could not get a profit on the products that we were manufacturing.

Q. Now when you say that you could not make a profit, do I understand that the price at which you sold it did not fully compensate you for the effort you expended in addition to the cost of the raw materials?

A. That is correct.

Q. Is that right?

A. That is correct.

Q. Can you tell me generally what the market price of aluminum wire and cable was over this period insofar as a trend may have been concerned? Did the market price of the fabricated aluminum wire and cable products that you manufactured and sold remain stable, rise or decline?

A. Since we are on a declining trend here, my statement would be that the market price of fabricated aluminum products declined as a result of which the profits diminished and disappeared.

[fol. 435] Q. I see. Now, looking to the other end of the transaction, what was the raw material that you purchased in order to fabricate the aluminum wire and cable?

A. For a time we purchased aluminum rod, and then drew it down to conductor size. We later on discarded this policy and we purchased the conductor size in the aluminm conductor size.

Q. Well, now, when did you first buy rod in order to fabricate it into aluminum wire and cable, about what time?

A. Well, I could only relate it to our going into the aluminum wire and cable business, and that was the process in effect at that time.

Q. And was that in the early fifties?

A. I would presume so, yes.

Q. Now, during the period you were buying aluminum

rod and fabricating it into aluminum wire and cable, can you tell me if you recall whether there was any general price trend insofar as the aluminum rod was concerned, did the price remain fairly stable or did that drop along with the price of wire and cable?

A. I couldn't give you a direct answer on that.

[fol. 436] Q. You don't recall?

A. No.

Q. You did say that your profit margins were lowered as the years went by between the early fifties and 1960 when you went out of business?

A. That's right.

Q. But you don't recall what the price level was on it as respects the aluminum rod?

A. Being in the sales end, I had no reason to be fully conversant with raw material purchases.

Q. But you do know that the market price at which you sold aluminum wire and cable declined over this period?

Mr. Bergson: I have been letting counsel lead the witness——

The Court: You are doing pretty good at testifying.

Mr. Bergson: ——down the line, because I didn't think it mattered.

The Court: Yes. You are testifying, counsel.

Mr. Melchior: I will withdraw the question.

Q. Now I believe, Mr. Simmons, you read the figures [fol. 437] of your shipments for the years 1955 to 1960, and I note that in the year 1957 you shipped approximately 355,000 pounds of aluminum wire and cable.

A. 345,000.

Q. I beg your pardon, 345,000, and in the year 1958 only 60,000 pounds; now, this was a very sharp drop. Is there any explanation for this drop that you can recall?

A. I can only state that an evaluation of our position in the product must have taken place between 1957 and 1958 to the point where it was decided that in the company interest it was no longer profitable for us to try to participate in the aluminum market we were in prior to that time.

Q. I see. Now, Mr. Simmons, I believe you stated that you purchased aluminum conduit from Kaiser for resale.

A. That is correct.

Q. You do not manufacture aluminum conduit?

A. That is correct.

Q. And you do not fabricate aluminum conduit?

A. That is correct.

Q. Did your company ever manufacture or fabricate [fol. 438] aluminum conduit?

A. No, we did not.

Q. Did your company ever give any consideration to manufacturing or fabricating aluminum conduit?

A. Yes, it did.

Q. What consideration did you give to that question?

A. When we saw aluminum coming into the conduit market, we naturally explored the possibilities of producing it as part of our own product line. We made cost studies based on buying aluminum tube from either the basic producing people or through extrusion people to see whether or not we could produce it at a satisfactory cost level to enable us to sell it as part of our line.

Q. And what was the conclusion that your company reached?

A. Based on our costs and the cost of either the tube from a producer or an extrusion company, the selling price of aluminum conduit was such that we could not produce it at a profit.

Q. Now, you do purchase it for resale?

A. That is correct.

[fol. 439] Q. Do you find this to be a profitable line at present?

A. A narrow profitable line.

Q. Is there any reason why you carry this product other than purely for the narrow profit that you get from it?

A. Strictly as an accommodation item for our customers whom we, as I said before, try to service with what they want when they want it.

Q. In other words, your customers on some occasions would like to purchase from you——

A. Combination truckloads of rigid steel and aluminum conduit.

Q. I see. Do some of your wire and cable customers desire to purchase aluminum conduit along with the wire and cable?

A. Aluminum conduit along with copper wire and cable?

Q. Yes.

A. We have the same customers buying the same type of products, or buying the line of products from us.

Q. And having this line of conduit is——

A. Part of our product line.

[fol. 440] Q. It is more or less of a sales inducement also to your customers?

The Court: Well——

Q. I will strike the question. Now, how long have you been purchasing aluminum conduit and reselling it, approximately?

A. The latter part of 1960.

Q. The latter part of 1960 to the present time?

A. That's right.

Q. Now, during this period have you reported your sales of aluminum conduit to any trade association of which you are a member?

A. We submitted one semi-annual report to the National Electrical Manufacturers Association for the first half of 1961.

Q. For the first half of 1961?

A. That is right.

Q. Do you recall approximately the data that you forwarded to them or the information you gave them as to your sales?

A. In dollars?

Q. In the manner in which you reported it to them, whatever that might be.

A. Yes, but I would prefer not to divulge the figure if I [fol. 441] don't have to, your Honor.

Q. Let's ask it this way, I am not asking for the precise figure, I understand your reluctance in giving that. Would you be able to give it to us as a round figure or under or over a certain amount?

A. I think I can correlate it to this extent, that based on our figure as to the overall industry figure that was reported for that period of time to NEMA we were probably in the 2 percent area.

Q. Would you explain that statement?

A. Our dollar sales as extracted from the total dollar sales of aluminum conduit reported to NEMA, reported for the first six months of 1961, was in the area of 2 percent of the reporting companies, less than 2 percent of the total

business reported by the companies submitting their figures to NEMA.

Q. Do I understand your answer to be that the sales figure you reported to NEMA constituted less than 2 percent of the NEMA reported total for that period?

A. That's right.

Q. Now, did you report any data to NEMA of this nature in 1960?

[fol. 442] A. No, since we only went into the business in November of 1960 there was no report submitted for that year. In addition to that, I don't think there was a rigid aluminum conduit section established in NEMA at that time to which we would submit our figures.

Q. Now, what time was this?

A. During 1960.

Q. You don't think there was a NEMA section at that time?

A. No.

Q. Were you a member of it?

A. No, we were not.

Q. Do you know as a fact whether there was or was not a NEMA section?

A. I do not know it as a fact.

Q. Now, Mr. Simmons, do you consign any of your wire and cable or conduit products?

A. Yes, we do consign wire and cable; we also consign a small amount of aluminum conduit.

Q. Now, would you explain what we mean by the term consignment?

A. We will ship a quantity of material to a particular customer which he carries in his warehouse location, the [fol. 443] title to which belongs to us until such time as the sale is made from that inventory, at which time he will submit a report on a monthly basis of the sales made during that reporting period for which he is billed.

Q. In other words, title is in you until your customer makes a sale?

A. That is correct.

Q. And at that time you receive the payment?

A. We receive the reporting form from which we submit our invoice and then, of course, get paid.

Q. Ultimately receive payment?

A. Yes.

Q. Now, do you do this on a large percentage of your wire and cable and aluminum conduit products?

A. As far as wire and cable, we consign to those people whom we think qualify for a consignment of the products, and this is based strictly upon the return on investment that we would get, or the turnover on our investment that we would get.

Q. Can you estimate it in the form of a percentage as to what the percentage of the products you sell of that type are consigned, would that be feasible?

[fol. 444] A. All of our 600 volt building wire products, with some exceptions, are consignable.

Q. Are consignable?

A. Are consigned to consignable accounts.

Q. Is it an important part of your business, would you say?

A. It has been.

Q. Now, when you consign these goods to your customer, if your customer doesn't make sales of these goods promptly, your goods are tied up for the period——

Mr. Bergson: I object, your Honor.

By Mr. Melchior:

Q. I will withdraw the question.

The Court: I think we all know what consignment is pretty much without going into the details. It is the regular consignment of goods.

The Witness: That's right.

The Court: If sales are slow you can even pull the goods back.

The Witness: That's right.

The Court: If the fellow is a good salesman, why give him a larger consignment the next time.

[fol. 445] The Witness: That's right.

The Court: It is a pretty well recognized business practice that doesn't require the details to prove it.

By Mr. Melchior:

Q. Is this a sales practice that you like to engage in, Mr. Simmons, in order to sell——

The Court: Sustained. What difference does it make? The consignment is recognized in lots of industries. A lot of people don't like it, but nevertheless I suppose they do it. It doesn't make much difference what they like or don't like, does it?

By Mr. Melchior:

Q. Do your competitors in the field of wire and cable consign their goods also to your knowledge?

A. Some.

Q. Can you name some that do in the field of wire and cable?

A. Phelps-Dodge, General Cable, Anaconda, Paranite.

Q. Is that the Paranite Company that is a subsidiary of [fol. 446] Essex Wire and Cable Company?

A. That is right.

Q. Now, do any of your competitors in the field of aluminum conduit consign their goods to their customers, to your knowledge?

A. Of aluminum conduit?

Q. Of aluminum conduit.

A. Yes.

Q. Could you identify those that do to your knowledge?

A. To my knowledge, Kaiser, Alcoa and Reynolds for sure. I couldn't tell you the policies of the other list of conduit people that I mentioned. I am merely not familiar with them.

Q. I see.

Mr. Melchior: You may examine.

Cross-examination.

By Mr. Bergson:

Q. Mr. Simmons, you stated that you made your decision to go out of the production of wire and cable products with aluminum as a conductor in 1958, is that right?

A. That's right.

Q. That was prior to the Alcoa-Rome acquisition, was [fol. 447] it not?

A. That is right.

Q. Therefore that acquisition had nothing to do with that decision?

A. Absolutely none.

Q. Were the products that you were making with aluminum as a conductor the same type of products that you had been previously and subsequently made with copper as a conductor?

A. Not in the wide range that we would make the copper products.

Q. But the——

A. Some of them were similar.

Q. Were there any aluminum products that you made that you hadn't formerly made in copper?

A. Well, by design I would say the self-supporting drop cable, triplex, as you heard through the testimony.

Q. You didn't make that in copper?

A. No, sir.

Q. Have you made it since in copper?

A. To my recollection, no.

Q. You also said that the reason you went out of the fabrication of wire and cable products with aluminum as [fol. 448] the conductor was because you were finding it difficult to make a profit?

A. That's right, sir.

Q. I suppose among the factors contributing to that inability to make a profit were rising labor costs?

A. In itself the answer would be yes, it is pertinent to that product as well as any other product.

Q. Rising insulation materials cost?

A. Not necessarily.

Q. But possibly?

A. Possibly.

Q. Before I leave that, when you fabricated the aluminum products did you get new machinery with which to do it?

A. No.

Q. Did you fabricate it on the same machinery on which you formerly fabricated copper?

A. That's right.

Q. When you returned to the fabrication—or did you fabricate both simultaneously?

A. During the same period, but at cycles of production.

[fol. 449] Q. Right. And when you stopped fabricating aluminum you used the machinery full time on copper products?

A. That's right.

Q. Now, do you in the course of your business periodically review your product mix to see which items are profitable and which items are not profitable and to determine whether or not you should drop them from your line or whether you should add something to your line?

A. Every month.

Q. And in making that sort of review, if you should discover that it would be profitable to make conductors with—or wire and cable products with aluminum as a conductor, would there be anything to impede you from going back into aluminum?

A. Absolutely none.

Q. Could you for example go back and start making aluminum triplex again?

A. Yes, we could.

Q. And you could make copper triplex if you so desired?

A. Yes. Sure.

Q. Now, in talking about conduit, you described the [fol. 450] characteristics of rigid steel, thin wall, EMT I guess is the trade term, and fiber conduit, and aluminum conduit, and you described the advantages of steel and some advantages of aluminum and some disadvantages of aluminum; is there any conduit use of any consequence that you know of where steel conduit cannot be used and aluminum conduit would have to be used?

A. To my knowledge I know of no such qualification.

[fol. 451] Q. And do you consider aluminum conduit and steel conduit competitive with one another?

A. Yes, they are.

Q. When you refer to your competitors in aluminum conduit, according to my notes you mention Kaiser, ALCOA, Reynolds and Harvey, who are primary producers of the metal, H. K. Porter, Clifton Division of General Cable, Walker Brothers, Pittsburgh Steel Standard, Wheatland

Electrical Products, and Melchior asked you about Channel Master; do you know of a company named The Aluminum Rigid Conduit Corporation?

A. No, I don't.

Q. How about the Conduit Pipe Products Company of Harsco Corporation?

A. To my knowledge they only produce fittings.

Q. How about Hazelwood Engineering?

A. They are a producer of conduit, an extrusion—

Q. (Interrupting) It is used for the same purpose.

A. That's right.

Q. One is made by extruding pipe, the other is by threading?

A. Yes.

Q. And it is a step backward in the integration?

A. Yes.

[fol. 452] Q. How about Jasco Aluminum Products?

A. I have heard of them, I don't know anything about them.

Q. How about Clayton Mark?

A. They produce conduit, I don't know whether they furnish aluminum or not.

Q. How about National Supply, a subsidiary of Armco Steel?

A. A producer of steel; I am not sure about aluminum.

Q. How about Nikoh Tube Company?

A. Again the same. In my listing I tried to name the companies I knew.

Q. I understand that. I am not questioning your veracity or anything like that, I just asked whether you considered these companies. How about Steelduct?

A. The same answer.

Q. You don't know?

A. I don't know, they are rigid steel conduit producers, I don't know whether they supply aluminum.

Q. You mentioned Walker Brothers. Let me ask you one final question; no need of holding you unnecessarily.

Has the acquisition of Rome Cable by ALCOA hurt you in your business in any way?

A. I would have to say no.

[fol. 453] Mr. Bergson: Thank you.

Mr. Melchior: May I ask two questions?
The Court: Yes.

Redirect examination.

By Mr. Melchior:

Mr. Simmons, Mr. Bergson asked you if you would go back into the aluminum wire and cable field if the market conditions changed, and I believe you answered——

A. (Interrupting) I would.

Q. Would you go back under the market conditions as they exist today?

A. Based on my knowledge of the market conditions at this time I couldn't answer you, because we haven't followed it as of recent date. We are just convinced it is not appropriate at this time.

Q. It is not.

A. That is right.

Mr. Melchior: That's all.

Mr. Bergson: Your Honor, in my haste to conclude with this witness I forgot to ask him a few questions. Would you indulge me?

The Court: Sure. Go ahead.

[fol. 454] Recross-examination.

By Mr. Bergson:

Q. Mr. Simmons, were you subpoenaed to testify here at this hearing?

A. Yes, I was.

Q. Were you served with a subpoena duces tecum to bring documents?

A. That's right.

Q. Do you have a copy of that subpoena with you?

A. Yes, I have.

Q. Were you asked to bring with you all written communications betwen the Triangle Conduit and Cable Company and others since January 1, 1957, referring or relating in whole or in part to difficulties experienced by the Triangle Conduit & Cable Company in securing adequate profit returns by reason of the relationship between the prices of

conduit or metal purchased by Triangle Conduit & Cable Company and the prices of finished wire and cable products, excluding communications to or from the United States Department of Justice?

A. That's right.

Q. Did you bring in such letters?

A. I have no such letters. We have checked our files and found no such letters.

[fol. 455] Q. And were you asked to bring with you all written communications between the Triangle Conduit and Cable Company and others since January 1, 1955, referring or relating in whole or in part to difficulties experienced by the Triangle Conduit and Cable Company in securing adequate supplies of aluminum to be used in the production of aluminum wire and cable products?

A. That is true. A review of our files indicated no such letters.

Mr. Bergson: Thank you.

Redirect examination.

By Mr. Melchior:

Q. With respect, Mr. Simmons, to the documents requested in your subpoena, do you know whether or not there was ever any documents like that in your business?

A. To my knowledge, there wasn't.

Q. As a matter of practice do you prepare written papers on matters like this?

A. As a matter of practice, we don't, we don't have time to be concerning ourselves with memorandums on subjects like this.

Mr. Melchoir: That's all.

The Court: Recess until two o'clock.

(Whereupon, at 12:15 p.m. a recess was taken until 2:00 p. m., this date.)

[fol. 456] AFTERNOON SESSION

2:15 p.m.

Appearances:—As before.

DAVID DALE MARTIN, resumed the stand, testified further as follows:

Cross-examination. (Continuing)

By Mr. Bergson:

Q. Dr. Martin, would you please look at your chart, Government's Exhibit 444, which is I think Chart No. 10. Now I would like to ask you why in compiling that chart you did not include figures of imports from foreign countries, particularly the Aluminium Limited?

A. I had no figures on imports from Aluminium Limited.

The Court. Keep your voice up.

The Witness: I didn't have the figures.

Q. Did you make any effort to obtain them?

A. Yes, I did. I found that figures on imports from government sources were not broken down on the same category, into the same category. I was unable to obtain any comparable figures for imports of EC aluminum in ingot.

[fol. 457] Q. Did you write to Aluminium and ask for the breakdown as you wrote to the domestic companies and asked for the breakdown?

A. No, I did not.

Q. Now, you heard Mr. Probst testify this morning that when he was making EC redraw rod he bought the majority of his pig from Alcan; did you not?

A. Yes, sir.

Q. Are you aware of any other producers that buy pig and ingot for their purpose from a foreign source?

A. I have no personal knowledge, but I would infer that they probably do.

Q. In the course of preparing your charts did it come to your attention that Southwire might have bought from Aluminium or from foreign sources?

A. I don't recall.

Q. Now, you also heard Mr. Probst testify this morning that now he buys his EC redraw rod from Southwire?

A. Yes.

Q. Why did you limit this chart to primary producers?

[fol. 458] A. With respect to pig and ingot of course primary producers are the——

Q. I am asking you about this redraw.

A. With respect to the rod and bar I simply made a comparable table based on the domestic sellers of both products.

Q. Do you know whether or not General Cable sells EC redraw rod?

A. No, I do not.

Q. Did you make any effort to find out?

A. I didn't really inquire into that question, no.

Q. Why didn't you inquire of General Cable?

A. I would say that my primary reason was that I just didn't—I did not have time in the work I was doing to go deeply into this. I was preparing a lot of other charts and I used every data on this category, I used the material that I could obtain and didn't engage in a major research project on this particular question.

[fol. 459] Q. Well, would it have been a major research problem to write to General Cable and have asked for a lot of information, would it be too much to ask how much E.C. redraw rod they sold?

A. No, it would not have been, but in the answers to the inquiries from the company that I was working with, I didn't have all the information that you are speaking of.

Q. I am familiar with the correspondence that has been exchanged between the Department and the companies that reported to the Department, because the Department made them available to us on a motion to produce, and in many instances I saw more than one exchange of letters. Now why couldn't there have been an exchange of letters here? General Cable didn't put up a fight about furnishing the first batch of information, did it?

A. Not to my knowledge, no, sir.

Q. I think this is pretty important, Dr. Martin, because on one of your charts here you have a footnote. I think it is chart—on a couple of them, as a matter of fact, let's take chart 6, which is Government Exhibit 439. For example,

you have a footnote, 5, in which you do a little testifying, in which you say "If General Cable Corporation were [fol. 460] treated as an integrated company after the entry of Ormet Corporation, because of the inter-related stock relationship among General Cable, American Smelting and Refining Company, Revere Copper and Ormet Corporation, then the integrated companies share would be 91.3 percent in 1958 and 89.1 percent in 1959." Now if it was important to get that information in on that chart, why wasn't it important to properly report it on Government Exhibit 444, chart 10?

A. I think that it would have been proper to put it in if I had concluded that General Cable was one of the domestic primary aluminum producers. I did not put General Cable in here. I considered it a border line case. There was a question of definition as to which were integrated and which were not. I considered Olin Mathieson to be integrated because of a jointly owned subsidiary producing primary aluminum. General Cable I considered putting in on that table in the front and I ended up by putting it in the footnote and explaining it and leaving it out.

Q. Do you honestly think that General Cable is an integrated aluminum producer?

A. I think that General Cable may have a relationship to source of supply of the raw material different from that of other non-integrated firms, yes.

[fol. 461] Q. Do you think General Cable gets its pig and ingot for anything less than anybody else gets it for?

Mr. Melchior: I don't know that that question is proper. The witness hasn't demonstrated any knowledge in that field.

Mr. Bergson: He demonstrated enough to put that in the footnote.

The Court: Overruled.

The Witness: Would you repeat the question, sir?

By Mr. Bergson:

Q. Do you think that General Cable's so-called integrated position is sufficient so that General Cable would get any price advantage in acquiring its pig or ingot for making of rod than any other non-integrated company?

A. I don't know. It is a question of fact. I have no knowledge.

Q. It doesn't sound likely though, does it?

Mr. Melchior: The witness stated he didn't know, counsel.

Q. Now I would like to invite your attention to Government Exhibit 448, which is your chart 13, and you show on that chart aluminum E.C. redraw rod sold by Rome——

[fol. 462] The Court: What is that number?

Mr. Bergson: 448, sir.

The Court: All right.

By Mr. Bergson:

Q. The last line in the body of the chart shows a aluminum E.C. redraw rods sold by Rome.

A. Yes.

Q. What was the purpose of having that line on the chart?

A. Well, I think in order to take the production figures for redraw rod and get from that to the amount of redraw rod used by Rome, since they produced it, bought it, sold it and used it, it was relevant to put it all in. Perhaps it shouldn't have been on the last line.

Q. I am not quarreling with its position on the chart or even its existence on the chart. Did you have in mind in putting this line on a comparison between Exhibit 448 and the Exhibit that we were just talking about, Exhibit 444, to show Rome's percentage of sales of aluminum E.C. redraw rod?

A. No, I didn't, as a matter of fact, make any such comparison, I don't believe.

Q. But with that line there and with Exhibit 444, if it weren't for the fact that we were comparing oranges and [fol. 463] bananas, you could make a comparison of the sales of E.C. redraw rod by other companies, some of the other companies and sales of E.C. redraw rod by Rome.

A. Yes.

Q. Now in putting these figures down did you consider whether the E.C. redraw rod sold by Rome was sold for electrical conductor purposes or for non-electrical conductor purposes?

A. I took the figures from the interrogatory answers.

Q. The Plaintiff's letter of August 18—do we have that available? I am afraid I don't know the Exhibit No. to this, Your Honor.

The Court: Maybe they can help you. I am not certain that I do.

Mr. Melchior: I think we can find it in a minute, Your Honor.

The Court: All right.

By Mr. Bergson:

Q. It is No. 27. I show you Government Exhibit No. 27, Question 3, and ask you if that is the data from which you prepared the material about Rome's sales in E.C. redraw rod that was tabulated in that chart?

A. Yes, it is.

[fol. 464] By Mr. Bergson:

Q. Now, on your chart you show for the year 1956 sales of 139,000 pounds of E.C. redraw rod by Rome?

A. That is correct.

Q. Going back to question 3 in Government's Exhibit 27, does it appear thereon, of that 139,000 pounds, 124,000 pounds were sold to the Aerofin Corporation of Syracuse, New York?

A. Yes.

Q. All but 15,000 pounds in 1956?

A. Yes.

Q. Do you know whether the Aerofin Corporation is a manufacturer of wire and cable products?

A. To my knowledge, it was not.

Q. In 1957 on your chart you show sales by Rome of 418,000 pounds. What were the sales to Aerofin Corporation?

A. 341,000 pounds.

Q. In 1958 you show 387. What were the sales to Aerofin Corporation?

A. 373,000 pounds.

Q. The first quarter of 1959 you show 103,000 pounds. What were the sales to Aerofin Corporation?

A. 89,000 pounds.

[fol. 465] Q. In the second quarter of 1959 you show 138,000 pounds. What were the sales to Aerofin Corporation.

A. 184,000 pounds.

Q. So the overwhelming majority of Rome's sales of E.C. redraw rod was sold to one customer for non-conductor purposes; is that right?

A. That's right.

Q. Why didn't you break that out and show it in the chart?

A. I really don't know why I didn't.

Q. To the extent that we have a so-called line of commerce of E.C. pig and ingot and E.C. redraw rod as alleged by the Government, these figures then create quite a misleading situation; do they not?

A. I am not sure that they are misleading.

Q. If I had not brought that to his Honor's attention, don't you think his Honor would have thought they were all sales for E.C. conductor purposes?

A. I don't know. I gave sales of E.C. redraw rod on the other chart. I broke them down.

Q. I know you did. That is going to be my next question. Why did you break it down in one chart and not in this chart? Wasn't it because you broke it out in the other chart and made the E.C. figure smaller so that the per-[fol. 466] centage of the Rome figures would be larger?

A. No, I don't believe I consciously considered that.

Q. Isn't that the effect of it?

A. That is true. Yes. I agree that is true. But you, I believe, give me credit for more analysis than I did.

Q. Well, I was tremendously impressed by your qualifications when Mr. Melchior reviewed them with you, and these charts are being offered in a very important lawsuit, important to the Defendants anyway, and I wanted the analysis to be as accurate as possible. Now, let's move on with an effort to get this job done, to the charts that you made, using NEMA figures as a universe.

Mr. Bergson: Could you mark for Identification as Defendant's Exhibit AR-6——

(Bulletin marked as Defendant's Exhibit AR-6 for identification.)

Mr. Bergson: Defendant's Exhibit AR-6 for identification is a statistical bulletin put out by the National Electrical Manufacturers Association called "Summary of net sales to domestic customers FS56, from July 1 to December 30, 1960, rigid metallic conduit and electric metallic tubing section," and it is dated April 21, 1961.

[fol. 467] Q. I think if you will refer to Government's Exhibit 459——

Mr. Melchior: Are you talking about AR-6?

Mr. Adler: The witness has it.

Mr. Melchior: You will have to tie it into a government exhibit.

Mr. Bergson: I have.

Mr. Melchior: Which one is it?

Mr. Bergson: I said if you will look at Government's Exhibit 459.

Mr. Melchior: 459, yes.

Mr. Bergson: As you arose to your feet I was about to say, "which is used as a source material for their exhibit."

Mr. Melchior: Yes.

Q. I show you Defendants' Exhibit AR-6 for identification and invite your attention to the third line thereof which says under description, "5RM-2 aluminum group, 6,709,000 then (seven companies), and I ask you if this is the material from which you obtained your universe figures for the exhibit in question?

A. Yes, it is.

Q. Now, we note there that it says seven companies [fol. 468] under aluminum?

A. Yes.

Q. Did you make any effort to find out whether there were any more than seven companies producing aluminum conduit?

A. No, sir, I didn't.

Q. Did you have that information available to you?

A. I might have had some information relevant to that.

Q. Well, in your source material, you say that you got ALCOA's figures from interrogatory 53 and Rome's figures from Defendants' answers to interrogatory 54, and in the same volume there are answers to interrogatory No. 55 and 56. Did you look, while you were looking at interroga-

tories 53 and 54, did you look at interrogatory 55 and 56 and the answers thereto?

A. I have looked at it. I am not sure I looked at it when I looked at 53 and 54.

Q. Well, look at it now and count for us the number of companies producing or selling aluminum conduit in September, 1960 and currently, bearing in mind this interrogatory was answered in April of 1961?

A. I am checking to see what the abbreviations mean.

Q. "P" means "producing" and "S" means "selling."

A. I see nine listed as producing and one additional one [fol. 469] selling on September 1, 1960.

Q. Now, how many do you find listed under current date, bearing in mind that the interrogatory was answered in the first quarter of 1961?

A. Thirteen listed as producing and seven listed as selling.

Q. Right. Now, you heard Mr. Simmons testify this morning that he didn't produce conduit, aluminum conduit but merely sold it and he reported his sales to the Aluminum Association, to NEMA?

A. Yes, sir.

Q. Now, if you had checked when you were preparing this chart against the next interrogatory you would have seen how grossly inadequate the number of the companies reporting to NEMA was; would you not?

A. The purpose for which I prepared the chart——

Q. I would like an answer to my question, not why you prepared the chart.

A. I think inadequacy has to be judged in terms of purpose.

[fol. 470] Q. How many companies did you say there were—twenty, twenty producing or selling, and seven reporting. Let me ask you this, if you had checked and you saw that there were twenty producing and selling and only seven reporting, would you have prepared the charts at all?

A. I knew when I prepared the chart that this did not give a complete picture of the conduit industry. I prepared the chart quite recently after the orginal chart I prepared on the topic was submitted to the defendants and defendants in their list of objections that they sent to the plaintiff said they would object to the accuracy and reliability of the

census universe figure on conduit. I thought therefore it would be useful to prepare a tabulation to get into the record the only other source I had any knowledge of that purported to give an industry total of shipments on aluminum conduit, and I set it out in a tabulation, simply substituting the NEMA figure for the census figure that I had in the other chart.

I made an adjustment for Alcoa's shipments because I knew that Alcoa had shipped, and I knew how much Alcoa had shipped.

[fol. 471] Q. When this chart was prepared it was prepared for submission to the court. It has been offered in evidence, I presume on the expectation that the Court would be instructed or illuminated by it. Is it your position that this chart in any way reflects the accuracy of the market position of the various companies, particularly Alcoa and Rome, in the aluminum conduit field or the combined aluminum steel and EMT fields which are based on that same NEMA report, which are Government's Exhibit 459, the one we are talking about, 460, 461, 456 and 457?

A. I think that this information should not be taken all by itself. I think that in conjunction with other information that is presented in the tables, based on census sources——

Q. That is another table.

A. It is another table, but this table was intended to be put into evidence with other tables as part of the picture.

Q. What you tried to do is shore up a weak table with a weaker one.

A. Trying to give what information I could find on this question of conduit sales and shipments and production [fol. 472] about which very little information is available on a national basis.

Q. And which has very little probative value. Now one other thing that I want to bring up, and I can't say that I bring this up with any pleasure, but I have to inform you that in addition to the infirmity in your Universe figures you are adding to the Universe figures, including additional totals for Alcoa, and that was a mistake because even though it is to our disadvantage, Alcoa's figures are reported in the NEMA figures.

A. I am very glad to get that information, Mr. Bergson, I prepared it with two alternatives——

Q. But you didn't prepare it at all with the information that Alcoa is in NEMA. Why didn't you ask us?

A. I didn't ask you because I prepared this at the very last minute before coming to the trial. I didn't have an opportunity to do so. I had alternates that would be sure that I leaned over backwards not to make it too small.

Q. Well, I relieve you of the necessity of leaning over backwards.

The Court: Just a minute before you leave that, see if I [fol. 473] understand about this 459, which is the only one I am trying to follow closely.

Now, Dr. Martin, you in substance say, if I understand it, that for the second half of 1960 Alcoa had a percentage of the industry total of rigid and EMT, sales of rigid and EMT conductor, I suppose that is——

Mr. Bergson: That is electrical-mechanical tubing, which is a form of conduit.

The Court: All right, a form of conduit, of 7.6 percent; is that right?

The Witness: Using this industry total as a base, their sales would be 7.6 percent counting only the sales by Alcoa that the Rome division had nothing to do with.

The Court: Yes. And then Rome's sales as agent would be 20.7?

The Witness: Yes, your Honor.

The Court: Well, now, if I understand the last few questions of Mr. Bergson right, your industry total is way too [fol. 474] low because you didn't include in it the sales made by companies who are engaged in this business as indicated by these answers 54 and 55, 57 and 58.

The Witness: Yes, your Honor, it is too low to the extent that some firms did not report to NEMA; it is too high to the extent, as Mr. Bergson just pointed out to me, that Alcoa's total was reported to NEMA. I had assumed that it was not, because their name did not appear as a participating company. It does appear Rome reported the total sales——

Mr. Bergson: Rome reported for Alcoa.

The Witness: That makes the industry total too big, and it tends to be too small in the fact that there are some other companies the interrogatory answer indicated were

producing the product who did not report to NEMA. I don't know how much they sold. This is the information that I would like to have.

The Court: I don't either.

[fol. 475] The Witness: I do know, however, that they were presumably reporting to the census, and my other tabulation shows the census total.

The Court: How can I use this chart, for instance, as any basis or as the basis for any conclusion if I am advised that several companies who are manufacturing or selling this product are not included therein?

The Witness: I should hope, your Honor, that perhaps additional information may come into evidence. On the basis of this you can't do it.

The Court: That is exactly what I thought.

The Witness: You can't do it. I would put much more weight on my No. 458 which gives value of shipments of conduit in 1960 based on census. But the defendants had objected to the census table and I was trying to be sure I had all relevant information into my tabulation.

The Court: Well, in making up your chart which on its [fol. 476] face—or charts, I assume it is supposed to represent the total of the condition in the industry——

The Witness: Your Honor——

The Court: Wait just a minute, couldn't you find out in some way how many firms manufacture or sell this particular item that are missing, for instance, from the census list?

The Witness: I cannot find that out.

The Court: Well, of course, you see I suppose when I get down to this I have got to say, put down, this is the condition of the industry. Well now, unless you furnish me something more than you have, simply by telling me that this is the industry as reflected by the census reports, this is the industry as reflected by the NEMA reports, and then advising me that you know that all of the industry is not reflected in either report; how do I ever use them for any purpose whatever?

The Witness: Your Honor, I do not know that all the industry is not reflected in the census. The census figures [fol. 477] are a little bigger than the NEMA figures where I have comparable figures. The difference between them

might be the shipments of those companies that didn't report to NEMA. So far as I know the census figures are accurate. I put these in as just supplementary information. They might have turned out to be different.

The Court: I don't blame you, Mr. Martin, at all, because after all what you did, you prepared statistics on the information that was given to you or that you got, but what is puzzling me a little bit is how much reliance I can place upon them if as appears in NEMA, they concededly don't represent the industry.

The Witness: I think, your Honor, that the value of the NEMA table is of a negative sort. It shows that NEMA did not report a much larger figure than census, in fact, it reported a somewhat smaller one. It certainly does not stand by itself as a sufficient basis for judging the structure of the industry.

[fol. 478] The Court: Well, of course, as this case goes on there may be more produced, but the thing that bothers me when I sit down to write and say this is the condition of the industry, I certainly can't use the Nema report, can I?

The Witness: Only to the extent that it is sort of limited.

The Court: I either have got to put it in my decision or leave it out. My job I suppose would be to find the condition of the industry. I think we are by the proposition that we can't use the Nema. I am wondering if I could use the Census.

The Witness: My knowledge of the Census figure is based only on conversations with people in the Census Bureau who prepared them and I was very careful to get the very latest figure. If there had been a revision, and there was a revision I incorporated that into the table. I believe that as far as it is possible to ever get adequate, accurate figures of this sort in an industry where companies are reluctant to make known their individual information. The Census is a reliable source. It is a source that is including information that is not disclosed. They don't give out [fol. 479] individual company reports and they are carefully checked and when new information comes in they issue a change slip——

The Court: You used it the best you could.

The Witness: I used it the best I could.

The Court: I don't find any faults with that.

The Witness: I found the Census to be usually accurate.

The Court: Doctor, I am not worried about you or these fellows. I am worried about myself, where I am going to get it from. I don't care so much about them. All right, perhaps I confuse more than I help.

Mr. Bergson: Your Honor, I would like at this time to move to strike the Government Exhibits 459, 460, 456 and 457 which are all subject to the infirmities we have just been discussing.

The Court: 459, 460, 456 and 457. I think I will reserve decision and let's see what happens to them. They don't look much good to me now, I will say that, on the motion to strike.

[fol. 480] By Mr. Bergson:

Q. I'm going to ask you just about one more chart, Dr. Martin. That is Government Exhibit 465, which is your chart 25, I believe.

A. Yes, sir.

Q. The Defendant did not object to this chart, as you know, because it accurately portrays what it purports to portray, but what I would like to ask you is why in preparing a chart of that capacity existing or under construction in the years, at the end of 1960, you didn't do what you did in other charts and make comparisons with preceding years.

A. I think this chart does not directly relate it to the market categories that I was trying to get a picture of, and this was sort of an extra chart to show the domestic primary producers and their relative sizes.

Q. To show that ALCOA was the biggest one?

A. I think the reason it shows that ALCOA was the biggest and Ormet is bigger than Harvey.

Q. But it doesn't show what would have appeared if you had used earlier years and while ALCOA is the biggest now it was a heck of a lot bigger prior to that.

A. That's right, it doesn't that.

[fol. 481] Mr. Bergson: Would you mark as Defendant's Exhibit AR-7 a chart entitled "Primary Aluminum Capacity, Production and Supply."

(Chart referred to above marked as Defendant's Exhibit AR-7 for identification.)

Q. This chart has previously been shown to counsel for the Plaintiff and they have expressed no objection to the accuracy of the figures contained in the chart. And I ask you to look at this chart and look at the year 1948 and tell us what percentage of primary aluminum capacity in the United States ALCOA had in 1948.

A. 50 percent.

Q. And what percentage did it have in 1954?

A. 41 percent.

Q. And what percentage did it have in 1960?

A. 35 percent.

Q. Does this—were the sources from which this information was compiled, which was stated on the face of the document, available to you?

A. Yes, they were.

Q. Now you also prepared a chart showing the number of new entrants into the aluminum wire and cable industry from 1955 to 1961, that is Government Exhibit 447. I beg [fol. 482] your pardon—strike that. 442.

A. Yes, sir.

Q. Now the source material for that information was the Department of Commerce, B.D.S.A. directory of aluminum suppliers dated April of 1961, and another one dated June 30, 1955, is that right?

A. Yes.

Q. Now we have already marked for identification, let me ask you this first, why didn't you prepare a similar chart regarding the entry of primary aluminum producers?

A. I think I included some information on that in some other charts, in some footnotes.

Q. It wasn't because the result would have been quite the opposite; was it?

A. I think, I really don't know why I didn't. There are a lot of charts I didn't prepare. It is hard to say why I didn't. I don't think I considered it and rejected it for a specific reason.

Q. Let me ask you this, and maybe you are not qualified to answer it, and if you are not I won't press it. But you are an economist and you are a teacher of economics and

business statistics at the University of Indiana and very highly regarded one. Let me ask you this, in your judg-
[fol. 483] ment is it harder or easier for a company to enter into the business of producing primary aluminum than it is to enter into a business of producing aluminum wire and cable?

Mr. Melchior: I object to that question, no basis has been laid.

The Court: Overruled.

A. I don't believe I can honestly answer the question. I don't know. There are so many things that determine ease of entry, and I am not in any position to answer it.

Q. You just don't know whether it is easier to become a primary producer of aluminum than it is to produce insulated wire and cable.

A. I made no study of this question and I wouldn't want to give an opinion on it without doing so.

Mr. Bergson: Mr. Reporter, will you mark for identification as Defendant's Exhibit AR-8 a directory of aluminum suppliers as of June 30, 1955 published by the United States Department of Commerce, Bureau of Defense Service Administration.

(Directory above referred to marked as Defendant's Exhibit AR-8 for identification.)

[fol. 484] By Mr. Bergson:

Q. Now I show you Defendant's Exhibit AR-8 for identification and ask you if that is the same directory that you used in compiling the information contained in Government Exhibit 442?

A. Yes, sir.

Q. And would you please look at that and tell me how many primary aluminum suppliers are listed for 1955? Right on the first page, I think.

A. Three.

[fol. 485] Q. Now, look at Defendant's Exhibit AR-5, which is revised as of April, 1961, and tell me how many primary aluminum suppliers are listed in that directory?

A. Six.

Q. 100 per cent more than there were in 1955.

A. Yes, sir.

Mr. Bergson: Thank you, Dr. Martin. I am sorry to have kept you so long.

The Court: Redirect, if any, Mr. Melchoir.

Mr. Melchoir: No redirect, your Honor.

The Court: I guess they are through with you, Doctor.

(Witness excused.)

Mr. Melchoir: Mr. Murray.

Mr. Bergson: Who?

The Court: Murray.

Mr. Bergson: He is not on the list that you gave me yesterday.

Mr. Melchoir: He wasn't on the list as of yesterday?

Mr. Bergson: No.

Mr. Melchoir: If you are not prepared, I won't put him [fol. 486] on. I thought I had given counsel all my witnesses for this week.

Mr. Bergson: It is all right.

The Court: Why don't I take a five-minute recess and maybe you can work it out.

Mr. Bergson: I can be ready, your Honor.

The Clerk: Court is in recess.

(At this point a short recess was taken after which the trial was resumed.)

Holt A. Murray, called as a witness in behalf of the Government, being first duly sworn, testified as follows:

Direct examination.

By Mr. Melchior:

Q. Would you state your full name and title?

A. Holt A. Murray, Vice-President, Salesmanager, Crescent Insulated Wire & Cable Company, Trenton, New Jersey.

Q. Now, Mr. Murray, in giving your testimony I would

suggest you talk slowly and clearly so the Court can hear everything you say.

A. All right.

Q. How long have you been in the wire and cable busi-
[fol. 487] ness, Mr. Murray?

A. Since 1945, sir.

Q. And is this organization with which you are concerned a family concern?

A. Yes, it is.

Q. And your experience has been primarily in what field?

A. In sales, all but about two years of my time has been in sales.

Q. And those two years?

A. Well, I was learning the ropes in the factory that early part of the time I was there.

Q. Now, when was Crescent Insulated Wire & Cable Company founded?

A. 1892.

Q. In what general type of business is it engaged in?

A. Most of that time it has been insulated wire, building wire, primarily.

Q. Both aluminum and copper?

A. Yes.

Q. Now, would you state for the record your approximate annual sales of wire and cable?

A. Approximately fourteen million dollars a year, currently.

Q. Would you be a little more specific now and indicate to us generally the type of wire and cable products manu-
[fol. 488] factured by Crescent?

A. Well, we make the standard building wire items used in commercial buildings, control cables, machine tool wire, power cable, up to 15,000 volts, steel armored cable for power distribution use, portable cords to an extent, varnished cambric cables, that is also power cable. I think that covers it generally.

Q. Now, do you consider this to be a fairly broad line of wire and cable products?

A. Yes, I would say it is fairly broad. There are others, of course, who make products that we don't make. We don't make any paper cable or asbestos insulated cable.

Q. But what sort of insulated cable do you make?

A. Rubber insulated, plastic insulated, they are the two main categories, synthetic rubber and plastic.

[fol. 489] Q. Now, are you a rod drawer?

A. Yes.

Q. What is your raw material that you use in making copper wire and cable?

A. We buy electrolytic copper rod and draw from that.

Q. And who are your suppliers of copper rod?

A. Mainly Phelps-Dodge Copper Products.

Q. Now, you said you draw some aluminum wire and cable also?

A. Yes, sir.

Q. And what is the raw material that you use in drawing the aluminum wire and cable?

A. We draw again from aluminum rod, electrolytic aluminum commonly known as EC aluminum.

Q. Now, Mr. Murray, the reporter will have to get this down on the record. If you will speak a little more slowly he will be able to read it afterward.

A. All right.

Q. Now, would you state in general the type of customer your company has, in a general sort of way?

A. We sell mainly through electric distributors or wholesalers as they are sometimes called. We do sell other accounts, OEM, original equipment manufacturers as they [fol. 490] are called, and some utility firms, but primarily it is through electrical distributors.

Q. And what is your sales area for these products?

A. You mean the distributed items alone?

Q. Yes, in what parts of the country do you distribute these products?

A. Well, we go as far west as Minnesota, Iowa, Nebraska. We do not sell on the West Coast.

Q. I see. Would you state generally your most significant competitors, the companies that you meet on a daily basis as competitors in the aluminum wire and cable field—I am sorry, in copper.

A. Triangle Conduit and Cable Company; General Cable Corporation; Anaconda Wire and Cable Company; Phelps-Dodge, that is their division is Habishaw Wire and Cable; Circle Wire and Cable Company; Hatfield Wire and Cable Company; Paranite Division of Essex; Narragansett Wire

and Cable Company; Walker Brothers, Rome Cable and H. K. Porter Corporation. There are maybe a few smaller other ones, but they are the important ones.

Q. I see. Now, some of these competitors of yours are integrated copper companies; is that true?

[fol. 491] A. That is true.

Q. Could you indicate which of these are integrated copper companies, and by integrated copper company I mean a company who produces primary copper.

A. Anaconda Wire and Cable is associated with Anaconda Copper; Phelps-Dodge Copper Products. And that would be it as far as the integrated ones I mentioned before.

Q. I see. Now, would you tell me who your most significant competitors are in the aluminum wire and cable field?

A. Well, we don't do a great deal in aluminum right now. Well, I would say Kaiser is a big factor in aluminum wire. Rome. Paranite. As far as aluminum is concerned I would say they are the main ones I would think of at the moment.

Q. And do you know which of these are primary aluminum producers?

A. Kaiser and Aluminum Corporation of America.

Q. What specific types of aluminum wire and cable have you made?

A. We made some building wire back when copper was very scarce. We made service entrance cable and the [fol. 492] service drop cable known as triplex. That is about the limit of it.

Q. Do you still engage in these types of wire today?

A. No, I would say we are almost completely out of that line.

Q. Can you state why you are almost out of that business, if you know?

A. Well, we have investigated from time to time to determine whether or not we can get into this triplex for instance, and also the service entrance cable, and the way it looks to us is that we can't compete in those lines. By that I mean we cannot justify the expense of going into it for the return we feel we could get.

Q. Were you in that business at one time?

A. Yes. We made quite a bit of service cable. We made some triplex and made quite a bit of building wire.

Q. All out of aluminum?

A. Yes, sir.

Q. Has the demand for those products in aluminum held up?

A. Not in the building wire end of it. We don't see much [fol. 493] market in building wire, but there is a market for triplex and the service entrance.

Q. Now, at one time, if I understand your testimony, you at one time produced and sold more aluminum wire of that type than you are producing today; is that correct?

A. That is true.

Q. And you indicate that the demand fell off, I believe?

A. That's right. The demand for the building wire fell off. There is very little demand for it at the present time. This is a rubber-covered 600-volt single conductor building wire.

Q. Did any of your former customers indicate to you why they didn't want to purchase aluminum building wire from you, if they did?

A. As near as I can find——

Mr. Bergson: Just yes or no to that question.

Q. Did any of your customers indicate the reason for not purchasing aluminum building wire from you?

A. There were problems——

Q. He wants a yes or no answer.

[fol. 494] Mr. Bergson: Go ahead.

Q. Is the answer yes?

A. Yes.

Q. Would you state what the reasons were that were given to you?

A. There were problems with the installation of building wire.

Q. Would you explain that a little further?

A. There were problems with making the connections and terminations.

Q. Can you indicate precisely what the problem was?

A. Making electrical connection to terminate the line to tie it into a panel board or something of that sort. Means getting a connector on the end of the cable so as to fasten

it to the panel board. And there were problems there that had, which apparently there was some trouble possibly due to lack of experience on the part of those installing it.

[fol. 495] Q. Did they indicate any other reasons, your customers, did your customers indicate any reason why they did not want to purchase aluminum building wire?

A. Well, I don't know of any specific reasons why they don't, other than what I have mentioned. There just wasn't the market for it. The wholesalers customers did not want to use aluminum, is what it amounts to.

Q. Do you sell flexible copper wire and flexible copper cords in your business?

A. To some extent we do.

Q. Do you——

A. (Interrupting) Light strand wire, flexible wire, yes.

Q. Do you sell aluminum flexible wire and cords, also?

A. No, sir.

Q. Did you ever?

A. No, sir.

Q. Have you ever thought of selling that as an item of your line?

A. Well, no, we haven't, I don't think there is any real market for it.

Q. You don't think——

A. (Interrupting) In the flexible strands as far as I know.

[fol. 496] Q. Can you state why, if you know?

A. Well, the problems having to do with the fine wire drawing and stranding of aluminum are different from those of copper. As I understand it, the copper will stand the drawing better and after it is made into a flexible wire, it will stand flexing better than aluminum.

Q. Well, I am not sure I understand your answer as to the difference between them.

A. Let me try to explain it. I think aluminum is more brittle than copper, and if you can draw it down to a fine size, say a real fine wire, the same size you can copper, it still will tend to break more readily than copper on flexing of the cable after it is in a cable after it is installed.

Q. Are you familiar with the Rome Cable Corporation as it existed prior to the merger?

A. Yes, I am.

Q. Was Rome Cable Corporation a competitor of yours?
A. Yes.

Q. Did Rome Cable Corporation have a line of products, wire and cable products as broader or broader than yours?

A. I would say even broader than ours. There were some [fol. 497] things they didn't make that we did; there were others they made that we didn't make.

Q. Are you familiar with Rome Cable Corporation's reputation in the wire and cable community prior to the merger as a producer of wire and cable?

A. Yes.

Q. What was it?

A. They had a very fine reputation in the field.

Q. Now, Mr. Murray, I'd like to ask you a little bit about your success in making a profit on the sale of aluminum—strike that, on the sale of copper wire and cable. I don't want to go into trade or business secrets. I want to be careful on that point. But I would like to ask you if you can indicate to me as respects the sale of wire and cable over the last five or six or ten years, what your profit margins have been over the last several years in the sale of copper wire and cable?

A. Well, in 1956 ——

Mr. Bergson: I doubt the relevancy of this, Your Honor.

The Court: I doubt it myself, but I think I will take it if the witness wants to testify about it. Go ahead.

The Witness: In 1956 our profits were fair, but since [fol. 498] that time they have definitely been on the decline and that has continued right through to 1961.

Q. Since 1956 there has been a decline in your profits?
A. That's right.

Q. Your profits now are lower than they were in 1956?
A. That's right.

Q. In the field of copper wire and cable?
A. That is right.

Q. Now, can you attribute this lowering of profit ratios to anything in particular?

A. Well, it is a matter of competition, I suppose, is one way to answer it, the prices have declined in general since that time.

Q. Have market prices of wire and cable, copper wire and cable, declined?

A. I think that is a fair statement in general. I wouldn't say it has declined each year a certain amount, but I think, generally, they have declined, and of course some costs have gone up in the meantime, others have stayed about the same.

Q. But on the whole you feel as respects copper wire and cable that the market price currently is lower than it was in 1956?

Mr. Bergson: He is leading the witness, Your Honor.

[fol. 499] By Mr. Melchior:

Q. I will change it. Do you feel the market price today is lower than it was in 1956? I think the witness stated that and I was repeating what he said.

A. Yes.

Q. Now, I believe you stated earlier, that the raw material you use in drawing copper wire and cable was copper wire bar or rod?

A. Rod.

Q. Copper rod?

A. Yes.

Q. Now, can you tell me what the relationship between the price you pay for copper rod today, electrolytic copper rod, as compared to what you paid for electrolytic copper rod in 1956, is the price today lower, higher, or about the same?

Mr. Bergson: This is going pretty far afield, your Honor.

Mr. Melchior: If counsel will state the basis for his objection, I would try to answer it.

The Court: He says it is far afield, that means far from anything we are concerned with.

[fol. 500] Mr. Melchior: You mean because we are discussing copper, is that your point?

Mr. Bergson: No, because you are discussing copper rod prices, copper—as a matter of fact, I forgot even the question now.

The Court: All right. We will settle that by overruling the objection and getting the answer if we don't know the question.

Mr. Bergson: It was so irrelevant I can't even remember the question.

Mr. Melchior: We think it is relevant, Your Honor, but since you have overruled the objection——

The Court: All right.

The Witness: Well, I can't quote offhand prices of copper as we paid for it in 1956, as compared to today, I am not sure of that.

By Mr. Melchior:

Q. Well, have you ever made a study as to the difference between what you have to pay for copper rod and what your sales price for copper wire and cable is to try and determine what portion of the sales price of your copper and wire is represented by the cost of the rod, the basic raw [fol. 501] material?

A. Yes, we have made that study monthly for as far back as I can remember, into the early fifties, anyway.

Q. You have made this on a monthly basis back as far as the early fifties?

A. Yes, sir.

Q. Now, I ask you if you can recall back to the year 1951, for example, the early fifties or 1950 or through that period, and if you can state what the ratio was between the cost of copper rod, your basic raw material, and its market price of the copper wire and products that you sell?

Mr. Bergson: For what period?

Mr. Melchior: For the period 1951.

Mr. Bergson: Just the year 1951?

Mr. Melchior: Or the first year you can recall figures for.

A. Well, back in 1951 the cost of copper rod represented approximately 23 per cent of the selling price of the wire and cable produced from that rod.

By Mr. Melchior:

Q. The rod represented 23 per cent of the sales price of aluminum copper wire and cable product?

[fol. 502] A. That's right.

Q. Was that for a particular type of wire and cable product?

A. No, it covered the whole range of products we manufactured.

Q. And you stated you had a fairly broad line?

A. That's right.

Q. Now, would you recall the figures for any subsequent year?

A. Well, it has gradually increased, that percentage has gradually increased to the point where in 1961 that represented 49 per cent, approximately 49 per cent of the selling price of the finished product.

Q. In other words, in 1951, your basic raw material in the production of copper wire and cable represented about 23 per cent of the cost of the copper wire and cable?

A. That's right.

Q. And the trend was steadily upward until 1961 when it represented—I didn't hear your last figure.

A. 49 per cent, not of the cost but of the selling price.

Q. Of the selling price?

A. That's right.

Q. Need I ask you what effect that has had on your profit [fol. 503] ratios in the field of copper wire and cable?

A. Well, I think it is pretty clear what it does do.

Q. What has been the effect?

A. It has certainly put a squeeze on us, there is no doubt about that.

Mr. Melchior: You may examine.

Cross-examination

By Mr. Bergson:

Q. Mr. Murray, the reason for this so-called squeeze, the difference between 23 per cent and 49 per cent represented—is that represented by an increase in the price of rod?

A. Perhaps that is some of it.

Q. But it is mainly due to the decrease in the price of the wire and cable product itself?

A. I would say that is the main factor.

[fol. 504] Q. And to the extent that you have suffered by this decrease in prices the public has gained by getting wire at a cheaper price?

A. Well, that is true, if you want to look at it that way.

Q. When you went into the business of manufacturing aluminum wire and cable, I think you said it was in the fifties.

A. I don't believe I mentioned a specific date. We did it at a time copper was scarce. I believe it was in the late forties, if I am not mistaken. It may have been either that time or just the time of the Korean war.

Q. Now, what new machinery did you install for the drawing of aluminum wire and cable?

A. We didn't install any new machinery.

Q. You drew, stranded and insulated aluminum on the same machinery that you insulated, drew and stranded copper?

A. That is correct.

Q. If the occasion arose today where you got an order for a conductor product, with aluminum as a conductor, would you be in a position to manufacture?

A. Yes.

[fol. 505] Q. When you went into the aluminum drawing, stranding, did you need any new employees?

A. Yes, I think we did have to have some.

Q. Because of the technical ability?

A. No, not that. What we did was draw the aluminum over right off the old machine that we had previously used on copper, and we did not want to manufacture with the large machine we were using on copper.

Q. So you had two machines running at the same time?

A. That's right.

Q. You didn't find that you needed any additional technical confidence or anything like that?

A. No, no problem there.

Q. If it became profitable for you to make service drop cable when using aluminum as a conductor today, would you go into that business?

A. Yes, we would.

Q. And what sort of an investment would it require for you to go into the business?

A. It wouldn't be an additional investment with the exception of inventory investment.

Q. You wouldn't need any new plant or any new ma-

[fol. 506] chinery?

A. No, sir.

Q. You could rapidly shift over——

A. That's right.

Q. —to aluminum. So that the reason you are not making aluminum today is not a matter of ability, not a matter of investment, it is just a matter of profitability?

A. That's right.

Q. And I think you said you reviewed your conductor line periodically?

A. That's right.

Q. To determine whether or not you should go into it. And do you periodically consider whether or not the time is now ripe to go back into aluminum?

A. That's right, we do.

Q. And if you discovered the time was now right your decision would be to go back into aluminum?

A. That's right.

Q. Are you appearing here under subpoena?

A. Yes, I am.

Q. Was that accompanied by a duces tecum provision requiring you to bring documents?

A. Yes, it was. (Hands document to counsel.)

[fol 507] Q. I notice that the subpoena requests you to bring with you all communications between your company and others since January 1, 1957, referring or relating in whole or in part to difficulties experienced by the Crescent Insulated Wire and Cable Company in securing adequate profit returns by reason of the relationship between the prices of conductor metal purchased by the Crescent Insulated Wire and Cable Company and the prices of finished wire and cable products. Did you bring any such documents with you?

A. No, I did not.

Q. Do you have any such documents?

A. No, I did not.

Q. Do you recall, do you have a records retention program?

A. Well, we keep a lot of records. I don't know what you mean exactly by records retention program.

Q. That is an euphemism for a record destruction program.

A. We keep them quite a while. Our records go back.

Q. Your records go back to 1957?

[fol. 508] A. Yes, sir.

Q. And were you also asked to bring with you all written communications between the Crescent Insulated Wire and Cable Company and others since January 1, 1955, referring or relating in whole or in part to difficulties experienced by the Crescent Insulated Wire and Cable Company in securing adequate supplies of aluminum to be used in the production of aluminum wire and cable products?

A. We have no such documents.

Q. And your records go back to 1955 as well?

A. Yes.

Q. Now you testified, Mr. Murray, that one of your competitors in copper products was Rome Cable Corporation?

A. That's right.

Q. Has the acquisition of Rome Cable Company by Alcoa hurt you in any way?

A. I can't say that it has. I can't definitely say that it has at all.

Q. And you also said that they were one of your competitors in aluminum products. I noticed that you didn't say that Alcoa had been one of your competitors in aluminum products.

[fol. 509] A. Well, that was an oversight. Certainly they are.

Q. Has the acquisition hurt you in these products?

A. I would say no.

Mr. Bergson: No further questions.

Mr. Melchior: No further questions, your Honor.

The Court: All right.

(Witness excused.)

Mr. Mahaffie: If the Court please, the Government at this time is going to offer into evidence some documents. Now, with the Court's permission I am going to follow the same procedure Mr. Melchior used the other day. That is I will offer these documents in groups and give the Court as brief a description as I can of each group, with some discussion of individual documents within the group. We hope that this will be the most expeditious way of getting this in.

Mr. Bergson: Your Honor, if the purpose of this discussion is to tell you what the documents are, I have no ob-
[fol. 510] jection. If the purpose of the discussion is to testify regarding the documents, I do object, and if permitted, I would hope that I would be, if they are permitted to do so, I hope I can be permitted to testify in rebuttal.

Mr. Mahaffie: I have no intention of testifying.

The Court: The difficulty is that we lead right into argument rather than evidence. I think that you ought to confine yourself as much as you can, and I am not going to be very finicky about it, and I certainly will give Mr. Bergson a chance here, but confine yourself as much as you can to a statement of what the document is rather than an argument over it.

Mr. Bergson: That seems to me to be the more appropriate thing.

Mr. Mahaffie: I certainly will. In some instances I would like to read from the document.

The Court: Oh, yes, I will let you call my attention to
[fol. 511] something particular about it.

OFFERS IN EVIDENCE

Mr. Mahaffie: The first group of documents which have been numbered GX 52 through GX 70 for identification. I offer GX 52 through GX 70 in evidence at this time.

Mr. Bergson: We have no objection to any of them.

The Court: All right, I will receive them.

(Government's Exhibits GX-52 through GX-70 for identication received in evidence.)

Mr. Mahaffie: Now, would the Court like these documents to be handed up while I am discussing them?

The Court: No. I couldn't digest them that fast.

Mr. Mahaffie: This group of documents, your Honor, begins with GX-52, which is an address by A. D. R. Fraser, president of Rome, given to the members of the Rochester Society of Investment Analysts in January, 1957.
[fol. 512] We offer this document primarily to show the history of the Rome Cable Corporation.

Now pointing to a few specific items in the speech on page 1 Mr. Fraser notes that the company was incorporated

in 1936. On page 2 I will quote from the second paragraph:

"When we started in business in 1936, we were the only independent company to have its own copper rolling mill. Now there are three or four others."

This is as of 1957.

"Our rolling mill and bare wire fabricating units process sizeable quantities for General Electric, Westinghouse and other wire fabricators. We have one wire and cable plant in Rome, New York and a steel conduit plant in Torrance, California, which we acquired in 1950. This is the only conduit plant in operation today west of St. Louis.

"We started with a limited line of standard products of [fol. 513] rods, bare and weatherproof wire which has now expanded to cotton, paper, asbestos and glass magnet wire, rubber and plastic construction wires, flexible cords, mining cords and cables, signal wires, control cables, rigid and thin wall steel conduit, high and low voltage overhead and underground cables, and many specialties for various industries and the government."

Now quoting from page 3:

"We sell through our own salesmen and some agents. We have eighteen offices, nine warehouses and almost 300 other stocks strategically located throughout the United States."

I would like to call to the Court's attention a chart which appears on page 4 of this document. It charts a graph of net worth of the corporation from 1936. Net worth appears as somewhat under two million dollars to 1956. As of March 31, 1957—excuse me, sir—that net worth appears at 16 million dollars.

[fol. 514] The document also shows on page 7 sales graph of the company from 1936 when there was sales of $1,800,000 to sales in 1956 of $57,000,000.

Quoting again, with the Court's indulgence from page 10:

"In 1956 and 1957 we will have doubled our capacity for production of aluminum rod, have added to our insulating, extruding, cabling and drawing equipment. We will also

have facilities for enameling rectangular magnet wire, besides adding capacity in many other lines, particularly in the rapidly growing and less competitive high voltage field."

Quoting from page 12:

"In the last five years aluminum has become an important base conductor for insulated wire. In 1952 it only represented five percent of our total volume in copper equivalent whereas in this last year it has climbed to almost 25 percent of our total."

Now, the remainder of this group of documents, your [fol. 515] Honor, it was necessary that I discuss that speech separately because it covers the Rome Corporation rather generally. The remainder of this group, that is GX-53 through GX-70 pick up the Rome Corporation in 1950 as it entered into what its executive then referred to as "an aluminum project." These documents are offered to show the increasing importance of aluminum at that time and to reflect Rome's planning to enter the aluminum business. Initially Rome made an expenditure of approximately $336,000 to install machinery to cast, roll and draw aluminum. This was in the early 1950's, from the start of its aluminum products.

Mr. Bergson: What document is that from?

Mr. Mahaffie: That is from GX-68, the figure is taken from GX-68. Rome's initial planning in this regard, your Honor, as these documents indicate includes right from the start the integration back to the rod stage.

[fol. 516] Now, specifically I would like to call the Court's attention to GX-53, which is the first document we have reflecting the higher echelon corporate planning of the corporation. These are the minutes of the executive committee of Rome dated November 6, 1960. I quote:

"Mr. Rolston reported on expansion plans of seven electrical corporations in the manufacture of aluminum. He also advised of the speed at which this company is drawing aluminum. It was thought that a further study of developments at Southern Electrical Corporation might be made."

I would also direct the Court's attention specifically to

Government's Exhibit 59 which again are minutes of the executive committee of Rome dated September 20, 1951. [fol. 517] And again I quote: "Full consideration was given to the Nichols Wire & Aluminum Company's Properzi continuous casting and rolling unit for aluminum as a result of a visit to Nichols and Southern Electrical. The Engineering Department recommended the Nichols installation. After considerable discussion, upon motion duly made, seconded and unanimously carried, it was

"Resolved, that the Properzi continuous casting and rolling unit for aluminum at an approximate cost of $125,000 be and hereby is approved; and it was

"Resolved, that aluminum wire drawing equipment be purchased with decision as to whether Vaughn or Southern equipment to be made at an early date.

"There being no further business to come before the meeting it was adjourned."

Mr. Bergson: May I be heard on that, Your Honor?

The Court: Yes.

Mr. Bergson: These documents all refer to proposed executive action. They do not indicate the action taken on those proposals.

Mr. Mahaffie: Well, Your Honor, I would only point out [fol. 518] that what I have just quoted from is a resolution of the Executive Committee——

Mr. Bergson: What is the date of the resolution?

Mr. Mahaffie: The meeting was held on September 21, at 11:10 a. m.

Mr. Bergson: What year?

Mr. Mahaffie: 1951.

Mr. Bergson: And the Properzi machine was put in in 1954.

Mr. Mahaffie: No, I think we are testifying here, Mr. Bergson.

Mr. Bergson: We sure are.

Mr. Mahaffie: Well, I am not testifying.

The Court: Well, I think you are, but it is good, it is very interesting.

Mr. Bergson: Well, neither one of us is under oath either.

Mr. Mahaffie: I believe the Properzi machine was put in prior to 1954.

Mr. Bergson: Mr. Fraser advises me it was 1953, not 1954.

Mr. Mahaffie: All right, sir.

Mr. Bergson: The resolution says what it says, all I am doing is pointing out the resolution wasn't acted on.

[fol. 519] Mr. Mahaffie: Well, directing the Court's attention to Government Exhibit 60, this is a memorandum from Mr. R. M. Fraser—this is not the Mr. A. D. R. Fraser, it is a much more subordinate executive, to Mr. C. H. Ellis, who is Rome's production manager, manager of its production facilities and I believe also vice-president, dated October 2, 1951: "The estimated cost for capital items under the project of casting, rolling, and drawing aluminum is $283,530. This is made up of the items in the attached list. There may be a few expense items such as lighting and ventilating change, but they will be of a minor character. The main items of equipment are the Ajax melting and pouring furnace with a capacity of 2,000 pounds per hour. The Properzi casting wheel and rolls, a ten die Vaughn drawing machine."

Now attached to and part of GX-60 is a table which furnishes an estimate—well, it is titled "Aluminum Project, Estimate of Cost," and it furnishes a breakdown of the cost items connected with the aluminum project totalling [fol. 520] $283,530.

I am not going into the table itself at this time.

GX-61 are the minutes of a Rome Engineering and Research Conference held on October 4, 1951, conducted by Mr. Schatzel, who is Rome's Director of Research.

Now, directing the Court's attention to pages 2 and 3, these are two pages of Mr. Schatzel's remarks at this conference, and this is the section headed "Aluminum":

"On the question of aluminum, we are taking a realistic approach. We do not intend to follow either these fanatics who would completely replace copper for all uses or those who would oppose the use of aluminum where it is entirely satisfactory. We shall evaluate the proposed application and make recommendations in agreement with sound technical and practical consideration. In this connection we should remember that the properties of aluminum have not changed with respect to its electrical and physical characteristics. The differences that make aluminum such

an important metal to us at the present time are, first, [fol. 521] economy, second, availability. Copper is still the best metal for electrical purposes when it is available at a reasonable price. For a long term swing we expect that aluminum will replace copper only in places where copper is not really necessary.

"Present planned increase in aluminum production calls for doubling that capacity by 1952 and tripling that capacity by 1954."

Now, skipping about five sentences: "It is expected that many utilities will swing over to aluminum on the basis of executive decisions owing to the economic advantages it presents. In most cases the changeover will be on a 100 per cent basis for a particular application.

We are actively producing increased quantities of insulated aluminum conductors. You can help us by sending in all facts and rumors. We will investigate, correlate and then pass back to you the facts. At the present time some companies are using aluminum in enamel magnet wire, but we do not think aluminum has a permanent place in [fol. 522] this application. For some types of magnet wire it may well have an important and permanent place."

Now, GX-62, 63 and 64 are all documents which relate to a transaction in 1951 between Rome and the Westinghouse Electric Corporation. These documents show that Rome —well, I am not going to try to state what they show or I will be accused of testifying.

The Court: You will be getting into a good big argument, that is what you will do.

I will read them sometime and see what they show.

Mr. Mahaffie: Let me state that they relate to a transaction by which Rome produced aluminum magnet wire for the Westinghouse Corporation.

The Court: There is probably no dispute about it.

Mr. Mahaffie: No, sir, I am sure there is no dispute about that.

Documents 56, 58, 59 and 70 are all minutes of aluminum meetings, so-called, held by the Rome Cable Corporation. These are meetings of executives. They are dated Novem- [fol. 523] ber 29, 1951, and January 4, January 15, and January 30, 1952.

I am not going to read from those minutes, your Honor. We think they are of considerable interest in showing what is involved or what at that time was involved in getting into this business, and showing how Rome felt about it.

The Court: I assume when we get along to the proper time in this trial we will have evidence of just how far they got in and what they did.

Mr. Bergson: If you don't get it in their case, you will get it in ours, Your Honor.

The Court: What's that?

Mr. Bergson: If you don't get it in their case you will get it ours.

The Court: So that while all of this may be interesting proposals, recommendations, I have made a lot of them myself and some of them went through and some of them didn't; some of them were more expensive, some of them were less. These were all right, of course they are. These exhibits, I don't know the force of them.

[fol. 524] Mr. Mahaffie: On the question of capital expenditure, GX-68, we offer to prove the capital expenditure.

The Court: You prove anything you want, but I assume the proof of these things——

Mr. Mahaffie: Excuse me, your Honor, that exhibit is not a proposal. That is proof of the expenditure, GX-68, and that is our proof of the initial capital expenditure.

The Court: Perhaps.

Mr. Mahaffie: In that year.

Mr. Bergson: Which will be rebutted later on.

The Court: Yes.

Mr. Mahaffie: Well, I am going to offer at this time another group of documents which have been marked Government's Exhibits 71 through 78 for identification. I offer these documents in evidence.

Mr. Bergson: No objection.

The Court: I will receive them.

(Documents were marked Government's Exhibits 71 through 78, in Evidence.)

[fol. 525] Mr. Mahaffie: Your Honor, these documents GX-71 through 78 relate to the same matter with respect to ALCOA as the previous group with respect to Rome.

Now the previous group showed that Rome in 1950 and 1951 was planning its entry into the aluminum wire and cable business. Now at the same time ALCOA was planning an expansion of it- own aluminum wire and cable facilities.

In 1952 ALCOA determined that this field was too difficult a field for its immediate entry and as a result it entered into the tolling agreement with Rome which has been discussed in connection with some earlier Exhibits.

Now this group of documents show some of the circumstances surrounding the ALCOA-Rome tolling agreement.

As I pointed out the agreement itself and one or two amendments have gone into evidence as GX-28 through GX-31. We think that this tolling agreement is of considerable importance in that it was the actual vehicle by which both ALCOA and Rome went into this business, it assisted Rome in getting into the aluminum business and [fol. 526] assisted ALCOA in getting in the business.

The Court: What's wrong with that?

Mr. Mahaffie: Nothing wrong per se.

The Court: What conclusion do I draw from all these things and how does it affect it? The ultimate proposition I suppose is to determine the lines of commerce involved, the relevant markets and its effect on competition.

Mr. Mahaffie: Yes, sir.

The Court: Now all of this is interesting and perhaps indirectly is important. I don't know. These anti-trust suits have a tendency of getting way out into the hinterlands. I don't think it makes very much difference whether Rome decided to get into the aluminum business because of Southern Electric Company's success or failure or whether they decided to get into it as a gamble on a horse race. What difference does it make, they are in.

Mr. Mahaffie: I will point out where it does have, the tolling agreement does have relevance. The tolling agreement was still going on in part at the time of the merger. Now we will offer evidence to establish this.

[fol. 527] The Court: Somebody else had an agreement with Kaiser. It is still going on. What of it?

Mr. Mahaffie: This is what I am getting at, Your Honor. In 1955 ALCOA undertook to do part of this work itself. If this merger had not gone into effect this tolling agreement in about I estimate two years would have been a thing

of the past, ALCOA would have been in this business on its own, Rome would have been in the business on its own, there would have been no tie between the ALCOA and Rome products.

Now one of the factors which is important in these cases——

The Court: Your guess may be better than mine, but I don't know how much better.

Mr. Mahaffie: This is not a guess.

The Court: Yes, it is a guess, you just told me it was a guess, you told me you estimated it would be out of business in two years.

Mr. Mahaffie: Two years is the estimate.

The Court: That is what I say, I say I don't know whether your guess of two years is right or my guess of one [fol. 528] year or somebody else's guess of three years.

Mr. Mahaffie: Well, just to sum it up, I think this evidence goes to the question of competition.

The Court: This evidence is background, and that is all it is, isn't it?

Mr. Mahaffie: It is background in a sense. It is also relevant to the line of commerce.

The Court: Perhaps.

Mr. Mahaffie: It is relevant to entry—we think it has relevance——

The Court: I have taken the Exhibits, counsel, I think you misstate what I am talking about. What I am saying here is that, sure, I am taking this stuff because I think it is perhaps historical and helps me maybe to evaluate it in some way, but it seems to me that it is over-detailed as an anti-trust suit tends to become, over-detailed, because after all when you get down to the decision you have got to take what the facts are, not what somebody estimated something was going to be in 1951.

Mr. Mahaffie: I certainly agree with you there, sir.

[fol. 529] The Court: That's all, you and I are holding hands, we are all right.

I don't urge you to change your future Exhibits, but I just thought it would be wise for everybody to understand my present feeling about them. I think it is over-detailed because fundamentally you have got to get down to something you can put your finger on, not what some engi-

neer said in 1951 about what he proposed to do or what he was going to investigate. That is all very interesting. I don't care whether he investigated it or not, the fact is he is in it. If he went in it without investigation I suppose it don't change this law suit one bit.

Mr. Bergson: I think this points up one of the difficulties of shoveling Exhibits into evidence like this without a witness.

The Court: It does, but I guess I won't change the course of the world. I feel better after expressing my opinion about it.

Mr. Mahaffie: If the Court please, this is the only method we had of proving these facts.

The Court: I am not finding a bit of fault with you.

[fol. 530] Mr. Mahaffie: I know.

The Court: All I am trying to tell you is that, sure, put it in. I have taken it. It is just what I said before, when you get down to the essence of it it is not what an engineer thought in 1951, it is what he did that is going to be of some importance.

Mr. Mahaffie: Yes, sir, and what he did is what we are proving.

The Court: Yes. Quite a little of what you mentioned is what he thought, but it is all right, I am not going to pay much attention to it though.

Mr. Mahaffie: I appreciate your comments on that.

The Court: I will see if I can find out what he did and what was the result of his doing, that is what it seems to me I am interested in.

Mr. Mahaffie: That is what we are going to try to show.

The Court: I know.

Mr. Mahaffie: Well, if I can conclude this group, GX-71 through 78.

The Court: Yes.

[fol. 531] Mr. Mahaffie: The first two, 71 and 72 are offered because they—this frankly is a bit of background, but I think it is relevant background because they detail an inspection trip made by ALCOA to the Rome plant, and once again, sir, they demonstrate the nature of this business, facts we think are relevant today and relevant to this lawsuit.

76 and 77 I also call to the Court's attention. They are

press releases issued by both ALCOA and Rome in 1952 setting forth in rather clear and simple language just how the tolling agreement did work.

We have put the agreement itself in, but these releases sum it up in a much simpler form.

The Court: Mr. Mahaffie, if you are going to start a new group, I guess we will quit.

Mr. Mahaffie: All right, I finished with this group.

The Court: We will recess until tomorrow morning at 10:00 o'clock.

(Whereupon, at 4:50 o'clock p.m. the recess was taken to Friday, February 9, 1962 at 10:00 o'clock a.m.)

[fols. 532-533] [Title omitted]

Transcript of hearing—February 9, 1962

* * * * * * *

[fol. 534] The Court: All right, gentlemen.

OFFERS IN EVIDENCE

Mr. Mahaffie: May it please the Court, at this time I am going to offer into evidence two more groups of documents, your Honor. The first group, consists of documents which have been marked as GX-79 through GX-137. I offer GX-79 through 137 in evidence.

Mr. Bergson: No objection, your Honor.

The Court: All right.

(Government's Exhibits 79 through 137 for Identification received into evidence.)

Mr. Mahaffie: Your Honor, this group of documents, which is a large group, follows the Rome Corporation from its entry into the tolling agreement with ALCOA which I discussed yesterday, as it expanded and developed its aluminum business through the date of the merger. The tolling agreement introduced Rome to the production of aluminum. These documents show Rome proceeded individually under the tolling agreement and independently in the development of its aluminum program. They also show a considerable amount of planning for the future development of Rome, which we think rather significant in view of the elimination [fol. 535] of Rome in 1959.

I am not going to call any specific documents to the Court's attention at this time unless Your Honor desires it.

The Court: No, unless there is something particularly significant, then do it. What I said yesterday, gentlemen, don't take too seriously. This is just a personal opinion. I think these anti-trust lawsuits grow and become too cumbersome. In other words, I could not stop the defendant from taking every one of them and going in and explaining what happened, at least those that you had yesterday, and I hope they don't do it. You can see I can't stop them. I

think maybe the time in anti-trust has arrived when we don't need twenty-five pages of congressional history in each of these decisions, and fifty more pages on the social development.

I think we ought to begin in this case to get down to what actually has happened.

Go ahead.

Mr. Mahaffie: Your Honor, the next group of documents consists of documents which have been marked as GX-138 through GX-156 for Identification. I offer Government's [fol. 536] Exhibits 138 through 156 in evidence at this time.

Mr. Bergson: No objection, Your Honor.

The Court: All right.

(Government's Exhibits 138 through 156 for Identification received in evidence.)

Mr. Mahaffie: This group, your Honor, is similar to the last group except it follows ALCOA in its development beginning, in these documents beginning with 1955, which was the time that ALCOA first began to enter the covered aluminum conductor business on its own, that is independently of the Rome arrangement. The first step in this direction was the production in 1956 of polyethylene covered conductors. The acquisition of Rome prevented ALCOA from planning to install facilities to produce the second principal type of covered conductor, which is neoprene.

[fol. 537] And once again, sir, I am not going to point out specifics in these documents to the Court at this time.

Thank you.

Minot H. Pratt, a witness called on behalf of the Government, was duly sworn and testified as follows:

Direct examination.

By Mr. Wertheimer:

Q. Will you state your full name and position?

A. Minot H. Pratt. I am Vice-President and Chief Engineer of Niagara Mohawk Power Corporation.

Q. How long have you been with Niagara Mohawk Power, sir?

A. Since its incorporation about ten years ago, and prior to that with predecessor companies for a total length of time of about 36 years.

Q. What are your responsibilities in your present job?

A. I am in charge of all design, specifications for new construction of our facilities.

Q. Does that include the design of transmission and distribution lines?

A. It does.

Q. Does that include the choice of the conductor for such transmission and distribution lines?

A. It does.

[fol. 538] Q. Have you any academic degrees, Mr. Pratt?

A. I have a degree in Mechanical Engineering from the University of Pennsylvania and I am a licensed professional engineer in the State of New York.

Q. Now I would like you to generally describe the Niagara Mohawk Power system for the Court.

A. Well, the Niagara Mohawk Power system provides in the electrical field electrical power and energy to customers in an area extending generally from the western boundaries of the State to the eastern boundaries of the State in upper New York State, exclusive in that area of the so-called southern tier counties, including Binghamton and Elmira and that area, and extending northerly to the boundaries of Lake Ontario and the St. Lawrence River, excluding on the northern boundaries the area around Rochester and an area in the northeastern section of the State. Other than that, within that area Niagara Mohawk gives the service, that is its territory. It is a system which can be measured in size by the demand electrically placed upon it which at the present time is approximately three million kilowatts.

Q. About how many customers do you have for electricity?

A. A little over a million.

Q. Are any cities included in your system?

[fol. 539] A. Yes, many cities.

Q. Could you name a couple of the larger ones?

A. The larger ones would be Buffalo, Syracuse, Utica, Albany and Watertown.

Q. Have you rural areas in your system?

A. Yes, all of the rural areas within the general territory which I previously described.

Q. I wonder if you would give the Court a general description of an electric power system?

A. Well, an electrical power system is a system which takes energy in some other form than electrical to start with, that is its raw material as it were, and converts it into electrical form and thereupon moves it in electrical form to the user.

The first stage in the process, of course, are the facilities which takes the energy in its non-electrical form as a raw material, energy in water or other fuels, and converts it into electrical form. These are what we speak of as the generating plants.

From the generating plants it is started on its journey to the ultimate consumer, ordinarily from a generating plant in relatively large amounts through the medium of what we speak of as transmission, which are generally high voltage lines because of the large amount of power [fol. 540] transmitted for relatively longer distances.

When it reaches the point where it is relatively near a utilization area, such as Utica, its voltage is reduced, it is split up or subdivided into lesser quantities but still fairly substantial quantities, and further transmitted over what we speak of *of* subtransmission or medium voltage lines to the next point in its journey which is the point where it is again reduced in voltage, split up into smaller quantities and further distributed now over what we call distribution lines to points close to your homes or factories where it has its final transformation to the voltage used in the factory or home, and where the energy is changed from its electrical form to the form in which it is ultimately desired, as illumination, heat, or mechanical power or whatever other form you may wish.

Q. Directing your attention, sir, to your transmission lines, what conductor do you use overhead?

A. Today we use aluminum exclusively.

Q. Why?

A. Because it is more economical.

Q. Are there any other reasons for using aluminum in overhead transmission?

A. Yes, in overhead transmission aluminum has many

[fol. 541] advantages other than the particular relative price of the material itself. Aluminum in the ways in which it can be made, aluminum core reinforced wire is stronger than copper and enables you to build transmission lines or any long span lines, including long span rural distribution lines, enables you to build any long span lines with lesser numbers of towers, or lower towers. Therefore, you use less insulators and therefore it is a more economical overall cost.

So it has advantages other than specific price in the field of application to transmission, and that has been the case for some time which is the reason it is essentially the only thing used today for such lines.

Q. Will you explain corona to the Court?

A. Well, when you get into very high voltage—well, first corona is a breakdown of the air surrounding a conductor due to the electrical pressure carried by the conductor and it occasions a loss. As the voltage goes up this loss will increase for a given conductor size, and to reduce it you can increase the conductor size to bring it back within the range that you may wish. So that as you go up in voltage larger conductors have—that is one of their advantages—size advantage of large conductors in extra high voltage transmission lines, size is an advantage.

[fol. 542] By Mr. Wertheimer:

Q. Would you compare aluminum and copper in regard to corona?

A. Well, aluminum inherently has greater size for a given conductivity and a given carrying capacity and therefore inherently having a larger size tends to give you a better corona effect with less loss condition. It is helpful.

Q. Would this be any advantage to aluminum in transmission?

A. Yes. At high voltages particularly, yes. In intermediate voltages it is not material.

Q. Directing your attention now to overhead distribution, what type of conductor do you use?

A. For all new construction today and major rebuilds we use aluminum in one form or another.

Q. Are you speaking now of bare or insulated or covered or both?

A. Both. Both bare and covered.

Q. What are the reasons for this decision?

A. It is more economical in overall costs to do so, to use aluminum.

Q. How long have you been in aluminum in overhead distribution?

[fol. 543] A. Well, there isn't any time that you suddenly change from one thing to another. It is a gradual change. But we work largely under standards and our standards now call for aluminum exclusively. They called for aluminum to a major degree, for the first time approximately ten years ago.

Q. Do you anticipate any switch to copper for overhead distribution?

A. I don't, no.

Q. What type of conductor do you use for service drop on your system?

A. Aluminum.

Q. What construction?

A. That is for all new construction. Well, it is covered ordinarily and aluminum. It may be single wire or it may be what is known as triplex, which is a combination of three wires, one bare and two insulated rolled up together.

Q. Now, what proportion of your service drop is this triplex construction?

A. A very large proportion. I couldn't give you a figure.

Q. Where do you use the triplex? Is there any use which differentiates the single wire from triplex?

[fol. 544] A. Well, triplex is used largely for services but also to some extent for secondaries and multiple street lighting. Essentially for services.

Q. Do you put triplex in one part of your system and the single wire in another?

A. No, we generally use triplex today.

Q. I see.

A. For all new constructions I said, generally. There may be exceptions.

Q. Directing your attention to your underground system, what conductor do you use?

A. For underground we use copper.

Q. In transmission and distribution?

A. That is correct, yes.

Q. Would you explain that to the Court?

A. Well, where aluminum has advantages aside from price and is in transmission overhead. Underground, aluminum, aside from price has only disadvantages. Because of its greater size for given conductivity it requires more insulation. Insulation is expensive. So the non-conductor part which is a material part in cables where the costs concerned have increased. Its greater size tends to require [fol. 545] larger ducts which are expensive, so it has no inherent advantage in use for underground cable. In fact, it has inherent disadvantages which to bring it into overall economic price, would have to be disadvantages. It is difficult to do and is inaccurate as yet, other than for experimental use during the war and for power cable.

Mr. Wertheimer: Thank you.

Cross-examination.

By Mr. Adler:

Q. Mr. Pratt, in your testimony referring to the bare transmission cable used in your system you stated that there were technical advantages to aluminum in addition——

A. Yes.

Q. —to the cost part in the cable itself.

A. Yes.

Q. Referring now to the insulated or covered conductors used in your distribution system, are there comparable technical advantages that aluminum has over covered or insulated copper?

A. Aside from long span lines, no, I wouldn't say so.

[fol. 546] Q. In your system prior to about ten years ago then you used in your overhead distribution lines, where you used the covered product copper rather than aluminum?

A. Largely, yes.

Q. Was there any problem from a performance standpoint?

A. No.

Q. Is it fair to say then that your decision to standardize on aluminum with respect to covered or insulated conduc-

tors was based on the cost of the conductor itself, of the cable?

A. That is correct.

Q. And if this cost relationship were to reverse you could return to copper without any loss from a performance standpoint?

A. Yes, from a performance standpoint, one is equivalent to the other. If it were to change and we were convinced it was a change you could depend on, we would go back for the same reason we went to this one.

Q. Do you still have covered or insulated coppers in your system?

[fol. 547] A. Oh, yes, indeed. We don't go out and change the ones that exist. We have a lot of them.

Q. And when you have to replace segments of the existing copper covered cable what do you replace it with?

A. It depends on the extent of replacement. If it was a major rebuild, it would be aluminum. If it was a minor, we would replace it with copper.

Q. Now, referring to the service drop, service drop is the connection from the pole to the building?

A. From the last transformer to the customer, let's say.

Q. You testified that in your system there are several types of construction used for that service drop.

A. You may have one or two of three separate wires or you have wires combined and wrapped together, which I mentioned as triplex. That is all.

Q. Do you also use in your system a single cable, an SD type cable?

A. I couldn't tell you. I am not familiar with what you mean by the words "S.D."

Q. To your knowledge, then, the principal types of service drop you used in your system would be the single cable [fol. 548] wound together?

A. Today would be what we speak of as a triplex. It is an ACSR conductor with two aluminum conductors, sometimes ACSR and aluminum and insulated wrapped around a bare conductor.

Q. And the other type of construction used in your system would be the three wires or an open wire?

A. Yes. But that is not prevailing today for new construction. The triplex is.

Q. For example, when a new residence is built in an area in which an open wire service drop construction is used, what would you use in that case?

A. Well, you could not answer that categorically. It would depend on what your plans were for the area and whether it was one house or many were involved, and what the probabilities were for others. You probably if you were going into changes in the area use triplex. If it was just a single replacement of a house where you had single conductors, you would keep up your single conductors.

Mr. Adler: All right, thank you.

Mr. Wertheimer: No further questions.

(Witness excused.)

[fol. 549] Mr. Mahaffie: If your Honor please, we offer four more groups of documents. I can get through this very rapidly.

The Court: You can probably get through them more rapidly than I will.

Mr. Mahaffie: I want to point out that I will have some appropriate point later in the proceedings either through submission of findings or otherwise point out——

The Court: All right.

Mr. Mahaffie: (Continuing) —the portions of this that we regard as particularly relevant.

The Court: All right.

OFFERS IN EVIDENCE

Mr. Mahaffie: The first group is a group of documents which has been marked as Government's Exhibits 157 through 167 for identification. I offer GX-157 through 167 in evidence at this time.

Mr. Bergson: What do they relate to, Mr. Mahaffie?

Mr. Mahaffie: Off the record or on the record?

[fol. 550] Mr. Bergson: Any way.

Mr. Mahaffie: I will make my statement on the record if you want. These documents, your Honor, relate to the attempts by Alcoa in 1957 and 1958 to acquire a manufacturer of wire and cable. The first document or the first in the group relates to an unsuccessful attempt in '57 to acquire Rome. After that attempt fell through——

Mr. Bergson: All right. I know what they are and I have no objection to them.

Mr. Mahaffie: I offer GX-157 through 167 in evidence.

The Court: Received.

(Government's Exhibits 157 through 167 for identification received in evidence.)

Mr. Mahaffie: To continue, your Honor, that attempt fell through. Alcoa then began looking for another company. This process lasted until the late or until the fall of 1958.

[fol. 551] Mr. Bergson: This is not a description of documents, Your Honor, this is argument.

The Court: It doesn't shock me at all. Suppose somebody goes out to purchase something, whether it is a house, business, grocery store, whatever it is. They may be unsuccessful at first. They continue looking and finally they find it.

Mr. Mahaffie: I am trying to describe what is in the documents. I am not arguing on these documents.

The Court: Go ahead.

Mr. Mahaffie: The process ended with the successful acquisition of Rome on March 31, 1959.

The Court: All right.

Mr. Bergson: What documents are these now, 157 to 167?

The Court: Yes.

Mr. Mahaffie: The next group of documents have been marked as Government's Exhibits 168 through 179 for identification.

I offer Government's Exhibits 168 through 179 in evidence at this time.

Mr. Bergson: No objection.

[fol. 552] The Court: I will receive them.

(Government's Exhibits 168 through 179 for Identification received in evidence.)

The Court: Tell me briefly what they are.

Mr. Mahaffie: Yes, sir. Government Exhibits 168 through 179, Your Honor, represent the program, the internal program which the Government contends ALCOA would have followed to expand into the wire and cable business if it had not acquired Rome.

The Court: All right.

Mr. Mahaffie: It consists of a series of internal memorandums, internal within the ALCOA corporation. The next group, your Honor, is a group of documents which have been marked as GX-180 through 187.

I offer GX-180 through 187 at this time.

Mr. Bergson: No objection.

The Court: Received.

(Government's Exhibits 180 through 187 for Identification received in evidence.)

Mr. Mahaffie: These documents, your Honor, are press releases and certain internal memoranda at the time of the merger. They demonstrate certain generally unrelated facts about the merger which we will bring to the Court's [fol. 553] attention.

The Court: All right.

Mr. Mahaffie: The last group which I want to offer at this time, your Honor, have been marked as Government's Exhibits 189 through 202. I am not offering at this time the document which has been marked as Government Exhibit 188. So I offer at this time documents marked as Government's Exhibits 189 through 202 for identification into evidence.

Mr. Bergson: No objection.

The Court: Received.

(Government's Exhibits 189 through 202 for Identification received in evidence.)

Mr. Mahaffie: These documents, your Honor, relate to two subjects, they relate to what we will contend is the dominance of ALCOA in the field of aluminum electrical conductor, and they relate to the difficulties of non-integrated independent manufacturers in competing with ALCOA.

The Court: All right.

Mr. Melchior: We will call the next witness, Your Honor. Mr. Fosdick.

[fol. 554] ELLERY R. FOSDICK, called as a witness in behalf of the Government, being first duly sworn, testified as follows:

Direct examination.

By Mr. Melchior:

Q. Would you state your name and occupation?

A. Ellery R. Fosdick, consulting engineer.

Q. Where do you practice, Mr. Fosdick?

A. My headquarters are in Washington, D. C.

Q. What field of engineering do you practice?

A. The field of electric power.

Q. Would you elaborate a little bit as to what you mean by the field of electric power?

A. My work is primarily in connection with the electric utility industry, involving the generation, transmission and distribution of electric power.

Q. How long have you been a consulting engineer?

A. Approximately six years.

Q. What type of activity did you engage in before that?

A. I have been engaged in a number of capacities as an engineer during the last thirty-seven years since graduating from college, most of which related to the electric power field.

Prior to my consulting work I was engaged for five years as construction engineer with the U. S. Atomic Energy [fol. 555] Commission in Washington, D. C.

Prior to that I was with the U. S. Bureau of Reclamation as Assistant Director of Power for approximately five years. Prior to that I was an engineer with the U. S. Federal Power Commission for approximately seven years.

Q. What is your educational background, Mr. Fosdick?

A. I received a Bachelor of Science degree in hydro-electrical engineering in 1924 from Washington State College. I am a Fellow and Member for Life in the American Institute of Electrical Engineers, and registered as a professional engineer in the District of Columbia.

Q. Would you keep your voice up at a level so the Court can hear it, and you might face the Court when you answer the questions.

From your education and experience, Mr. Fosdick, are you familiar generally with electrical conductors used by electric utilities for power supply?

A. Yes.

Q. Have you been retained by the Anti-Trust Division of the Department of Justice to render engineering services in respect to this proceeding?

[fol. 555a] A. I have.

Q. In general what have been the nature of the services you have performed in this connection?

A. These have consisted primarily of making a survey and study to determine the extent to which electric utilities in the United States use aluminum and copper conductor for overhead electric lines and underground electric cable.

[fol. 556] Q. Have you incorporated the results of your survey and study in a report?

A. I have.

Q. Would you identify it?

A. Government Exhibit 468 for identification, entitled:

"Report on the use of copper and aluminum conductor for overhead electric lines and underground cables by electric utilities in the United States for the years 1950, 1955 and 1959."

Q. What was the purpose of this study?

A. Well, the purpose of the report is to show the extent to which aluminum and copper conductor is used for gross additions to overhead electric lines and underground electric cables in the United States.

Q. Now was all the information that is set forth in this report prepared by you personally or under your direct supervision?

A. It was.

Q. Now you used the term "gross additions," what do you mean by that term?

A. Gross additions are additions to electric plants as a result of new construction and exclude replacements of conductor used for maintenance.

Q. Why did you use gross additions as your unit of measurement?

[fol. 557] A. Gross additions represent the new conductor that is added to an electric utility system. I have

excluded the conductor used for maintenance because the type of conductor used for maintenance is governed primarily by the type of conductor that is being repaired, whereas gross additions is determined by the engineer who feels what should be installed for new installations.

Q. Would you explain to the Court generally, Mr. Fosdick, how you conducted this survey?

A. Yes. Questionnaires were sent to 93 electric utilities in the United States, which had been selected as representative of the electric utility industry. Information received from these utilities has been used in making the report.

Q. Now were these questionnaires prepared by you?

A. Yes.

Q. Were they reviewed by anyone in the anti-trust division that had an economic or statistical background?

A. They were reviewed by a government economist with statistical training and experience who was assigned to this case at that time.

Q. What type of information did you request in these questionnaires or schedules?

[fol. 558] A. Four schedules were sent to the electric utilities. Schedule 1 requested information regarding gross additions of overhead electric conductor for each of the years 1950, 1955 and 1959. It was requested that the information be supplied for both transmission and distribution conductor, indicating the usage of copper and aluminum conductor in each case.

Schedule 2 requested similar information for underground electrical cable. All of the information requested in schedules 1 and 2 was purely factual and objective in nature, and no opinion was called for. Schedules 3 and 4 requested certain information relative to the expected use of aluminum and copper by the utilities in the future, and also regarding the restrictions in use of conductor. However, the information received in response to 3 and 4 was not susceptible to tabulation and was not tabulated in this report.

Q. You did tabulate the information from questionnaires 1 and 2 but not from 3 and 4.

A. That is right.

Q. You selected the years 1950, 1955 and 1959 as the three years of your survey, why did you select those years?

A. It was felt that a period of approximately ten years [fol. 559] was desirable to show a trend in the use of conductor, and this period 1950 to 1959 was the latest period of time for which the information was available. Instead of using ten years I used nine years, starting with the even year of 1950.

I took three different years during this period because this was the minimum that could be used in establishing a trend.

Q. Now how many utilities did you say you selected?

A. 93.

Q. Now did you consider the 93 utilities that you selected as representative of the electric utility industry in the United States?

A. I do.

Q. Would you state your reasons?

A. The electric utilities selected are considered to be representative of the electric utilities in the United States because utilities were selected from all parts of the United States, utilities were selected from the privately owned sector, the publically owned sector and from rural electrical operators. Utilities of all sizes were selected and the utilities selected served over half of the ultimate consumers in the United States.

Q. Now what form does your report take, Mr. Fosdick? [fol. 560] A. In my report I give a summary of findings, findings in detail, and in appendices I set forth the procedures followed in making the survey.

Q. Did you get a response from all 93 utilities?

A. Yes, I did.

Q. Do you have in your possession copies of the schedules, the completed schedules that you sent to these utilities and received in response to your request from them?

A. Yes, I have, and I understand copies have been made available to the Defendant sometime ago.

OFFERS IN EVIDENCE

Mr. Melchior: The Government offers at this time Government Exhibit 468 for identification.

Mr. Bergson: Your Honor, this Exhibit 468 is based, as Mr. Fosdick stated, on returns of 93 companies. So far as

Mr. Fosdick is concerned everything in the Exhibit is hearsay. I think certainly as a pre-requisite of admitting the report that the returns themselves should be offered in evidence.

The Court: Well, of course, the returns themselves, I suppose, are the basic documents upon which the report is based. Now they certainly should be received in evidence. They probably were made available to you, were they?

[fol. 561] Mr. Bergson: Yes, but I would like to have them made available to you.

Mr. Melchior: The Government is willing to have them go into evidence. We are trying to keep the size of the record down. Does counsel have any objection to any particular one of the schedules?

Mr. Bergson: No, I just think since this report, which is a survey report and which is normally recognized I concede when properly conducted, and I concede this was properly conducted, is based on an exception to the hearsay rule, but in basing the exception to the hearsay rule I think it is required that the basic documents should be put in evidence.

The Court: That is probably true.

Mr. Melchior: We will be glad to mark them. Can we make arrangements to mark them later?

Mr. Bergson: I want to use them in Cross Examination.

[fol 562] By Mr. Melchior:

Q. Would you have the ones we used as the original?

A. I don't have them with me here, they are in the file.

Mr. Melchior: We will have those later.

Mr. Bergson: Why don't you mark those as Exhibit 469.

Mr. Melchior: We will mark it 468A, I think.

Mr. Bergson: All right. Supposing you offer it now and have it received now without physically offering it.

The Court: All right.

Mr. Melchior: The Government will at this time offer Government Exhibit 468A for identification.

The Court: Which are the basic reports upon which Exhibit 468 is based.

Mr. Melchior: That's correct, Your Honor.

The Court: They are foundation documents for 468.

Mr. Melchior: That's correct. Now these, Mr. Bergson, are copies. Do you have your own copies to use?

Mr. Bergson: Yes.

[fol. 562a] Mr. Melchior: Then you won't need these and we will see that the originals are properly marked at a later time.

The Court: All right. I will receive both of them, Exhibit 468 and 468A.

(Government Exhibits 468 and 468A for identification received in evidence.)

[fol. 563] By Mr. Melchior:

Q. Now, Mr. Fosdick, would you state in general what the result of your survey was, what conclusions have you drawn?

A. The results of the survey can be stated very simply and very easily despite the fact that it covers quite a lot of work in between.

Q. Perhaps we should begin by indicating the questions that were asked of the utilities that were surveyed and then you can explain what results or what your conclusions were.

Mr. Bergson: Off the record.

(Discussion was held off the record which the reporter was asked not to take.)

A. I might refer first to Schedule 1, which is in the very back of my report, the third from the last page in the book. Schedule 1 requested in thousands of feet the gross additions of overhead electrical conductor of electrical utility plants for each of the years 1950 to 1951. This is for all the electric line in two general categories.

Namely, transmission and distribution. And under distribution I asked for that information divided between bare conductor and insulated or covered conductor.

[fol. 564] Now, I requested it for copper and aluminum in each case, for each of those years. And the schedule, of course, would contain the name and address of the utility and was to — signed by some officer of the utility indicating his title and the date of submission.

Schedule 2 was quite similar to Schedule 1, except, of course, in the case of distribution cable there was no need for asking for bare conductor because there is no bare underground distribution. And subsequently "2" applies to underground cable. And so I asked for the amount of copper and aluminum transmission underground cable and copper and aluminum distribution underground cable.

The returns from these giving the amount of conductor data as gross additions have been used in determining the data that I am about to refer to. I might state briefly how that data was used. It is very simple, of course.

The reports were given in thousands of feet of conductor and all that was necessary as far as my work and study was concerned was to determine the percentage of aluminum and percentage of copper conductor in each category for each year. Taking the thousands of feet as a basis and computing the percentage even at those figures. As a result [fol. 565] of this work there are a few very simple and general conclusions that can be drawn.

The first one that I have drawn is that aluminum conductor was a dominant conductor used in 1959 for gross additions of overhead electric lines for the electrical utilities that supplied information on these questionnaires. The percentage of aluminum used in 1959 for overhead electric lines was 80.1 per cent.

My second conclusion is that a continuing trend for an increasing use of aluminum conductor for gross additions to each of the three major categories for overhead electrical lines that I mentioned a moment ago in regard to Schedule 1, occurred over the period from 1950 to 1959 inclusive. In other words, transmission conductor, bare distribution conductor and covered and insulated conductor showed a continuing trend as over the use of aluminum conductor during that period.

The trend for increasing use of aluminum conductor for transmission electric lines was found throughout the United States in all seven geographical regions. It was not identical in all geographical regions but it was up as a whole throughout all the regions generally.

[fol. 566] That covers, I believe, the most important aspects of my findings for overhead conductor.

Now, in the case of underground conductor, copper was

the dominant product used in 1959 for gross additions and was manufactured for 97.7 per cent of those additions. Furthermore, as a result of the information received, there appears to be no appreciable trend away from the use of copper conductor for underground cable. There was a small amount used in 1955 and in 1959, but based on the information supplied by the utilities they seemed to have little, if any, intention to use increasing quantities of aluminum conductor for underground cable. That summarizes and, I believe, gives fairly completely the facts which can be derived from the information supplied by the utilities that we sent questionnaires to.

Q. Now, in the findings part of your study, Mr. Fosdick, am I correct in saying that you have given more detail with respect to each of the conclusions you have drawn and you have implemented it by a series of charts and pictograms; is that correct?

A. Yes. I have shown more detail of this giving ratios and also charts that show the percentages.

[fol. 567] Q. And these charts and graphs are based upon statistics which you have compiled by these schedules and which are contained in your study; is that correct?

A. Yes.

Q. This document is complete on its face, then, and all the information contained herein of a statistical nature you have secured from your schedules?

A. Yes.

Mr. Melchior: You may examine.

The Court: Just before you start, one question. Is there any way in determining whether or not the amount of underground conductor, whether that has increased in these years? What I am getting at is this: Are you putting in more and more underground transmission and distribution lines?

The Witness: Your Honor, that, of course, is shown in the return. They did show the amount of conductor that was put in underground.

The Court: Yes, but——

The Witness: And, while, of course, it is not large compared with overhead line, there has been a continuing addi-

tion to the underground system over the period of time that my report covers.

[fol. 568] The Court: I am just wondering if there isn't a tendency, being just a layman here, to reflect that there is more underground transmission or distribution conductor used now in proportion to the utilities or the total amount than there was in 1950?

Is there any way of determining that?

The Witness: Of course, that could be determined, Your Honor, but let me point out that all of this data can fluctuate in total amount from year to year.

The Court: Yes, I understand that, but here is what I am getting at. It seems to me as I read the newspapers——

The Witness: Yes.

The Court: (Continuing)—and perhaps observing, that there is more of a tendency in towns, communities, cities in requiring that you put your distribution system underground.

The Witness: Yes. I understand the nature of your question now.

The Court: That is what I am getting at. Is there any way of measuring that?

The Witness: No. These reports certainly do not disclose [fol. 568a] that. I can only give you an opinion from studying the returns and talking to utility men.

The Court: All right.

[fol. 569] Cross-examination.

By Mr. Bergson:

Q. Mr. Fosdick, before getting into the detail of your report to the minor extent that I intend to get into it, I would like to ask you a preliminary question, and that is in view of your qualifications as a professional engineer, whether copper conductor is available, price aside, to perform the same functions that aluminum conductor performs?

A. If I understand the import of your question, Mr. Bergson, the answer is yes.

Q. Dollars aside?

A. Yes. Copper conductor is an equally good conductor

of electrical power as aluminum, leaving out the physical characteristics which may make it more advantageous than the other.

Q. But for the transmitting of energy from the generating plant to the transmission station to the distribution station to the sub-station to the point of end use, you can use copper just as well as you can use aluminum, and for many, many years copper was the only metal that was used?

A. That's right.

[fol. 570] Q. For such transmission purposes?

A. That's right.

Q. Now, I notice that you divided the country into seven regions in making this survey.

A. Yes.

Q. Those are the seven regions I assume that are used by the Federal Power Commission?

A. That is correct, sir. I think I refer to that in the appendix in this report.

Mr. Bergson: Do you have a copy of this, your Honor?

The Court: Yes.

Q. Table 1 which I have, well, it is page 10,' of your survey sets out what has happened in a representative capacity using these 93 utility companies out of, how many are there in the United States anyway?

A. I was afraid you would ask me that. There are 3,300 some odd electrical utilities in the United States.

Q. So this represents in number of utilities about one percent?

A. Infinitesimal.

Q. But on total carrying lines——

[fol. 571] A. The number of customers is almost 62 to 63 percent.

Q. I am not questioning the validity of the percentage. Now, I hate to take your time to do this, and I think the survey probably does do it, but the areas involved in Region 1, that is the northeast section of the country?

A. Yes, sir. For the information of the Court, if you look in Appendix B you will see the states and the companies listed by regions.

Q. Right. Now, which of these seven areas would you say embraced areas which were affected by a substantial de-

gree by this salt water corrosion problem that we heard talked about here in the last several days?

A. Well, I wouldn't—may I answer the question slightly differently than you asked it. I don't believe that any region would be affected to a substantial degree because even in those utilities that have a salt water corrosion problem it is only a minor part of their conductor that is involved. But all of these regions that border on either the Atlantic or Pacific Ocean have some conductor exposed to salt water.

[fol. 572] Q. Let's see. Region 1 is the northeast. That has some?

A. Yes, sir. Region No. 2 does not.

Q. Region No. 2 does not. Region No. 3, north central; does not?

A. That's right. Region 4 and 5 do.

Q. 4 and 5 do. Region No. 6?

A. Does not.

Q. Region No. 7?

A. Does.

Q. Now, directing your attention to the year 1959 on Region No. 2, well, let's take each one, Region No. 1 shows 77.9 percent aluminum on covered and insulated conductor. I am only going to take your time on covered and insulated because we have conceded that aluminum is a separate line of commerce for ACSR and bare.

A. Might I interject, Mr. Bergson, a comment, as you get into these percentages, first the number of utilities in each region is probably small enough there that the result region by region are distorted somewhat. That is why I prefer answering on national total rather than regional total.

Q. I don't follow that, Mr. Fosdick, because if each region [fol. 573] is distorted a little bit it would seem to me the entirety would be distorted a lot more.

A. No. If you only have a few utilities, which each region has, only relatively few, the construction problem in any one year would alter the results somewhat. But taking all the regions together the weighted average for these regions then represents something that doesn't vary from year to year——

Q. But what we are talking about here, as you well know, is competition between copper and aluminum.

A. Yes.

Q. And no matter how few or how many you have in a particular region, it is the competition in that region rather than the competition in the Northeast, for example, rather than the competition in the Northwest or the Southwest, that would cover.

A. Except I would perhaps, if I may, take exception to the statement "competition." I don't believe there really is competition.

Q. That is what you have been trying to prove here.

[fol. 574] A. No—well, go ahead. Pardon me.

Q. All I am trying to do is point out for his Honor and for my own edification and for the record that in Region No. 1, which has a corrosion problem which you say to a relatively minor extent, with insulated and covered conductor, which is the only line of commerce in issue——

A. Yes.

Q. —between the Government and the defendants. That in 1959 there was still 22.1 percent of copper.

A. Yes.

Q. And in Region No. 2 there was still 29.4 percent.

A. That's right.

Q. And in Region No. 3 there was still 27.5.

A. That's right.

Q. And in Region No. 4 there was 33.6. One third. And in Region No. 5 there was still 20.1.

A. Yes.

Q. And in Region No. 6, I shudder to state, there was only 7.4—7.6, which of course helps to bring up the weighted average.

A. Yes.

[fol. 575] Q. And in Region No. 7 there was 18.6 percent of copper?

A. Yes.

Q. Now, this covers gross new additions?

A. Yes.

Q. These companies are in areas that could use either copper or aluminum as they chose. These companies bought copper despite the price advantage that aluminum apparently had?

A. Yes.

The Court: The answer is yes.

Q. Now, let me ask you this, do you think that the companies that were furnishing insulated aluminum wire and cable conductors to those companies were trying to sell aluminum wire and cable, insulated wire and cable to those companies?

A. I am very sure they were.

Q. And in the balance, where aluminum was being sold, do you think that the copper companies were trying to sell copper to them?

A. Perhaps, although I believe copper companies——

The Court: Keep your voice up.

A. (Continuing)—were not trying too hard, as hard as [fol. 576] they used to, is my understanding.

Q. But they make it because they sell it in other areas?

A. They sell it, yes.

Q. And some instances like the Anaconda Wire and Cable Company, which is the same company that is trying to sell copper and aluminum; right?

A. Yes.

Q. Or the General Cable Company.

The Court: Just answer. You don't get anything on the record by shaking your head.

Q. Yes or no?

A. Yes. Yes. Pardon me.

Q. So that the manufacturers of insulated wire and cable are in there competing with each other to try to get the business of these utility companies for their covered and insulated wire products?

A. Well, I don't know that, Mr. Bergson. I don't know the sales policies of the utility companies.

Q. Isn't it normal to expect that the aluminum companies are trying to take it away from the copper and the copper [fol. 577] companies are trying to take it away from the aluminum; and the ones that buy both are trying to sell it?

A. That is the trouble. Many of them sell both and I don't know their policy in competing with themselves.

Q. Let's take Phelps-Dodge for example. Does Phelps-Dodge sell aluminum?

A. Not that I know of.

Q. They do sell insulated and covered conductors?

A. Yes.

Q. We heard several witnesses here yesterday and the day before say that they were making only copper?

A. Yes.

Q. They were in there competing with the aluminum companies?

A. Probably.

Q. So that when this, so that in these covered and insulated—well, let me ask you this question, in these covered and insulated conductor types of business we find using your weighted average of 77.2, which leaves 22.8 which is pretty close to 25 percent?

[fol. 578] A. Yes.

Q. The copper companies and the aluminum companies are in there pitching trying to get the business.

A. I would expect so, yes.

Q. Now, you say in your charts, and I don't quarrel with the accuracy in which the charts are portrayed, that aluminum has had quite a sharp increase since 1950.

A. Yes.

[fol. 579] Q. Is the principal reason for that increase the difference in price between aluminum and copper?

A. Of course, that information wasn't supplied as a result of this questionnaire, and I can only give you an opinion based on my knowledge of the utility industry, and my answer is yes.

Q. And if it hadn't been for the price differential, the increase might not have been so startling.

A. I think that's right.

Q. Now do you know how the utility companies keep their records? I am sure in your years with the Federal Power Commission you have seen many a utility company record.

A. I was going to ask which records you are referring to.

Q. Their records of purchase of wire and cable products.

A. No, I haven't gotten into those. The accountant would normally investigate matters of that sort, but I know in general their method of recording additions to lines, which follow the purchases.

Q. Well, you have requested information from the utility companies in terms of feet.

A. Yes.

Q. Do you know whether they keep their records in terms of dollars as well?

A. No, most of them do not for conductor alone.

[fol. 580] Q. Don't they have to keep their records in terms of dollars for rate-making purposes?

A. Yes, but the dollars include more than just the conductor. You are asking me to go back in my memory quite a ways, Mr. Bergson, but I think I am reasonably sure there are appurtenances with the conductor that is in the cost accounting. The dollar total alone is not available.

Q. Do you think that if you had asked an additional question of the utility companies and said to them—in addition to giving me your purchases in feet, which I think was quite proper, I am not contending that it isn't, you could also have asked them the dollar value of such purchases; would they have been able to furnish that?

A. I am sure they could have, but it might have taken some work on their part to get it out of their records.

Q. This I am pretty sure took some work on their part, too.

A. It did, that's right.

Q. Now if you had requested the utilities to report in terms of dollars, and the utilities had reported in terms of dollars, and I might add parenthetically that dollars are rather important in this case because the Universe figures that we have been talking about in this case are in terms of [fol. 581] dollars, would the percentages have come out any differently?

A. I haven't thought about that, so I would hesitate to give an off-the-cuff opinion. They probably would.

Q. Isn't it a matter of simple arithmetic if the aluminum is cheaper than copper, when you multiply the cheaper price of aluminum by the number of feet of aluminum and you multiply the more expensive price of copper by the number of feet of copper, that the copper dollar volume would show a corresponding increase?

A. Yes, you have a higher percentage of copper than has been shown by feet.

Q. And wouldn't that have been fairly substantial?

A. Based on the testimony in difference in price of some of the previous witnesses, it would be fairly large.

Q. And the percentages might have come out nearer to 60-40 than 80-20.

A. I wouldn't want to hazard a guess on that. I don't know.

Q. But in any event the percentage of copper in terms of dollars would be larger than the percentage of copper in terms of feet.

A. I think that's right.

Q. Now taking your percentage ratio of 77.2 percent, and [fol. 582] here we are going to have to do a little bit of juggling because your figures are for 1959 and we have census figures for 1958, let me ask you this question first as a preliminary matter. In covered and insulated wire conductor, what products do you include, are included within your definition? Is it weatherproof and service drop?

A. Yes.

Q. Now I show you the census of manufacturers—I guess that hasn't been marked yet.

(The document referred to is marked Defendant's Exhibit AR-9 for identification.)

Q. Defendant's Exhibit AR-9 for identification is the 1958 census of manufacturers report for the non-ferrous metal, mill, and foundry products put out by the U. S. Department of Commerce and its constituent agency, the Bureau of the Census, and I now show you page 33-D-23 and ask you what the census total dollar weatherproof wire is for the year 1958.

A. Well, that is labeled weatherproof and slow-burning wire. Now I am not sure that includes only weatherproof wire that is used outside. I assume it is but I don't know that. I want to point out, Mr. Bergson, that I have looked at some of these census figures and I am not sure what they [fol. 583] contain, but anyway the total you are asking for is 16,478—there are three figures there, I don't know whether it is—we have to total that up to get it . . . 37,988.

Q. That is 37,000,000, isn't it?

A. Yes, 37,988,000 for the three types of conductor under that category of weatherproof and slow-burning wire.

Q. Now under the category for service cable, what do the census figures show?

A. They have two figures there that would have to be added ..... 28,653,000.

Q. All right. Now would you mark both of those down on a piece of paper?

A. That should be 28,053,000 instead of 28,653,000.

Q. Would you add those two figures together?

A. 66,041,000.

Q. Now according to your report, 77.2 percent of that would be aluminum. Giving you the benefit of the rise in trend, giving your report the benefit of the rise in trend it would be 77.2.

A. Not necessarily. You are dealing in dollars. My report is dealing in feet.

Q. Well, let me put it this way, you are saying that 77.2 percent of all usage is aluminum, whatever the measure is.

[fol. 584] A. No. No. On the basis of feet.

Q. Right.

A. I am not saying on the basis of dollars that it is 77 percent.

Q. Well, the basis of 77 percent, if you took 22.8 percent of that sixty odd million, that would show the amount in copper in its less favorable light, would it not?

A. It would be somewhat less probably than the amount of dollars for copper.

Q. So let's accept this in the lesser favorable light to the Defendant and compute what 22.8 percent of that total is.

The Court: We will take a short recess.

(A short recess was taken after which the hearing was resumed.)

[fol. 585] By Mr. Bergson:

Q. I think as we recessed I asked you to determine the percentage of copper according to your survey that would be represented by the total dollar volume for insulated and covered of the census; did you do that?

A. What I did, Mr. Bergson, I don't quite agree with your statement.

The Court: Keep your voice up.

A. I don't quite agree with the import of your statement, but what I did, I did multiply the 22.8 percent of copper dollars with the 66 million, I did it with my slide rule, and it is approximately, roughly it is 15 million.

Q. And you don't agree with me, because the dollar volume, if you are talking in terms of dollar volume, the dollar volume for copper would be greater than 15 million?

A. Well, it might be. There are so many variables in there that we have no knowledge of that I hesitate to express an opinion. We don't know for example whether the copper conductor, the 22.8 percent of copper conductor is bigger or smaller than the aluminum conductor. There are many things that we don't know that may influence it. It [fol. 586] is like trying to compare, and I am not saying this facetiously, but seriously, apples and peaches. We have no basis for firm comparison. If we want to make such comparison, I think we would have to go about it differently than you are doing it here, with all respect to you, sir.

Q. I think we would too, and I don't want to testify here, but I think we will find that the dollar value for copper was much higher than 15 million. But I don't want to press you on it.

Just going back for a moment to the trend that you referred to, I noticed that in Region No. 4, I am looking at Table 1 which is on page 10 of your report, that in Region No. 4 covered and insulated conductor in aluminum in 1955 was 72.7 percent, and in 1959 it was 66.4 percent.

A. Yes.

Q. That is a sport, I gather.

A. There is an explanation for that. I was caught by that figure myself, and the reason for that is this. The City of Seattle, which was one of the utilities that we submitted a questionnaire to, did not have data for the years of 1950 and 1955. They had it only for 1959. And their distribution [fol. 587] system uses a great deal of copper. So that when their data for 1959 was put in without any corresponding data for 1950 and '55, it gave what appears to be a reversal in trend.

Q. Is there any explanation to that effect in your report?

A. No. But the schedules, of which you have a copy, clearly show that, sir. I might add, Mr. Bergson, that I tried to get that data from the City of Seattle by phone call to the city superintendent, Dr. Rayburn, who I know, and due to some acquisitions and other problems that they had with this situation they were not able to reply.

Q. Now in your questionnaire where you asked for opinions of the companies in Schedule 3, you asked the utility to state whether it expects any increase or decrease in 1960; is that right?

A. Yes. Or in subsequent years.

Q. Or in subsequent years, yes. Now, how many companies responded to that question by saying substantially or in effect that it depends on what the prices will be?

A. I didn't tabulate the data. I can't answer your ques-
[fol. 588] tion in terms of numbers. There were some utilities that made such a statement.

The Court: Keep your voice up.

Q. There were some who stated they did?

A. Yes.

Q. You don't know whether it would be as many as 15 or 20?

A. I didn't count them. I doubt if it was that many.

Q. Well, I am not going to take the time to go through each one with you. Now, how many companies reported that they expected no change in the relative use of aluminum and copper?

Mr. Melchior: Mr. Bergson, I think I have to object. The witness testified on direct examination that he did not tabulate the schedules 3 and 4 because they were not susceptible to tabulation. All these schedules are in the record and we can refer to them.

Mr. Bergson: I am not asking about the tabulation. I am asking him to state if he knows how many said they expected no change.

[fol. 589] The Witness: No, I don't know.

Mr. Bergson: We have tabulated them and we will introduce evidence to that effect on our case, but I just wanted to know if the witness did. I think that covers it. Thank you very much, Mr. Fosdick.

[fol. 590] Mr. Melchior: No further questions, Your Honor.

The Court: All right. That's all.

Mr. Melchior: Your Honor, we are going to introduce some documents in just one minute.

The Court: All right.

OFFERS IN EVIDENCE

Mr. Wertheimer: At this time, your Honor, the Government would like to introduce into evidence the following groups of documents, with omissions as indicated.

GX-228 to 231 for identification.

The next group——

The Court: Wait just a second. Let me pass on each group separately.

Mr. Wertheimer: All right.

Mr. Bergson: No objection to those, your Honor.

The Court: I will receive 228 to 231.

(Government's Exhibits 228 to 231 for Identification received in evidence.)

The Court: If you want to make a short statement as to what they pertain to, I would be glad to have it.

Mr. Wertheimer: In general, your Honor, this package [fol. 591] contains marketing studies by ALCOA concerning the products relevant to this case, predominantly aluminum conductor.

The Court: All right.

Mr. Wertheimer: The next group is 232 to 274, with the following omissions, 244, 247, 255 and 260.

Mr. Bergson: No objection, your Honor.

The Court: All right, I will receive them.

(Government's Exhibit 232 to 274, with the omissions as indicated, marked in Evidence.)

Mr. Wertheimer: This package contains documents relating to ALCOA's activities in aluminum conductor and conduit; Rome's activities in aluminum conductor and steel conduit and give the differences between aluminum and copper conductor, aluminum and steel conduit.

The next group if Government's Exhibits for identification 275 to 347.

Mr. Bergson: No objection.

The Court: All right. I will receive them.

(Government's Exhibits 275 to 347 for Identification received in evidence.)

[fol. 592] Mr. Wertheimer: The subject matter of these documents, your Honor, is conduit. Included in this package are documents setting forth differences between steel and aluminum conduit, documents consisting of intra corporate memoranda from Rome Cable Corporation in which the market share of Rome Cable Corporation in the eleven Western states is estimated, documents post-acquisition by ALCOA personnel describing arrangements whereby conduit, aluminum conduit would be produced or finished at Rome's Torrance Plant and distributed in the eleven Western states.

The Court: All right.

Mr. Wertheimer: The next group consists of Government's Exhibits 348 to 386 for identification, with the omission of 361.

Mr. Bergson: No objection.

The Court: Received.

(Government's Exhibits 348 to 386 for Identification, with the omission of 361, received in evidence.)

Mr. Wertheimer: These documents, your Honor, generally relate to the line of commerce issue, the differences in physical and electrical characteristics of aluminum and [fol. 593] copper, aluminum and copper conductors, differences in price between primary aluminum and primary copper, and the conductor made from these two metals.

The next group is Government's Exhibits for Identification 387 to 397.

Mr. Bergson: No objection.

The Court: Received.

(Government's Exhibits 387 to 397 for Identification received in evidence.)

Mr. Wertheimer: These documents generally consist of memoranda from Reynolds Metal Company. They were

authenticated at pre-trial depositions in this case, Your Honor. The general subject matter is the aluminum wire and cable field and acquisitions therein and Reynolds' response thereto.

The final group to be offered at this time, Government's Exhibits for Identification 398 through 408.

Mr. Bergson: No objection.

The Court: I will receive them.

(Government's Exhibits 398 through 408 for Identification received in evidence.)

[fol. 594] Mr. Wertheimer: These documents are from the files of Ebasco Company, a consulting firm hired by ALCOA to investigate the possibilities of acquisitions.

These are all the documents the Government intends to offer at this time.

Mr. Melchior: The Government has nothing further to offer today.

The Court: All right, gentlemen, it is agreeable to everybody that we recess this case until Tuesday morning. All right, you gentlemen can be excused, anybody connected with the ALCOA-Rome case can be excused.

(Whereupon, at 12:22 p. m., a recess was taken to Tuesday, February 13, 1962, at 10 o'clock a. m.)

[fols. 595-596] [Title omitted]

Transcript of hearing—February 13, 1962

* * * * * * *

[fol. 597] Mr. Melchior: Govenment calls Doniel Aymes.

DONIEL G. AYMES, called as a witness in behalf of the Government, being first duly sworn, testified as follows:

Direct examination.

By Mr. Melchior:

Q. Would you state your name and place of employment?

A. Doniel G. Aymes. Place of employment, Aluminum Rigid Conduit Corporation, Westbury, Long Island.

Q. What position do you presently hold with that company?

A. Secretary-Treasurer.

Q. How long have you held this position?

A. Two and one-half years.

Q. What positions have you had earlier in the field of aluminum or aluminum products?

A. Prior to this association I was with Capitol Products in Mechanicsburg for three years as executive sales manager. Prior to my association with Capitol I was with the R. D. Winter Company of Greenville, Pennsylvania, approximately five years. Prior to that I was with Kaiser Aluminum Products in sales capacity.

Q. From your experience are you generally familiar with [fol. 598] the manufacture and sale of aluminum conduit?

A. Yes.

Q. In what year was the Aluminum Rigid Conduit Corporation founded?

A. 1960.

Q. Would you state generally the line of products it manufactures themselves?

A. It manufactures a line of aluminum rigid conduit from one-half inch to four inch I.P.S. and accessories such as couplings and elbows.

Q. What is aluminum conduit?

A. Aluminum conduit is defined as ASA Schedule 40 pipe according to the American Steel Institute whereby this pipe is cut in 10-foot lengths, threaded at both ends, capped with a coupling at one end and a protection cap at the other, plus any identification or markings required by the Underwriters or federal agencies.

Q. What accessories do you sell?

A. Couplings and elbows.

Q. Would you explain to the Court what those products are?

A. A coupling is a piece of tubing or pipe which has been cut to approximately two and one-half inches and is slightly larger than its accompanying piece, the piece of rigid conduit which is threaded internally and champed on both ends.

Q. What is its function?

A. Its function is to join two pieces of conduit together.

[fol. 599] Q. What are elbows?

A. An elbow may be described as a piece of conduit which is bent to any included angle less than 180 degrees, varying from 30, 45, 90, 130 degrees, as the case may be, with both ends of the elbow being threaded for attachment to couplings.

Q. What is the function of elbows?

A. Elbows are to take the place of severe bends or joining portions in conduit whereby angles are required.

Q. Are these items essential to the use of aluminum conduit?

A. Yes.

Q. I believe you stated that you sell accessories. Do you manufacture them?

A. We do not manufacture them.

Q. Do you purchase them from others?

A. Yes, we do.

Q. Now, where is your plant located, Mr. Aymes?

A. Our plant is located in Westbury, Long Island.

Q. What in general is the machinery you have in this plant?

A. We have two pipe threading machines which have [fol. 600] the capacity of one half inch to four inch conduit.

Q. In what sizes is aluminum conduit generally sold on the market?

A. It is generally sold in the area of one half inch to four inches, with additional sizes of five, six and up, if the requirements are there.

Q. But your line is limited to half inch through four inches, is that correct?

A. That's true.

Q. Now, I believe you described yourself as a fabricator of aluminum conduit. Is that correct?

A. Yes, sir.

Q. What is the raw material you use in fabricating conduit?

A. Aluminum pipe schedule ASA 40.

Q. What is aluminum pipe?

A. Aluminum pipe is extruded aluminum tubing, to pipe specifications.

Q. Who are your suppliers of aluminum pipe?

A. Allen Scott Aluminum Corporation.

Q. Would you identify the Allen Scott Aluminum Corporation? Where are they located?

A. Allen Scott Aluminum Corporation is an extruder fab-
[fol. 601] ricator of aluminum pipe, and is located also in Westbury, Long Island. It is the supplier of raw tubing to the ARCC Corporation.

Q. This raw tubing is aluminum pipe, is that correct?

A. Yes.

Q. Are you connected in any way with Allen Scott?

A. Yes.

Q. In what respect?

A. I hold the position of secretary-treasurer of that corporation.

Q. Are you generally familiar with the operations of that company also?

A. Yes, I am.

Q. Do you know from whom Allen Scott purchases the raw material it uses in manufacturing aluminum pipe?

A. Yes, I do.

Q. What is the raw material it purchases?

A. Extrusion billet.

Q. From whom does it purchase extrusion billet?

A. We purchase extrusion billet at various times from Alcoa, Kaiser, Reynolds, and Alcan.

[fol. 602] Q. From whom is Allen Scott Corporation presently purchasing billet?

A. The majority of our purchases of billet is purchased from Alcan, Aluminium, Ltd.

Q. Do you presently purchase from Alcoa?

A. No, we do not.

Q. What is billet?

A. Billet is cylindrical in nature. It can come in sizes anywhere from three inches up through probably fifteen inches, depending on its required diameter. It also varies in length from twelve to thirty inches. It is alloyed to specification and is purchased for extruded alloy billet.

Q. This is the material that is extruded by Allen Scott into aluminum pipe?

A. Yes.

Q. Now, Mr. Aymes, who are your principal competitors in aluminum conduit?

A. Alcoa, Kaiser, Reynolds, Revere, Harvey, Channel Master, Jasco, and Hazelwood Engineering.

Q. Would you identify these companies by giving their full name and location, if you know?

A. Alcoa is the Aluminum Company of America. I be-
[fol. 603] lieve it has several strategically located plants in the United States for the manufacture of conduit. Kaiser is Kaiser Aluminum and Chemical Corporation—I believe sales corporation. They have several plants strategically located in the United States. Likewise, Reynolds, I believe, is Reynolds Metals. Harvey is Harvey Aluminum, located on the West Coast. Channel Master is located in Ellenville, New York. Jasco is located in New Hyde Park, New York.

[fol. 604] Q. Do you know the full name of Jasco?

A. Jasco Aluminum Products.

Q. Do you know how many aluminum conduit fabrication plants Reynolds Aluminum has?

A. I believe there are least two. One in Phoenix and one in Richmond. Phoenix, Arizona and one in Richmond, Virginia.

Q. I believe you stated you had a single plant located in Long Island; is that correct?

A. That is correct.

Q. Now, have you had experience in competitive disadvantage in competing with any of these companies by virtue of the fact that each of these companies have more than one plant?

Mr. Bergson: Well, I think that is a leading question in the first place, Your Honor, and I don't believe he has established that these companies have more than one plant.

The Court: I think I will take it. It is obvious and I suppose is a matter of position.

Mr. Melchior: We want the witness to state it for the record.

The Court: All right.

Q. Would you answer the question: Have you had ex-
[fol. 605] perience in disadvantage——

A. Yes, we have.

Q. In what respect?

A. A stiff price competition.

Q. Would you explain what you mean by that?

A. Aluminum conduit is basically sold on a price schedule basis by zone. The definition of a zone is that area which encompasses a certain market area in which the products can be sold as well as distributed. Closeness to a certain market creates a higher competitive situation by virtue of the closeness or lack of cost of transportation, handling of the product from one point to another.

Q. How do you sell your aluminum conduit?

A. We sell it through recognized independent electrical wholesale distributors.

Q. And where are they located?

A. For the most part they are located in the northeast of the United States.

Q. Do you sell any to distributors in the western part of this country?

A. No, we do not.

Q. Why do you not sell them in that area?

A. The freight costs are prohibitive.

Q. Now, how far west do you actually ship your alumi-
[fol. 606] num conduit?

A. Farthest west we can possibly go is east of the Mississippi.

Q. Now, do you ship on a deliver price basis or how do you sell the conduit?

A. We ship on an f.o.b. Westbury full freight allowed basis.

Q. In other words, you pay the freight?

A. That is correct.

Q. Now, you spoke about a zone pricing system. Can I understand from that that the nation is divided into a number of zones?

A. Yes.

Q. For pricing purposes? How many zones?

A. Six or seven.

Q. Without giving us too much detail, can you tell us generally where these zones are located? What zone is your company in?

A. Zone 2.

Q. And where is—what generally is the zone 2 area?

A. Zone 2 is generally what might be defined as the North Atlantic States.

Q. Now, where would Zone 1 be, if you recall?

A. Frankly, it depends on who the competition is in Zone 1.

[fol. 607] Q. As far as your Zone 1 is concerned, I am asking you about.

A. We have no Zone 1 as such.

Q. You have no zone 1 as such. Do you have a zone 3?

A. Yes, we do.

Q. Where is that located?

A. It begins where zone 2 leaves off and is the boundary between those states and zone 3, which then becomes zone 3.

Q. I am not sure that I understand where zone 3 is. Could you identify certain states so we have the general locality?

A. Assume in zone 2 we have the State of Ohio. The western, the next westerly state bounding the westerly border of Ohio would necessarily fit into zone 3 as the next zone.

The Court: Are these the zones that you sort of make up at your own convenience?

The Witness: Your Honor, not for our own convenience, but our own profit structure.

The Court: Well, yes. In other words, your zone 2 may not be the same as some other conduit manufacturer's zone 2?

The Witness: That is correct. It reflects our cost of [fol. 608] marketing the product in a certain area.

The Court: So you make up your zones yourself?

The Witness: That is correct.

The Court: All right.

By Mr. Melchior:

Q. Where are your zones 6 and 7?

A. Our zones 6 and 7 are on the Rocky coast and the Far West. Rocky Mountain area and the West Coast.

Q. Can we generally say that the zones as they go west, the number goes up? Your low zone numbers are in the eastern part and as the numbers of the zones go higher they go westerly; is that generally true?

A. That is correct.

Q. Now, if you sell a stated quantity of aluminum conduit in Zone 2, would any customer in zone 2 purchase at the same price if the conditions were the same, from you?

A. Yes.

Q. Now, if you would——

The Court: Wait just a minute. I don't understand that. What is that, if you sell to zone 2?

Mr. Melchior: Would you repeat the question?

[fol. 609] The Court: You repeat it, Mr. Melchior.

Mr. Melchior: Would you like me to rephrase the question?

The Court: Yes, rephrase the question.

By Mr. Melchior:

Q. Directing your attention to zone 2, that is where your plant is located, and it covers several states, I believe you described it as the northeastern section of the United States. If you sell a stated quantity in size of aluminum conduit to several customers within that zone, would all of those customers be charged the same price?

A. Yes.

Q. Within that zone? Now, if you would sell the same volume of aluminum conduit to several customers in zone 3, would the price to each of these customers in zone 3 be the same?

A. No, they would not. They would be higher.

[fol. 610] Q. In other words, your zone 3 customers would pay a higher price than your zone 2 customers?

A. That's correct.

Q. And why is this?

A. It reflects the additional cost of handling and transportation.

Q. Into zone 3?

A. That's correct.

Q. Zone 3 being further from your plant, is that correct?

A. That's correct.

Q. Would all customers in zone 3 pay the same price to you?

A. Yes.

Q. Now, can we say the same with respect to all other zones?

A. Yes, we can.

Q. In other words, all customers in each zone purchasing conduit under similar conditions will pay the same price?

A. Yes.

Q. And in which of the zones are the prices the highest as far as the nation as a whole is concerned?

[fol. 611] A. Zone 6 and Zone 7.

Q. And they are in the Rocky Mountain area, West Coast?

A. Correct.

Q. And they are furthest from your plant, is that correct?

A. That's correct.

Q. Would you generally state what processes are involved in fabricating aluminum conduit?

The Court: Is that limited—this man manufactures only rigid conduit, doesn't he?

Q. Do you manufacture any other form of aluminum conduit than rigid conduit?

A. No, we do not.

The Court: I notice in some of your questions you refer to rigid conduit. Then you would change your question to refer to conduit. Let's have it understood. You refer in your testimony, Mr. Witness, to rigid conduit alone?

The Witness: Yes.

The Court: Okay.

Q. You manufacture only rigid aluminum conduit?

[fol. 612] A. That's correct.

Q. You do not manufacture a product known as EMT aluminum conduit?

A. No, we do not.

Q. I believe I asked you if you would describe generally the processes used in fabricating rigid aluminum conduit.

A. Rigid conduit requires the threading of both ends of approximately 10-foot length of pipe, putting protective covering on one end, an aluminum coupling on the other end, then marking it, as the case may be. Then finally packaging it as the requirements are set up.

Q. Into what lengths is this conduit?

A. 10 feet.

Q. Is this the practice in the industry generally?

A. They are accepted as 10 footers with the specifications set up. They vary from nine feet eleven and a quarter inches up to ten feet, depending on the size of the conduit.

The Court: May I interrupt just a minute, for my own information.

Mr. Melchior: Yes.

[fol. 613] The Court: You described what you do, in this fabrication. You spoke of billet sometime ago. Do you make the pipe or buy the pipe? Do you fabricate the pipe in your operation, or do you buy the pipe already fabricated, made up, whatever the correct word is, and simply put the threads on?

The Witness: We simply put the threads on the pipe.

The Court: What is this evidence you gave, something about billets, which I didn't quite understand anyway. Do you have anything to do with aluminum billet, whatever they may be, in your manufacturing process?

The Witness: We purchase this pipe from the company which extrudes this particular pipe from raw billets.

The Court: So when you use the word billet you meant pipe.

The Witness: No, sir, I meant in the sense of the raw commodity, prior to being made into pipe.

[fol. 614] The Court: Do you buy raw commodity and fabricate it into some form of a completed item of commerce?

Mr. Melchior: Your Honor, perhaps I could ask a few questions that might clarify this.

The Court: You lost me, because we started out as being rigid conduit. Then we got talking about conduit. Then we got into billets.

Mr. Melchior: Well, because two companies became involved. That's the reason, your Honor.

By Mr. Melchior:

Q. You are secretary-treasurer of the Aluminium Rigid Conduit Corporation, is that correct?

A. Yes.

Q. And what does the Aluminum Rigid Conduit Corporation manufacture?

A. It fabricates aluminum rigid conduit and markets that product.

Q. Aluminum rigid conduit, and markets that product. Now, what raw materials do you purchase to fabricate this conduit?

[fol. 615] A. Aluminum pipe.

Q. Aluminum pipe. And from whom do you purchase the aluminum pipe?

A. From Allen Scott Aluminum Corporation.

Q. Which I believe you stated is an affiliate of your company.

A. Define the word affiliate.

Q. I will withdraw the question. Are you connected in any way with this Allen Scott Company to which you refer?

A. Yes.

Q. You are familiar with their activities?

A. Yes.

Q. What does Allen Scott sell to Aluminum Rigid Conduit Corporation?

A. Extruded aluminum pipe.

Q. Extruded aluminum pipe. Now, what product does Allen Scott manufacture extruded aluminum pipe from?

A. Aluminum extrusion billet.

Q. From whom does Allen Scott purchase these billets?

A. From people such as Alcoa, Kaiser, Reynolds, Alcan, and so forth.

[fol. 616] Mr. Melchior: Is the relationship clear?

The Court: I guess so, but I still don't know what billet is.

Q. Would you describe for the Court what aluminum billet is?

A. Let me see if I can put it in layman's language. You take a tree, cut the limbs off, you've got nothing but a big log. To basically obtain billet, it is cast in long logs like the trunk of a tree, in various diameters. Then it is cut to specific sizes for the manufacturing requirements and limitations of the equipment available.

The Court: It is a solid piece of aluminum?

The Witness: Cylindrical in shape.

The Court: And from that solid piece of aluminum, cylindrical in shape, through a fabricating process you make a hollow pipe.

The Witness: Basically plastically deformed.

By Mr. Melchior:

Q. What do you mean by that?

[fol. 617] A. In the morning, when you get up, you squeeze the tube of toothpaste. Tubing is done the same way.

The Court: What I am getting at, it's a solid item from which your pipe is eventually made.

The Witness: That's correct.

Q. What type of company sells aluminum billet on the domestic market? Primary producer?

A. Primary producer, as well as several independent producers.

Q. Who are these independent producers that sell billet, if you know?

A. Channel Master, Capital Products, Aluminum Billets. Several others.

Q. What is billet made from?

A. Billet is made from prime pig, or prime pig and scrap, or prime pig and alloy constituents.

Q. Who manufactures prime pig, domestically?

A. Alcoa, Kaiser, Reynolds, Anaconda, Olin, Revere, and a couple of others.

Q. In other words, primary aluminum producers; those who produce primary aluminum.

A. Yes.

[fol. 618] Q. Are you generally familiar with the physical and utilization characteristics of aluminum conduit?

A. Yes.

The Court: You are still talking about rigid?

Mr. Melchior: Rigid aluminum conduit.

The Court: Just to clear up something else. This witness described his sales difficulties in his zones. Which company were you talking about?

The Witness: Aluminum Rigid Conduit Corporation.

The Court: I see.

Mr. Melchior: The only reason we mentioned the other company was because it was the supplier of the raw material.

Q. Now, do you advertise any of the special characteristics possessed by rigid aluminum conduit?

A. Yes, we do.

Q. Do you publish any brochure or other advertising literature which points out what these special characteristics are?

A. Yes, we do.

[fol. 619] Mr. Melchior: May I have this marked?

(Product data sheet marked as Government's Exhibit No. 492 for Identification.)

By Mr. Melchior:

Q. Mr. Aymes, I hand you Government Exhibit 492 for Identification and ask you to identify it.

A. This is a product data sheet which indicates the advantages of aluminum rigid conduit.

Q. And is this put out by your company as advertising literature?

A. Yes, it is.

Q. And what does it explain, generally?

A. The advantages, its final methods and its possible applications as well as installation of conduit.

Mr. Melchior: I offer Government's Exhibit 492 for Identification into evidence.

Mr. Bergson: No objection, Your Honor.

The Court: Now, tell me, what do I do with that? Certainly, I assume that anybody that manufactures anything or any type of conduit, I suppose, most of them think that their product is salable, that it is usable in the market. They may orally produce it or they may do it in writing. I don't think that this does any harm, but I am just wonder-[fol. 620] ing what possible use I make of it.

Mr. Melchior: It is my purpose at this time, Your Honor, to discuss, or have the witness discuss briefly the contents and I hope that clarifies this for you.

The Court: Well, I will take it, but it just seems to me to be another one of these appendages that seem to attach itself to an anti-trust lawsuit.

Mr. Melchior: I would like to point out why I think it is important.

The Court: All right.

Mr. Melchior: As I indicated in my opening remarks, we think the proper test of the line of commerce under Section VII of the Clayton Act, i-s peculiar uses and characteristics. We feel the line of commerce is defined by this standard, and we cite in support of that the case of U. S. against Bethlehem Steel, the Supreme Court cases of Dupont and Crown Zellerbach. We feel that information of this type which sets out the peculiar characteristics and particular uses of aluminum conduit to be highly relevant [fol. 621] to a determination of this point of law.

The Court: Well, that applies to every single thing that is manufactured, I suppose.

Mr. Melchior: Yes.

The Court: In other words, every single item has its own use, I suppose, has its own sponsors and so forth.

Mr. Melchior: We think that is true, and we think this is what the Court will do in evaluating aluminum conduit as a line of commerce because of its peculiar use in distinguishing aluminum rigid conduit from conduit made by other metals. We think it is highly significant.

(Government's Exhibit No. 492 for Identification received in evidence.)

By Mr. Melchior:

Q. Directing your attention, Mr. Aymes, to Government's Exhibit 492, the pages don't seem to be numbered, about the third page indicates advantages. And there are a number of factors listed under "advantages." The first being resistance to corrosion. Would you explain to the Court as respects aluminum rigid conduit how aluminum rigid [fol. 622] conduit may differ from other forms of conduit in this respect? Do you need the Government exhibit to refresh your recollection? (Hands document to witness)

A. Corrosion is basically defined for those products that do not have ferrous alloy constituents. An iron product will rust. Non-ferrous product such as aluminum will basically corrode. Corrosion in aluminum is a much, much slower acting reagent as compared to the rusting of a ferrous or iron type of product.

This advantage, therefore, allows people to save on maintenance cost of maintaining this type of product.

Q. How would you save on maintenance costs? By using aluminum rigid conduit?

A. They are almost nil compared to steel type of conduit.

Q. If you know, what maintenance costs are involved in using steel conduit that are not involved in using aluminum, rigid aluminum conduit?

A. Well, there is the painting of the product; the replacement of the product and the labor involved in either one of these two operations.

Q. You don't paint aluminum conduit generally; is that [fol. 623] correct?

A. That is correct.

Q. How about steel conduit, if you know?

A. Well, there are many ways of attacking a problem of steel conduit with some sort of cleaning or other.

Q. And that is not necessary in aluminum conduit?

A. No, it is not.

Q. Another factor you have listed is good appearance. Could you enlarge on that a bit for the Court and explain why you consider aluminum conduit having good appearance is an advantage as compared to steel conduit?

A. Aluminum basically has become a household word. It gives an appearance as cleanliness, desirability, from the aesthetic sense. It has a good, cool-looking appearance. It is a shiny metal. People generally like it. It is considered to be light.

Q. Is this a sales factor?

A. Yes, it is.

Q. Do your customers purchase aluminum in some cases because of this factor?

A. They most certainly do.

Q. Another item you have listed is non-sparking. Can you distinguish aluminum conduit in that respect from steel conduit or any other type of conduit?

[fol. 624] A. I wish I had my engineers with me.

The Court: Well, you go ahead and give it. The Judge is supposed to use a little common sense, anyway. You help me a little bit.

The Witness: Right now I need your help.

The Court: I need yours.

Q. Do you understand the question, Mr. Aymes?

A. I do, but it is very difficult to give you an answer in just a few words.

The Court: What is the question?

Mr. Melchior: The question was: what the feature of non-sparking means, which is listed as one of the attributes of aluminum rigid conduit.

The Court: Doesn't that mean that it is not a good conductor as compared to steel?

The Witness: No, it means it is less hazardous to use aluminum conduit than steel conduit.

Q. In other words, in a toxic or gaseous atmosphere would this be a factor?

A. Well, sparking in the same area as combustible products could create some sort of problem.

Q. A problem that you wouldn't have in aluminum but [fol. 625] you may have in the case of steel?

A. Possibly.

Mr. Bergson: I am confused as to who the witness is and who the examiner is.

The Court: Yes. In that last, of course, it doesn't prove

anything. Might possibly have. If there is a difference, have him give it to us. I don't know what you are talking about now.

Q. Can you explain to the Court what the difference is between aluminum steel conduit in this respect?

A. Since aluminum conduit is non-sparking it eliminates almost completely the danger by the use of application of aluminum conduit where products of combustion are available.

Q. Now, you have listed as another advantage of aluminum conduit lower installation costs. Would you explain that you mean by this factor?

The Court: It costs less to install, or you think it does; is that right?

The Witness: We know it does.

The Court: All right, next question.

The Witness: The reason for it is that a comparable piece [fol. 626] of steel conduit, say 4-inch, weighs 105 to 104 pounds as compared to the same size of aluminum which weighs roughly 34 to 35 pounds. The average individual can lift up a 34 pound piece. However, the average individual can lift up a piece of steel of the weight of 105 pounds to a required height. Therefore, it requires two people to lift the steel. By having the lighter weight, of aluminum, it would follow that you can install three times as much aluminum conduit as you would steel.

Q. Now, another factor that you have mentioned is the non-magnet property of aluminum. Will you explain what you mean by this?

A. Well, under the old concept all magnets were basically made out of ferrous oxide products. In working under this old concept, aluminum is a non-ferrous product and therefore non-magnetic.

Q. Does this have certain advantages in the distribution of electricity?

A. Well, it reduces the voltage drop of other volfage carrying capacities.

The Court: Let me interrupt again.

When you are giving these advantages you intend to give the advantages of all aluminum conduit or just rigid

[fol. 627] aluminum? In other words, some of these properties you describe to me as advantages applies to all aluminum and not just to aluminum conduit?

The Witness: That is correct.

The Court: So when you are giving these advantages here, it is not limited to rigid aluminum conduit at all?

The Witness: Not in your sense of understanding of the question.

The Court: I don't know whether it has any sense or not. Go ahead.

Q. Will you look through the list of advantages you have listed there and indicate which ones are not applicable to the EMT form of aluminum conduit?

A. They are all applicable.

Q. In other words, the answer to the Court's question is that your comments with respect to aluminum are applicable to both rigid and EMT aluminum?

A. Yes.

Q. Have you formed any opinion as to the extent to which steel conduit may be displaced by aluminum conduit?

A. Yes, I have.

Q. Would you state it?

The Court: Well, the question is have you formed an [fol. 628] opinion as to the extent that aluminum conduit may replace steel conduit?

Mr. Melchior: Displace or replace, yes.

The Court: That is speculative. It may not replace it at all.

Mr. Melchior: I think the witness has a certain amount of expertise in the field from experience——

The Court: Whether he says it may, the end of the world may come tomorrow and we won't have any conduit. You are getting so far away from anything we can tie to it,— but I will let him give the facts.

Q. Are you familiar generally with industrial and residential construction in the area wherein your plant is located?

A. Yes.

Q. Has conduit been installed in this, in buildings in this area for the conducting, for the conduct of electric current in these buildings?

A. Yes.

Q. Are you generally familiar with the type of conduit that is being installed in some of these newer buildings, particularly the larger buildings, the so-called skyscrapers in New York?

[fol. 628a] A. Yes.

Q. And are you cognizant of whether they are using aluminum conduit or steel conduit or both?

A. Yes.

[fol. 629] Q. Now, has there been any noticeable change over the last three years, since you have been in business, as respects the volume of aluminum conduit being installed as compared to the volume of steel conduit being installed?

Mr. Bergson: I would like to inquire whether the witness will answer this from his personal knowledge, or hearsay.

Q. Answer this question from your personal knowledge.

A. From personal knowledge, yes.

Q. Yes, what? I'm not sure what that——

A. It is on the increase.

Q. What is?

A. Aluminum conduit.

Q. Aluminum conduit is on the increase. Now, in selling aluminum conduit, I believe you stated that you also sell certain accessories, which you described as elbows and couplings.

A. That's correct.

Q. Do you manufacture elbows and couplings?

A. No, we do not.

Q. How do you acquire them?

[fol. 630] A. We purchase them from outside sources, and many times from our competitors.

Q. Well, now, when you sell aluminum conduit do you sell these accessories in conjunction with the aluminum conduit?

A. Yes, we do.

Q. Do you sell any conductor wire and cable?

A. No, we do not.

Q. Do any of your competitors in the field of aluminum conduit sell accessories along with their conduit?

A. Yes, they do.

Q. Do any of them sell conductor wire and cable.

A. Yes, they do.

Q. Do any of them sell both aluminum and copper wire and cable?

A. Yes.

Q. Now, do any of your competitors sell what I might describe as a full line of conduit—accessories, aluminum and copper conductor wire and cable?

A. Yes.

Q. They do? Now, do you find your inability to offer [fol. 631] such a full line any disadvantage to you in attempting to make sales of conduit?

Mr. Bergson: Well, I object, your Honor. He didn't say he was unable. He said he didn't.

The Court: Yes, you are putting something in this question that there is no proof of.

Q. I believe you stated you do not sell either copper or aluminum conductor wire and cable, is that correct?

A. That's correct.

Q. Have you ever considered selling it?

A. No, we have not.

Q. Would you state why you have not considered this?

Mr. Bergson: I object, your Honor.

The Court: Yes. Sustained.

Mr. Bergson: This is far afield.

The Court: Aren't these things obvious? Many of these things, certainly, a person with a complete line of products, be it aluminum, steel, clothing, textiles—I assume he has a broader space to sell and certain advantages.

[fol. 632] Mr. Melchior: We feel the same way, your Honor. I just thought I'd get it in the record if I could.

The Court: Well, you can't get it in the record this way. We don't need some of these things.

Q. Have any of your customers indicated a desire to purchase from you conduit and accessories as a package?

Mr. Bergson: I object, your Honor. I don't think that has any relevance.

Mr. Melchior: I think it is highly relevant.

The Court: How can you meet that? Sustained. Sure, I might go to him and say, "Listen, I want to build a big house and I'd like to have it all aluminum." Suppose I did

say it? So what? The next man comes in and says, "I don't want you to buy any part of it." I can't see——

By Mr. Melchior:

Q. Have you ever found yourself in a position of not making a sale because your customer desired a broader line of products than you had?

[fol. 633] Mr. Bergson: I object.

The Court: Again, sustained. It is obvious. If a guy only sells candy, I suppose he might be out of a sale because he didn't sell popcorn. He doesn't make it, that's all. He can't sell it.

Q. Do you consign aluminum conduit to your customers?

A. No, we do not.

Q. Will you state why?

A. It takes a tremendous cash reserve.

The Court: It is not a good business practice in your judgment.

The Witness: It never was a good practice.

The Court: Well, a lot of people disagree, but your judgment is that it is not a good business practice. You don't have to go far to find that opinion either.

Q. Do any of your customers consign conduit to your knowledge?

A. Yes, they do.

Mr. Bergson: I'm sure you didn't mean to ask that question.

[fol. 634] Q. I'm sorry. Do any of your competitors consign conduit?

A. Yes, they do.

Q. Would you state which of your competitors engage in this practice?

Mr. Bergson: If you know.

Q. If you know.

A. The primary producers.

Q. The primary producers of what?

A. Of aluminum rigid conduit.

Q. Would you name them?

A. Kaiser, Reynolds and Alcoa.

Q. Do you publish price lists for this aluminum conduit?
A. We did.
Q. You did?

(Government's Exhibits 493 and 494 marked for identification.)

Mr. Bergson: May I see them, please?
Mr. Melchior: Yes.

Q. I show you Exhibits 493 and 494 for identification, and ask you to identify them.
A. Exhibit 493 is our distributor price list, dated June [fol. 635] 1, 1960. Exhibit 494 is our distributor price list dated September 1st, 1960.
Q. In the trade do you describe Government Exhibit 493 in a particular way, for simplicity?
A. The sheet is most often described as the 1352 price schedule, which is the Zone 1 price for half inch conduit. Likewise, on 494 it is considered the 1285 price sheet schedule for half inch conduit.

Mr. Melchior: The Government offers Government Exhibit 493 and Government Exhibit 494 for identification at this time.
Mr. Bergson: I don't object. I question their relevance.
The Court: So do I. It is a price list that went into effect on June 1st, 1960 and September 1st, 1960. Is it in effect now?
The Witness: No, sir.
Mr. Melchior: I was going to ask that question, your Honor.
The Court: Go ahead.

Q. Now, directing your attention to Government Exhibit [fol. 636] 493, which is your distributor price list effective June 1st, 1960, which, for brevity, you have described as the 1352 price list, would you state what that price list is?
A. It describes in detail the price to be paid for a specific size or sizes of conduit in a specific zone area.
Q. In other words, for each size of pipe from half inch up to four inch, you have set forth a price and shown what that price is in each zone where that pipe would be sold, is that correct?
A. That's correct.

Q. Now, directing your attention to Government Exhibit 494, which is your distributor price list for aluminum rigid conduit dated September 1st, 1960 and which you have described for brevity as the 1285 price list, I ask you whether the other prices set forth in there have been changed as respects the prices set forth on Government Exhibit 493?

A. Yes.

Q. In what way have they been changed?

A. There is a reduction in price.

Q. In other words, on September 1, 1960, your company reduced its prices on aluminum rigid conduit in all its sizes, in all its zones?

[fol. 637] A. That's correct.

Q. Why did you do this?

A. To meet competition.

Q. Now, are you presently operating under your September 1, 1960 pricing schedule?

A. No, we are not.

Q. What pricing schedule are you operating under at present?

A. Frankly, we have none.

Q. Would you state why?

A. The last changes in price schedule which appeared were in April, 1961, and since then, for lack of putting out a price schedule, the competitive price situation is such that price schedules have been thrown out the window.

Q. You don't publish them anymore?

A. No, because we are actually out of the conduit business.

The Court: You are out of the conduit business?

The Witness: Just about.

Q. Now, would you state how you are just about out of the conduit business?

The Court: Can't make any money.

[fol. 638] A. Well, I was going to put it a little differently. For every dollar we sell, we have got to put twenty cents on top of it.

Q. I am not sure I understand that statement, Mr. Aymes.

A. The price has dropped so low that regardless of what price we can buy it, we can't sell the finished product for

more than the raw material can be purchased. In other words, there are instances where the price of the finished product is below the price of the raw material.

Q. Have you finished your answer?

A. Yes.

Q. Did I understand you to say that the market price at which you are required to sell rigid aluminum conduit is below what?

A. The price for the raw pipe.

Q. The raw pipe that you purchase from Allen Scott?

A. That's correct.

Q. Is the price at which you purchase raw pipe from Allen Scott the generally prevailing market price for aluminum pipe?

A. No, it is below the market price.

[fol. 639] Q. Allen Scott sells below the market price to you, but you still cannot sell your rigid aluminum pipe at a profit, is that correct?

A. Allen Scott refuses to sell the pipe to us because it is below their cost.

Q. Allen Scott cannot sell pipe to you?

The Court: Refuses to sell.

A. Refuses to sell.

Q. Why do they refuse?

A. They are losing money on every stick they make.

Q. Allen Scott is also losing money?

A. Correct.

Q. From your knowledge of the operations of Allen Scott, why are they losing money?

A. Since 90 percent of the cost of aluminum pipe is in the raw material itself, the remaining 10 percent for labor and overhead indicate that unless they can purchase it at a lower raw material price, they cannot make money.

Q. Now, since you have been in the aluminum rigid conduit business, which as I recall began in 1960, what has been the trend in aluminum conduit prices?

[fol. 640] A. Downward.

Q. The market price has been downward?

A. Yes.

The Court: That is the price to your consumer? Is that what you are asking?

Q. The price you sell to the consumer, or your customer?

A. The distributor.

Q. The distributer, which is your customer. Now, what has been, if any, the change in the price of aluminum pipe in the time you have been in business? Now, aluminum pipe is raw material that you use. Has there been any material change in the price since you have been in the business?

A. The appreciable change has been infinitesimal as compared with the drop in finished conduit.

Q. From your knowledge of the operations of the Allen Scott Company which purchases billet and which sells aluminum pipe to your company, the Aluminum Rigid Conduit Company, what if any has been the change in the market price of billets since you have been in business in 1960?

A. The price of billet has come down approximately be-
[fol. 641] tween 8 and 11 percent, while the price of conduit has dropped 25 percent.

The Court: The greater part of the squeeze is on the price to the distributor or consumer.

The Witness: That's right.

Q. This is the product you sell?

A. That's correct.

Q. Now, in order to give the Court an indication of what success you are having in selling aluminum conduit, I believe you began production and sales in 1960. Can you recall your approximate sales in the year 1960, the first year when you began production—your sales of rigid aluminum conduit?

A. We started to market successfully in the last quarter of 1960. We sold in that three-month period about $63,000 worth of conduit, which would be our annual rate of sales for the first year in business, projected sales volume roughly a quarter of a million dollars. In 1961, the books are just being closed out, we have done approximately $93,000 total for the year. At the rate we are going, for 1962 we will be fortunate if we even sell $50,000 in the en-
[fol. 642] tire year, and the reason for the sale of this $50,-000 is due to the fact that the remaining stock we have on hand, which we must liquidate.

Q. Have you ever heard the expression "commodity pricing"?

A. Yes.

Q. Would you explain what it means?

Mr. Bergson: Is this for your company or——

Mr. Melchior: What is the question, counsel?

Mr. Bergson: For his company or for——

Mr. Melchior: Commodity pricing? The term "commodity pricing" as used and understood in the industry.

Mr. Bergson: Well, I don't know that he is qualified to answer that.

The Court: I don't know either. Has he heard the words "commodity pricing"? Now you ask him to define it. I think you better——

Q. Are you familiar with the term "commodity pricing" as used and understood in the trade?

A. Yes.

[fol. 643] Q. Would you explain what this term means, as used and understood in the trade.

A. Commodity price is that type of price which applies to specific goods for a specific industry. Its pricing structure is entirely different for this particular commodity in this segregated industry as compared to selling it on an overall basis.

Q. Well, now, do any of your suppliers engage in commodity pricing to your knowledge? Strike that question. Do any of the suppliers of Allen Scott or Aluminum Rigid Conduit engage in commodity pricing to your knowledge?

A. Yes, they do.

Q. Would you identify them?

A. I would identify them overall as the primary producers.

Q. The primary aluminum producers?

A. That is correct.

Q. Do I understand your response to be that all the primary aluminum producers engage in this practice?

A. Yes.

Q. As respects your two companies?

[fol. 644] A. Yes.

Q. Now, would you cite an example of how—is Alcoa one of your suppliers or Allen Scott's?

A. Not at present.

Q. They were at one time?

A. Yes.

Q. Were you ever involved in a situation wherein you discussed the question of commodity pricing with Alcoa personnel?

A. No, I was not.

Q. You were not. Were you ever involved in a situation where you discussed the question of commodity pricing with any other?

A. Yes, I was.

Q. (Continuing) Integrated aluminum company?

A. Yes.

Q. Would you describe the most recent situation?

Mr. Bergson: I object, your Honor. Discussions with Alcoa personnel I can't object to, but with any other aluminum supplier I must.

Mr. Melchior: I think one of the essential factors in this [fol. 645] proceeding, your Honor, is the question of industry conditions and a great part of the Government's case is not only to show the dominance of Alcoa in the aluminum and aluminum products field but also the dominance and concentration in the hands of primary producers. Therefore it is relevant.

Mr. Bergson: I don't object to it on the ground of relevancy. I object on the ground of hearsay. Granting for the sake of argument it is part of the Government's case, I think you got to prove it the right way.

The Court: Yes, I think that is going pretty far afield. You can go out and talk with all of these people and you get very different ideas. I don't know how that would help us here. I don't know how the defendant could meet it. No time and place here involved, no foundation. How in the world does anybody meet it.

Mr. Melchior: That is what I hope to get from the wit- [fol. 646] ness, if he personally was involved in the situation.

The Court: You asked him to tell us about the most recent. I don't know whether it happened the day before yesterday when he went out looking for it or if it happened in 1960. No foundation laid for it in my opinion.

Q. How recently have you been involved in conversations with any of the primary aluminum producers with respect to this subject of commodity pricing?

A. I would say it is a continuous thing.

Q. It is a continuous thing.

The Court: I am afraid you didn't understand the question. I think what you mean was, when did you personally have some talk or transactions with one of these primary producers which involved the subject of commodity pricing. Perhaps it happens every day, but he is asking you when and where and so on.

The Witness: Not being able to pinpoint the specific day of the week, I would say it has happened within the last [fol. 647] week and a half or two weeks.

By Mr. Melchior:

Q. Can you recall a particular instance?

A. Well, as I said, every supplier comes in and you are continually after him on this commodity pricing. It is something we never cease to harp on because we are looking for that price advantage.

Q. Would you explain what this price advantage is that you are looking for as respects this recent instance that you speak of?

Mr. Bergson: I think this is so utterly vague——

The Court: Yes, it is very vague. Apparently I think what this man means is that he can't proceed in this because he can't make a profit. When the suppliers come in to sell him, no matter where they come from, Kaiser Aluminum, Alcoa, anywhere, he constantly raises the question to them that he ought to be able to buy their goods cheaper. Isn't that in substance it?

The Witness: Yes, sir.

Q. Do you raise this question because you know of your [fol. 648] own knowledge that other customers of theirs are getting the commodity you want to purchase at a different price?

Mr. Bergson: I object, your Honor.

The Court: Yes, it is badly leading. Now, if he knows about something and can testify to it as a fact, I will let

him testify to it. What you are asking is for the mental operation of his mind, because he knows about something. Why don't you ask him is that the fact and let's get the facts out.

Q. Do you know as a fact that other companies and perhaps competitors of yours are purchasing material from any of the integrated aluminum companies at a price lower than you can purchase this same commodity from them?

Mr. Bergson: I object, your Honor. I don't think we should have "perhapses" in questions.

The Court: Well, perhaps it is not a very good one. I will overrule you and let him answer yes or no.

A. Yes.

[fol. 649] Q. You do know. Can you cite an instance of this?

Mr. Bergson: From your own knowledge.

The Court: Instance of what?

Q. From your own knowledge.

The Court: An instance of what?

Mr. Melchior: An instance of whether other parties are purchasing products from any of the primary aluminum producers at prices lower than he can purchase them.

Mr. Bergson: Now wait a minute. That is not what you asked him. You asked about competitors.

Mr. Melchior: I said other parties including competitors.

Mr. Bergson: I object to it if it is other parties including competitors. I think if it is going to have any relevancy at all it must be confined to competitors.

The Court: Well, I don't know what we are getting at myself, but I am going to overrule and let him answer. Of course, I don't know what the question is. Better reframe it, Mr. Melchior.

[fol. 650] Mr. Melchior: I will reframe the question.

Q. Of your own knowledge do you know of instances where any of the primary producers have sold commodities to others at a price less than they were willing to sell them to you?

The Court: Hasn't it got to be, in asking him, hasn't

it got to be to others of the same things? Maybe Alcoa sold me some rigid aluminum for half what it cost. That isn't what we are trying here.

Mr. Melchior: No, the essence of the matter—I don't want to testify.

Q. I will limit the question to your competitors initially.

A. The answer is obvious.

The Court: No. Just a minute, witness.

The Witness: It is obvious.

The Court: Just a minute. The answer isn't obvious. He is asking you of a specific instance.

The Witness: Well, specific instances would be those specific times when we are high man on the totem pole and [fol. 651] not low.

The Court: Strike it out. Answer the question if you can. Give us the time, place and names involved.

The Witness: My memory bank is not working good.

Q. You don't recall?

A. I can't come up with this answer.

Mr. Melchior: No further questions.

The Court: How in the world can you read it if you can't come up with it.

All right, cross-examination.

Cross-examination

By Mr. Bergson:

Q. Mr. Aymes, what is the relationship between Aluminum Rigid Conduit Company and Allen Scott Aluminum Company?

A. The relationship is one of supplier and customer.

Q. What is the corporate relationship?

A. There is none. They are separate corporations.

Q. Do they have different stockholders?

[fol. 652] A. No, they do not.

Q. The same people who own the stock of Allen Scott own the stock of Aluminum Rigid?

A. That is correct.

Q. And the only difference is that you have two corporate set-ups?

A. Yes.

Q. Are you secretary-treasurer of Allen Scott and secretary-treasurer of Aluminum Rigid?

A. That is correct.

Q. Who is president of Aluminum Rigid?

A. Irving Schneider.

Q. And who is president of Allen Scott?

A. Irving Schneider.

Q. Do you have a board chairman?

A. No.

Q. Who is the executive vice president?

A. There is none.

Q. Are the offices of Allen Scott and the offices of Aluminum Rigid the same?

A. Yes, they are.

Q. Now, when you went into the—was Aluminum Rigid founded solely for the purpose of marketing aluminum conduit?

[fol. 653] A. That is correct.

Q. And when you entered the business of marketing aluminum conduit what sort of additional equipment did you need that Allen Scott didn't already have?

A. It did not have pipe threading facilities nor space facilities.

Q. Nor space facilities?

A. That is correct.

Q. You mean you didn't have enough room?

A. Or operating personnel.

Q. How much do those pipe threaders cost?

A. I can't recall.

Q. $5,000?

A. Probably more.

Q. Ten?

A. Just about.

Q. About ten thousand. You stated that your sales area was primarily in the Northeast United States; is that right?

A. Correct.

Q. That is Zone 2. And you state that location gave the company an advantage?

A. Yes, it does.

[fol. 654] Q. From a freight standpoint. Do you know where Alcoa makes aluminum rigid conduit?

A. It would be impossible to know all the places they can make it.

The Court: He asked whether you knew where they did make it.

Q. Do you know where they make it?

A. They appear to have one in Lafayette, Indiana and one on the West Coast.

Q. Now, when you sell in Zone 2 does Alcoa have a freight advantage over you?

A. I would have to examine the sheet to see whether Alcoa's Zone 2 is equal to my Zone 2 before I answer the question.

Q. I was asking do they have a freight advantage.

A. I don't know what their Zone 2 is.

Q. I am asking whether it is cheaper for Alcoa to sell in your Zone 2 than it is for you to sell in your Zone 2.

A. I can't tell.

Q. Is Lafayette, Indiana further away from the area covered by your Zone 2 than Westbury, Long Island?

[fol. 655] A. Not particularly.

Q. Not particularly?

The Court: Well, it is not at all; isn't that right?

Mr. Bergson: Sir?

The Court: It is not at all. You say "not particularly." I don't know what the word "particularly" means. It is not as far away.

Mr. Bergson: Westbury is not as far away.

The Court: No.

Q. Now, isn't it a fact that the largest market for conduit in the United States is in Zone 2?

A. I believe so.

Q. So that your plant is strategically located for meeting the largest marketing area for conduit in the United States?

A. That is correct.

Q. You also—let me ask you this: If the price of steel conduit went down would that affect the price of aluminum conduit?

A. It has affected it in the past.

Q. It has?

[fol. 656] A. Yes.

Q. And when you are selling aluminum conduit do you feel that you are selling in competition with steel conduit?

A. No, sir.

Q. You don't?

A. No, sir.

Q. Is there any function which aluminum conduit performs that cannot be performed by steel conduit?

A. None other than the advantages I have already given.

Q. Well, all right. You told us about some advantages such as sparking and painting and ease of handling. How about the disadvantages of aluminum conduit; are there any?

A. I can't think of any.

Q. Isn't aluminum a little softer than steel?

A. Yes.

Q. Doesn't it bend more readily than steel? Doesn't it damage more readily than steel?

A. Not particularly.

Q. Isn't it easier to pull wire through steel than it is through aluminum?

[fol. 657] A. It is only easier if you don't have the know-how. But once you acquire the know-how, both are easier.

Q. Isn't it a fact, when you put out your brochure you are putting out a tout and that you are extolling the advantages of aluminum conduit and the disadvantages of steel conduit?

A. I don't know what your definition of "tout sheet" is.

Q. A promotion sheet.

A. All our sales are promotion.

Q. There is a little puffing in it and a little exaggeration?

A. No exaggeration.

Q. You emphasize the virtues and you cover up the disadvantages. Isn't that normal?

A. No.

Q. When you perform the function of manufacturing aluminum rigid conduit from pipe, is there any particular art to doing that?

A. We think there is.

Q. Isn't it just putting threads on the end of a hunk of pipe?

A. To the average layman, yes.

[fol. 658] Q. And putting a little coating on the inside so that the wires will slip through a little bit more readily?

A. They look like little things, but they are not.

The Court: But that is what you do is his question. Is that what you do?

The Witness: Yes.

Q. And that is the function that you perform, that the Aluminum Rigid Conduit Corporation performs?

A. That is correct.

Q. It puts some threads on the end of a pipe, puts some lubricant inside the pipe and sells it as aluminum rigid conduit?

A. That is correct.

Q. And you got into the business with machinery of about ten thousand dollars?

A. Yes.

Q. And you feel that you are at a tremendous disadvantage because you have to compete with companies who have investments of substantially greater amounts?

A. I don't think they have any greater equipment.

Q. Greater investment?

[fol. 659] A. No, I do not.

Q. You don't think Alcoa in making its aluminum rigid conduit performs more than the function of putting some threads around the end of a pipe and putting some lubricant inside the pipe. Doesn't Alcoa take the pipe, coming from the beginning to the end, doesn't it take the bauxite, smelt it, make the alumina, make the aluminum, make the pig, make the billet, extrude it, make the pipe, put the threads on the pipe? Don't you think that that is a little bit more than the function that you perform?

A. Yes.

Q. And don't you think that Alcoa had to have an investment to do that?

The Court: The answer is yes, isn't it? Just so we get it on the record.

A. Yes.

Q. How could you have gotten into the business for ten thousand dollars unless other people performed all these functions for you before you got to that stage of the game?

A. Can you repeat that question?

Mr. Bergson: Would you repeat the question.

[fol. 660] (The reporter repeated the question as above recorded.)

The Witness: The only way I could answer you is to say that this is a democracy and this is how small businesses persist.

The Court: But you have to have those things done. Let's not waste time on it. You have to have those things done by someone else.

The Witness: Correct.

The Court: Before it reaches the stage when you get it.

The Witness: Yes.

The Court: The answer is yes. Take a short recess.

(At this point a short recess was taken after which the trial was resumed.)

Cross-examination. (Continued)

By Mr. Bergson:

Q. In your direct examination you testified Allen Scott in its production used certain amounts of secondary aluminum.

A. No, I did not.

[fol. 661] Q. You did not?

A. No.

Q. They use no secondary metal at all?

A. Oh. Will you rephrase your question again.

Q. That Allen Scott used secondary metal in some of its products.

A. Yes, they do.

Q. Would you tell the Court what secondary aluminum is?

A. Secondary metal is defined as that material which is

alloyed a second time with the addition of primary metal and alloyed metal from the first time around.

Q. It is made from scrap, with an addition of some primary metal, is that right?

A. Yes.

Q. Scrap aluminum. Now, who are the suppliers of scrap aluminum, do you know? Who are the suppliers of scrap aluminum? Who sells it.

A. I testified to who they were before. I said Channel Master, Capitol, Aluminum Billets.

Q. You said the suppliers to Allen Scott.

[fol. 662] A. No, you didn't ask me who the suppliers were to Allen Scott. You asked me who they are. So can you define it a little more fully for me?

Q. Well, all right. Do you know who sells secondary metal, irrespective of whether they sell to Allen Scott or not?

A. Yes, I do.

Q. Who are they?

A. Channel Master; Aluminum Billets; Capitol Products. Is that enough?

Q. Well, there are several others?

A. There are many more.

Q. Does Allen Scott make any secondary metal itself?

A. No, it does not.

Q. Now, you also testified that so far as Allen Scott's principal purchases or purchases of primary metal are concerned, at the present time it is purchasing most of its metal from Canada, is that right?

A. That's correct.

Q. Just one final question. Does Aluminum Rigid Conduit Company report its sales of aluminum conduit to the Census Manufacturers?

A. Yes, it does.

[fol. 663] Mr. Bergson: Thank you.

Redirect examination

By Mr. Melchior:

Q. On cross-examination you were asked for an approximation of your expenditures for the threading machines.

A. Yes.

Q. Now, what machinery does Allen Scott have or utilize in manufacturing aluminum pipe from billet?

A. Well, it has a self-contained aluminum extrusion press and the allied equipment to extrude.

Q. This equipment is necessary to extrude aluminum pipe from billets, is that correct?

A. Yes.

Q. Can you indicate generally the approximate value or cost of this machinery?

A. In excess of $400,000.

[fol. 664] Q. Now, if I understand your testimony in respect to secondary aluminum, did you say Allen Scott purchases secondary aluminum?

A. He does. It can be answered both yes and no.

Q. Would you explain your answer?

A. In the process of manufacturing a product there is always scrap generated.

Q. Manufacturing what product, Mr. Aymes?

A. Aluminum product. Like aluminum conduit and aluminum pipe there is scrap generated. It is common practice to convert the scrap back to the alloying requirements, and this is done either by outright sale or toll conversion. So the majority of our scrap that is generated is given out for toll conversion.

Q. What does that mean, given out?

A. Toll conversion is taking the generated aluminum scrap, the fall-offs, the cuttings, the rejects, and having it reconverted or toll converted back into the alloy required.

A. In other words, the scrap from your operation is converted by the toll converter and the result of the product is resold to you?

A. That is correct.

Q. In other words, it is the metal that you get back [fol. 665] is your own metal, is the same metal that you had originally, which has been remelted?

A. That would be very difficult to refine. We get it back in poundage but we don't know whether it is our own metal or not.

Q. But it is the same type of metal?

A. Yes.

Q. Is this the secondary metal that Alan Scott uses in extruding pipe?

A. That is correct.

Q. Does it use it for any other purpose?

A. It uses it for other purposes.

Q. Oh, it does. What other purposes?

A. For other extruded shapes that Allen Scott produces for its customers.

Q. Can you give me an indication as to what percentage of the so-called secondary that you have reconverted is used for conduit and what percentage—strike conduit—is used for aluminum pipe and what percentage is used for other products of Allen Scott?

A. Not being able to segregate the aluminum in the plant that well, I would say less than 5 per cent of our secondary is used in pipe.

Q. In aluminum pipe for conduit purposes?

[fol. 666] A. That is correct.

Mr. Melchior: No further questions.

Recross-examination

By Mr. Bergson:

Q. Mr. Aymes, what products does Allen Scott produce?

A. Aluminum extrusions.

Q. What form?

A. Whatever form the customer requires.

Q. Is that the major part of its business?

A. Yes, it is.

Q. And in that major part of its business does it use the same 400 thousand dollars worth of machinery that you were talking about in answer to Mr. Melchior's question?

A. Yes.

Mr. Bergson: No further questions.

The Court: Just one question. Witness, I am not certain I understand about these two companies. One of them is the Aluminum Rigid Conduit Company; is that right?

The Witness: That is correct.

The Court: And the other is the Allen Scott Company?

The Witness: That is correct.

[fol. 667] The Court: Do they, where are their places of business with reference to each other?

The Witness: They are in the same proximity.

The Court: Do they occupy entirely separate facilities or are they interchangeable?

The Witness: They operate separate facilities and at times some of the facilities are interchangeable like the recording book or the telephone switchboard.

The Court: How about any manufacturing facilities; are they interchangeable at all?

The Witness: No, sir.

[fol. 668] Q. So that all orders or all merchandise manufactured by Allen Scott are made in their own facility?

A. That's correct.

Q. And all pipe, I guess, is the only thing the other company manufactures, is made in its own facility?

A. That's correct.

Q. You mentioned you had to have extra space. Do you have separate buildings? How does that work?

A. Prior to 1960, or let's say November of 1959, we occupied five separate buildings.

Q. When you say we, who are you talking about?

A. Well, these various companies.

Q. I thought you didn't go into business until 1960.

A. The reason we did not go into business until 1960 is that Allen Scott occupied two buildings in separate locations, and in building a new plant, the conduit program was held up until the supplying company could function properly. The equipment was moved from December, 1959. Finally put back into working condition by April, May, June of 1960. Then that put us in the middle of the second [fol. 669] quarter by the time we started producing again and having a stock for the conduit company, that did not occur until the fourth quarter of 1960.

Q. Well, that's what confused me a little. You started to tell me something about 1959. This rigid conduit company did not start to produce until about the last quarter of 1960, as I understand it.

A. That's correct.

Q. All right. So that what happened before that? The companies were intermingled, or were they separate?

A. One was functioning, and the other was a projected company.

Q. I see. All right. Now, if I understand it right, in 1960, when the Rigid Conduit Company began to produce, they occupied some additional space in other words?

A. That's correct.

Q. They spread out into space that you might call their own.

A. Space was assigned and allotted for them, separate and distinct from the other operation. With its own equipment.

Q. Well, do you mean that the Aluminum Rigid [fol. 670] Conduit Company occupied space owned and controlled by the other company? Is that what you mean? When you said "alloted"——

A. Your question is one which leads me and brings in several additional companies. In other words, there are other companies that these companies rent space from.

Q. Well, that doesn't help either. These companies rent space from. Who is your landlord, if I may use the term? The Aluminum Rigid Conduit Company. Whom do you rent from?

A. I am trying to figure out which one. It does not rent space from Allen Scott. It rents space from Venimore.

Q. What is Venimore?

A. Venimore is a real estate corporation.

Q. Do they own the buildings?

A. Yes, sir.

Q. I see. And are they also connected by stock ownership or common directorship, officers, by either the Aluminum Rigid Conduit Corporation or the Allen Scott Company?

A. No, sir.

Q. They are entirely separate?

[fol. 671] A. Yes, sir.

Q. Now, are the other companies or concerns which occupy adjacent space controlled by either the same corporate ownership of either the Rigid Conduit or the Allen Scott?

A. I think so. I'm not sure.

Q. Well, you see, witness, in order to get anything out of your testimony I have to know something about it, because of course the success or failure of any company depends upon a lot of things. It depends upon competi-

tion. It depends upon overhead. It depends upon a lot of things. Now, are there any other companies engaged in any type of manufacture who are occupying any part of the same facilities as the Rigid Conduit Company and the Allen Scott Company?

A. By definition, what do you mean, "same facilities"?

Q. Well, I don't mean to be too tough on semantics at all. Are there companies in there that occupy part of the same building, for instance? I am going to let you tell us. What kind of an arrangement have you got down there?

[fol. 672] The Witness: I think it will solve your——

The Court: All right, tell us what it is.

The Witness: We have four companies, four distinct manufacturing companies. The oldest one is SeasonMaster, which is a manufacturer of aluminum building products. The second oldest company is Allen Scott Aluminum Corporation, which manufactures aluminum extrusions. Approximately 60 per cent for SeasonMaster and 40 per cent for the outside. For SeasonMaster competitors. The third oldest company is Aluminum Rigid Conduit and it buys tubing primarily from Allen Scott for the manufacture of conduit. Now, these first three companies that I have mentioned, there are walls or partitions in this building that we put up. What I started to tell you is that we basically had five buildings. In an attempt to reduce the overhead, to reduce all the additions that go in a unhealthy manufacturing company, we decided to put them as close in one area or combination of areas—To put them as close under one roof or combination of roofs in one area. This building is approximately 105 to 130 thousand square feet. It was put up in sections because all five buildings of five manufacturing facilities could not be [fol. 673] moved at one particular time. So they were moved over on a turntable basis.

The first company that was moved over was the aluminum extrusion company, Allen Scott, so that it could function properly. Then the second company that moved over was the aluminum fabrication company, SeasonMaster.

Now, SeasonMaster occupies a separate facility of manufacturing, separate by building, separate by docking space, separate by service. And this separation is basically what

is termed under the building code of a Class A fire wall, but there are methods that you can go from one building to another with a minimum of effort.

The space that Aluminum Rigid Conduit occupies might be defined as adjacent but not part of the Allen Scott facilities. Each one of these corporations pays rent to either another corporation or to a building corporation. I have to check to see how it was set up. In other words, the builder when he built these things set up many corporations as well, so I could not give you a definite answer.

Now, the fourth company we have is the anodizing company, that is called IDM Anodizing.

[fol. 674] The Court: What is that?

The Witness: It places an anodized coating on aluminum which retards the rate of corrosion.

The Court: Well,——

The Witness: Now, this is a processing company. Now, any one of those four companies are basically independent of the other. They buy from one another. The transaction is no different than the relationship between an outside customer and any one of its suppliers.

The Court: All right. Now, does this Season Good——

The Witness: SeasonMaster.

The Court: That is one I just heard of now, and the other is Ano——

The Witness: IDM, like IBM. I wish—IDM Anodizer.

The Court: Now both of them have to do with aluminum, too?

The Witness: Yes.

The Court: What is the stock ownership of the SeasonMaster Company?

The Witness: The same as Aluminum Rigid Conduit. The same as Allen Scott.

The Court: What is the stock ownership of [fol. 675] IDM Company?

The Witness: Same ownership.

The Court: What about the officers?

The Witness: Same officers. Same positions.

The Court: Well, with that kind of setup, Mr. Witness—how about the Board of Directors?

The Witness: Same Board of Directors.

The Court: With that type of setup you can easily control the profit or loss of any one of the companies, can't you?

The Witness: No, sir.

The Court: You can't?

The Witness: No, sir.

The Court: Well, how much of the President's salary is paid by the Allen Scott?

The Witness: None.

The Court: How much by Rigid Aluminum?

The Witness: One-tenth.

The Court: How much by SeasonMaster?

The Witness: 90 per cent.

The Court: And how much by IDM?

The Witness: Nothing.

[fol. 676] The Court: So that, for instance, with that example, the salary of this one officer is handled 90 per cent by one of these four companies and 10 per cent by another?

The Witness: Yes, because his duties and functions are in that particular company mostly.

The Court: I understand that. I don't question you. When you answered me, when companies like that are commonly owned, that they are not capable of affecting the profit and loss of each other, I am a little surprised because I always thought they could pretty easy. Now, as an example, they pay 90 per cent of the president's pay in this one corporation; is that right?

The Witness: Yes.

The Court: And 10 per cent in the other. And no percentage, no overhead, for a president in this IDM and Allen Scott?

The Witness: That is correct.

The Court: So that the overhead in those two companies are somewhat lower, that is, they don't have the item of a president's salary?

The Witness: But he still has an element of risk for his investment.

[fol. 677] The Court: I am not worrying about his risk,

I am just trying to figure out the officers, because, after all, this involves; and I repeat the proposition, I am a little surprised when you say it couldn't affect the profit and loss where there is common stock ownership. I am just trying to figure out how that happens. Now, I assume that the Board of Directors have the power of voting salaries; haven't they?

The Witness: Yes.

The Court: They have the power of allocating salaries.

The Witness: Yes, sir.

[fol. 678] Q. All right. From what companies do you draw salary?

A. I personally?

Q. Yes.

A. Allen Scott Aluminum and the anodizing company, IDM Anodizing.

Q. So you don't draw any salary fom Rigid Conduit Company at all?

A. No, sir.

Q. But the president does?

A. Yes, sir.

Q. How about the dividends that have been declared in the last two years on these companies?

A. There have been no dividends declared.

Q. By any company?

A. No, sir.

Q. All right. Is the stock owned other than by the officers and directors?

A. No, sir.

Q. So it is all—all the stock is in the hands of the officers or directors?

A. That's correct.

Q. So that the profit, assuming there was one, in any of these companies can be taken up by salaries [fol. 679] rather than dividends?

A. Not necessarily.

Q. No, not necessarily, but it can be done by a simple vote of those that own it?

A. Oh, but not in this particular case, or any of these cases. Salaries have not changed in the last three years.

Q. I didn't ask you that. That's what they can do. All of this is controlled by these three or four men, isn't it?

A. Yes.

Q. That's all I am getting at. They have the usual powers of the board of directors, and the usual powers of company ownership?

A. That's correct.

Q. That's all I am trying to ask you. Very simple. All right. Just one or two more questions. Seasonmaster does what?

A. Fabricates aluminum extrusions into building products. Building products are storm windows, storm doors, porch enclosures, bathtub enclosures—those things that go into home improvement within the building industry.

Q. Now, what does this other company, this [fol. 680] IDM?

A. The IDM Anodizing Company is a job shop contractor which anodizes aluminum extrusions. 60 percent for outside use, 40 percent for inside use, on any one of these which you call inside control companies.

Q. I suppose these companies do work for each other in the course of their business?

A. Yes, sir, but may I add one point. There are times during the year or our season whereby one of the producing companies cannot take care of another company's requirements. We therefore buy our additional requirements on the outside.

Q. I assume that's true; all depends upon whether you are busy or not. But they do work for each other?

A. They do.

Q. Who fixes the price of that work?

A. The competitive market price on the outside.

Q. Oh, no. Who fixes it? The board of directors?

A. Purchasing agent.

Q. So that he could control whether a company made or [fol. 681] lost money by the price that he charged for this interchanging work?

A. Yes.

Q. All right. That's all.

Mr. Melchior: May it please the Court, I am not sure

that the record reflects whether your Honor admitted Government Exhibits 493 and 494.

The Court: I think it does; if it doesn't, I will now admit them. I think I admitted them.

Mr. Melchior: Thank you.

PAUL A. NEHRING, called as a witness on behalf of the Government, being first duly sworn, testified as follows:

Direct examination.

By Mr. Mahaffie:

Q. Will you state your full name, please, sir, and your occupation?

A. Paul A. Nehring, president, Nehring Electrical Works. Manufacturers.

Q. Where is the Nehring Electrical Works located, sir?

A. DeKalb, Illinois.

[fol. 682] Q. Mr. Nehring, would you describe the product line of the Nehring Electrical Works?

A. Well, we manufacture electrical conductor, copper and aluminum wire and cable. Copper and steel insulated wire. And some fine wire that's very fine and insulated.

Q. By "fine wire" you mean, sir, insulated fine wire?

A. Yes, fine wire drawn and stranded.

Q. These are for use as electrical conductors?

A. Oh, yes, everything we make is for electrical conductors.

Q. Mr. Nehring, you stated you manufacture both aluminum and copper electrical conductor products?

A. Yes.

Q. In what form do you buy aluminum, sir?

A. In rods. Aluminum rods, for drawing into wire.

Q. Mr. Nehring, have you since approximately 1956 written any letters to any of your suppliers of aluminum rod concerning the relationship between the price of aluminum rod and the price of finished aluminum wire and cable products?

[fol. 683] A. Yes, to all of them; to the copper people

also, and told them verbally, trying to get the price down, which I have done on copper. It is perfectly natural to try to buy cheaper. My stock in trade.

Q. I hand you a document which has been marked Government Exhibit 424 for identification, sir, and I ask you if that is one of the letters of which you speak?

A. Yes, it is, and I might say I am ashamed of it. This letter was written—I'll tell you the reason for all those letters. And not that I expect a company like Aluminum Company to lower a price when there is a little price war on, on cable—a little company like mine—going to lower the price—it's almost laughable. The main reason of writing that, knowing C. B. Owen, Holloman, fine fellows, all fine fellows, you like to give them an order. It was written mainly for that purpose. Not expecting a lower price.

Q. Who is the letter addressed to?

A. C. B. Owen, now retired. Aluminum Company of America.

Q. What is the date of the letter?

[fol. 684] A. July 1st, 1957. Now, these aluminum rod salesmen don't sell cable, and they are all after me, calling on me to sell rods, which I like to give them orders when I can. The letters were written to let them know why I am not buying more rods, thinking I'm buying them elsewhere. Really, I am ashamed of those. They are not business letters at all.

The Court: You needn't be ashamed of them.

A. (Continuing) Trying to get a lower price.

Q. Mr. Nehring, is there any statement contained in this letter dated July 1st, 1957, which was not true at the time you wrote the letter?

A. No, it is all true.

OFFERS IN EVIDENCE

Mr. Mahaffie: I offer Government Exhibit 424 at this time.

Mr. Bergson: No objection.

The Court: Received.

(Government Exhibit 424 marked received.)

The Witness: What is in that principally?

Mr. Mahaffie: I'm sorry, I thought you had read it over.

[fol. 685] The Witness: You know, when I talk about aluminum cable selling cheaper, there might be—I wouldn't know exactly how much, and all that, unless——

Mr. Mahaffie: Well, why don't you take the time to look it over, and if there is anything which is misstated as of the time it was written we will correct the record on it.

The Witness: Yes. You see, when price changes take place on copper or aluminum, then the finished rod and the finished wire and the insulated wire and strand lowers also. But when there is a price war on, the raw materials don't decline because it is only a matter of a short time.

By Mr. Mahaffie:

Q. Well, am I correct, sir, that the statements in this letter were true at that time?

A. Yes. Places where I say a difference of so many cents a pound might not be just exactly——

Q. Might not be precisely accurate?

A. They were written mainly to let the salesmen [fol. 686] know why we weren't buying more rods. Not let them think we were buying them elsewhere.

Mr. Mahaffie: I offer at this time documents which have been marked as Government's Exhibits 425, 426 and 427 for identification. These, if I may, your Honor, are Alcoa documents which relate to the letter which was previously introduced. One of them is the answer to that letter.

Mr. Bergson: May I see those just a second?

Mr. Mahaffie: Yes.

[fol. 687] Mr. Bergson: No objection, Your Honor.

The Court: Received.

(Government's Exhibit 425, 426, and 427 for Identification received in evidence.)

By Mr. Mahaffie:

Q. Now, Mr. Nehring, I hand you a document which has been marked as Government Exhibit 428 for identification and I ask you, sir, if this also was one of the letters which we talked about previously?

A. Yes, it is.

Q. To whom was that letter written?

A. To C. B. Owen, Aluminuin Company of America.

Q. What is the date of it, Mr. Nehring?

A. July 16, 1957.

Q. Mr. Nehring, with respect to that letter dated July 16, 1957, are there any statements contained therein which were not true at the time they were written?

A. No, unless it is a difference in price because of some equating, you know, some would be a difference in price. Below what we used to call the market. Because when the market changes, then all materials change generally first, so it is just a case of lower prices to get business in raw materials, because it don't last long. I always understood the Aluminum Company does not cut prices, but it [fol. 688] might meet a price when it is going out, but it don't last long and they are back in the harness again.

Mr. Mahaffie: I offer Government Exhibit 428.

Mr. Bergson: I don't object to the admission of the document as a whole. The document does contain hearsay statements to which I do object.

Mr. Mahaffie: May I ask whether your objection is to the fourth paragraph of this document?

Mr. Bergson: No, I don't care about that one.

Mr. Mahaffie: Which one do you——

Mr. Bergson: The third paragraph.

The Court: What does it say?

Mr. Bergson: It says: "Mighty strange there was such competition in ACSR and not in rods or pig aluminum. It certainly appears that the price of rods and pig is agreed upon by the large producers."

I don't think that this letter is competent to prove anything in that regard.

The Court: Of course, we are not trying that.

[fol. 689] Mr. Mahaffie: No, sir. I don't think it has much probative value, but I don't think it is hearsay.

The Court: Well, I think it certainly is.

Mr. Mahaffie: It is perhaps opinion.

The Court: Well, what is opinion?

Mr. Mahaffie: Well, I am perfectly willing to offer this document without that statement.

The Court: All right. I will receive it without the statement.

(Government's Exhibit 428 for Identification received in evidence.)

Mr. Mahaffie: I offer at this time a document which has been marked as Government's Exhibit 429 for identification. This, your Honor, again is an internal ALCOA document relating to Exhibit 428 which has just been offered.

Mr. Bergson: No objection.

The Court: Received.

(Government's Exhibit No. 429 for Identification received in evidence.)

By Mr. Mahaffie:

Q. Now, Mr. Nehring, I hand you a document which has [fol. 690] been marked as Government Exhibit 430 for Identification, and ask you again, sir, if that is one of the letters to which you refer?

A. It is.

Q. What is the date of the document?

A. January 28, 1958.

Q. And to whom is the letter addressed?

A. J. B. Holloman, Aluminum Company.

Q. Now, Mr. Nehring, are there any statements in this letter which were not true at the time you wrote the letter?

A. Not unless it is about cents per pound, because there were many quotations in it and we don't know what customers tell us, we are not always sure of it.

Q. In other words, where you have quoted or stated in the third line of this letter, you said, ". . . we should have a rod price from 4 cents to 6 cents a pound lower than the present price of aluminum rods." You figure 4 to 6 might not be completely accurate?

A. When it was being sold before way below market, but we never found ALCOA quoting anything like that because I figure they have more support than any company in the game, including my own company. I actually do.

[fol. 691] Q. Now, Mr. Nehring, directing your attention to the second line of this letter, the sentence begins, "According to the going price of aluminum cable and for us to meet the highest price . . ."?

A. That is a mistake. That should be the "lowest."

Q. I see, that is what could be a kind of typographical error?

A. Yes.

Q. With that exception, Mr. Nehring, are there any mistakes or errors in the letter?

A. Here I said something about copper varied 2½ cents. That isn't very often. Now and then we have the same thing with copper. We buy it cheaper than domestic producers. We did it on aluminum but it didn't work.

Mr. Mahaffie: I offer——

The Witness: Not only did ALCOA but all of them.

Mr. Mahaffie: I offer Government's Exhibit 430 in evidence.

Mr. Bergson: No objection.

The Court: Received.

(Government's Exhibit No. 430 for Identification received in evidence.)

[fol. 692] By Mr. Mahaffie:

Q. Mr. Nehring, I hand you a document which has been marked as Government's Exhibit 431 for identification and again, sir, I ask you if that is one of the letters to which you refer?

A. Yes, to Holloman, Aluminum Company, February 13, 1958.

Q. All right, sir, are there any statements in this letter which were not true at the time you made them?

A. No, I guess not. Yes. When there was a shortage of steel, I had plenty of steel coming in. Eventually we had orders by the carload and I couldn't use it and I asked ALCOA to help me out. I furnished the steel and they furnished the aluminum and labor and shipped direct to our customers. Here I refer to copper being a little cheaper by—you know, maybe sometimes I would get it from smelters or refiners, on copper only.

Q. Well, the statements in this letter are——

A. Just about correct, yes. Just a little difference in figures.

Q. Other than the matter of difference in figures.

A. These prices will vary often when somebody starts cutting the price, and when the Government bought eleven [fol. 693] or twelve million pounds and Reynolds Metal was over one hundred thousand below the biggest bidder. The wildest thing I saw in my sixty years of business.

Q. This is in this recent year?

A. Yes.

Mr. Mahaffie: I offer Government's 431.

Mr. Bergson: I have no objection to the admissibility of the document as such, but I do object to the second sentence in paragraph 2 which is obviously hearsay.

The Court: What does it say?

Mr. Bergson: It says "It appears that the market is rigged against us, and we are talking plain about it."

The Court: Yes, we better keep right out of this case. You don't care about that.

Mr. Mahaffie: No, sir. I am not offering it to prove that the market was rigged.

The Court: All right.

Mr. Bergson: No objection under those circumstances.

The Court: All right, received.

[fol. 694] (Government's Exhibit 431 for Identification received in evidence.)

By Mr. Mahaffie:

Q. Mr. Nehring, I hand you another document which has been marked as Government Exhibit 432 for Identification, and again I ask you, sir, if this is one of the letters to which you referred?

A. Yes. Aluminum Company. J. B. Holloman, February 27, 1958.

Q. Now, directing your attention, Mr. Nehring, to the second paragraph, second sentence, which reads, "This is due to the spread between rods and finished aluminum cable, and the spread of about 8½ cents a pound between the ingots and rods." Is that sentence correct as written?

A. Probably close to it. But you see these other companies selling it, you know what we call a white sale or buyer's market. Aluminum Company never cut price that I ever found out. But, as I said, it was mainly to satisfy their salesmen.

Q. Are the statements made in this letter of February 27, 1958, or were those statements true at the time they were written?

A. Well, yes. There isn't anything to it, except telling you why we are, why we couldn't buy rods because prices are so low. What is this last one here?

[fol. 695] Q. Excuse me, sir.

A. (Hands document to counsel)

Mr. Mahaffie: I offer Government's Exhibit 432.

Mr. Bergson: No objection.

The Court: Received.

(Government's Exhibit 432 for Identification received in evidence.)

Q. Mr. Nehring, I show you one more letter which has been marked as Government's Exhibit 433 for identification. I ask you if this is one of the letters to which you referred?

A. Yes. J. M. Holloman, Aluminum Company of America, April 17, 1959.

Q. Are the statements contained in this letter, or were those statements true at the time they were written?

A. Well, I don't just remember this. This is something about error in quotation and it was revised and requoted by them.

Q. What about the second paragraph, sir; is that correct?

A. Yes. When there is any price war on we always made money with the spread, whatever it was, in both copper and aluminum.

[fol. 696] Mr. Mahaffie: I will offer Government's Exhibit 433.

Mr. Bergson: No objection.

The Court: Received.

(Government's Exhibit 433 for Identification received in evidence.)

The Court: Are you through with the letters, Mr. Mahaffie?

Mr. Mahaffie: I am finished with direct examination, Your Honor.

The Court: All right. We will recess until 2:15.

The Clerk: The Court is in recess until 2:15.

(Whereupon, at 12:55 p.m. o'clock, an adjournment was taken to 2:15 p.m. o'clock of the same day.)

[fol. 697] AFTERNOON SESSION

APPEARANCES: Same as the Morning Session.

Mr. Mahaffie: The Government has no further questions of this witness, Your Honor.

The Court: All right, cross-examination.

Cross-examination.

By Mr. Bergson:

Q. Mr. Nehring, you said you have been in the wire and cable business 50 years?

A. Yes. Worked in it a total of 60 years.

Q. Sixty years. My word. When you first went into the wire and cable business what metal did you use as conductor metal for your product?

A. Copper only.

Q. When did you first start using aluminum as a conductor metal?

A. Well, I believe nearly 25 years ago. We were second in the States to make it.

Q. That would be in the 1930s?

A. Oh, no, probably 1935 or a little later. We wanted to start it earlier but ALCOA says, "We're the only rod makers," and they were the only ones. They said, "You [fol. 698] better not start it. It will look as though we can hold up the price on it."

Q. When you began making aluminum wire and cable did you use the same machinery you had used in making copper wire cable?

A. Yes, only a different solution for drawing and cooling.

Q. At the present time, is your equipment interchange-

able so that you can draw strand and cover copper on the same machines that you do with aluminum?

A. Yes.

Q. In your direct examination you were talking about the purchase of rods. Aluminum rods. Who supplies aluminum rods to you?

A. Well, ALCOA aluminum company. SouthWire. Kaiser, some, but not really. They make it differently, and they are so far away I guess they don't have too much capacity. And Anaconda Aluminum Company. Had very little from them.

Q. Do you buy a substantial quantity of rod from South Wire?

A. Oh, yes, like a hundred thousand pounds at a time, or more, and sometimes fifty.

Q. Fifty thousand?

A. Yes.

Q. You know that this case concerns the acquisition of [fol. 699] Rome Cable by ALCOA?

A. So I understand.

Q. That acquisition, in case you don't remember, took place in March and the first part of April, 1959. Has that acquisition had any effect on your business?

A. Not at all, no.

Q. Mr. Nehring, during the course of the Government's investigation of this case, were you asked to supply certain statistical information to the Government?

A. I don't recall of any, no.

Mr. Beigson: Would you mark as Defendants' Exhibit AR-10 for Identification a letter dated August 19, 1960, from Nehring Electric Works to Mr. Samuel Karp of the Department of Justice, Washington, D. C., which letter was signed by, for the Electric Works, by Paul Nehring, Jr., Vice-President?

(Letter dated August 19, 1960, marked as Defendants' Exhibit AR-10 for identification.)

Q. I show you defendants' Exhibit AR-10 for identification and ask you if that signature is the signature of Mr. Paul Nehring, Jr., who is your son, I take it?

A. Yes. What is the date?

Q. August 19, 1960. That letter has attached to it

[fol. 700] a tabulation of figures showing Nehring's production in bare aluminum wire, insulated aluminum wire and cable and bare ACSR?

A. Yes.

Q. And bare aluminum cable; is that correct?

A. Well, I don't know. It seems we make some reports out about aluminum. It is very simple for us to do, but I don't know offhand who to, and I have been out of the office quite a while.

Q. It looks like they did it here anyway.

A. Who is this to?

Q. To the Department of Justice. Now, this tabulation which is attached to the letter just mentioned, shows that in the year 1958, your shipments of aluminum wire and cable were 1,094,000 pounds; is that right?

A. Well, I imagine it is, because I know there was one year when it was very slack.

Q. And in 1959, the year of the merger, three-quarters of which was after the merger, shows 4,473,000 pounds. And the first quarter of 1960 shows 902,000 pounds?

A. That's right.

Mr. Bergson: I think that is all. Thank you. Wait a minute, the Government may have something.

[fol. 701] Mr. Mahaffie: Just one moment, Mr. Nehring.

Redirect examination.

By Mr. Mahaffie:

Q. Mr. Nehring, with reference to this document which was marked as AR-10 for Identification, I wonder, sir, if you would look at the tabulation that Mr. Bergson referred here to and state the total shown for the year 1957? You recall Mr. Bergson asked you to state '58 and '59.

A. 4,079,000 in '57.

Mr. Mahaffie: Thank you, sir. No further questions.

(Witness excused.)

Mr. Melchior: Mr. Roger Schoerner.

ROGER J. SCHOERNER, called as a witness in behalf of the Government, being first duly sworn, testified as follows:

Direct examination.

By Mr. Melchior:

Q. Will you state your full name and your place of employment?

A. Roger John Schoerner; Southwire Company, Carrollton, Georgia.

Q. What is your title with that company?

[fol. 702] A. Vice-President.

Q. And how long have you been employed by that company?

A. Since its inception in 1950.

Q. Did you have any prior experience in the wire and — field?

A. Yes.

Q. Prior to your employment with Southwire?

A. I worked with Anaconda Copper Company in Hastings-on-the-Hudson, New York.

Q. Where is Southwire located?

A. In Carrollton, Georgia, 50 miles due west of Atlanta.

Q. In general, what are the line of products sold by Southwire, in a general way?

A. We generally manufacture a line of products commonly known as transmission and distribution, and also building wire; some alloy products, in the alloy field, some mechanical. Principally we are in the electrical transmission and distribution field.

Q. Do you sell E.C. rod?

A. Yes, we do sell E.C. rod.

Q. Do you sell service drop cable?

A. Yes, we do.

Q. Would you state what service drop cable is?

[fol. 702a] A. Service drop cable is a term generally referred to for the cable that comes from a power pole to the weather head on house.

[fol. 703] Q. Would you describe its construction?

A. The most popular construction is one currently being made with aluminum, two insulated conductors insulated with any of several materials and one bare neutral. It is

commonly triplex. It also is made in duplex and quadruplex, but is commonly referred to as triplex.

Q. Under this construction, the wires are twisted?

A. Twisted together, yes.

Q. And you describe this as service drop cable?

A. Yes.

Q. Are there any other types of wire or cable that are sometimes used as a substitute for this same purpose?

A. Yes, there are other constructions that are used, and this construction is one that generally replaces an item we still sell some of, which is known as service wire. This was usually in copper weatherproof construction, but it also is currently made with some other newer insulating materials.

Q. What would you describe this other product as?

[fol. 704] A. Weatherproof wire.

Q. Wire, as opposed to cable?

A. Generally, yes.

Q. What is the difference between wire and cable, if you know?

A. They are terms that are by different people used perhaps in a different way. Generally we would think of cable as a multi-conductor, or a stranded, larger unit, and wire would generally be construed as being a solid type single conductor.

Q. What are the approximate sales of your company annually?

A. They have grown regularly. Last year they were something over twenty million dollars.

Q. And what is the area in which your company operates?

A. We concentrate in the Southeast. However, we do sell in nearly all of the states.

Q. And where are your plant or plants located?

A. In the states we just have one plant, it is located at Car---lton, Georgia. We have a small subsidiary operation in Brazil.

Q. I believe you stated among the products your company manufactures and sells EC rod?

[fol. 705] A. Correct.

Q. What raw material do you use in making EC rod?

A. We purchase 99.5 grade aluminum pig and/or ingot

as it is sometimes referred to. It would be commonly referred to as high purity ingot.

Q. I see. Where do you purchase this commodity?

A. From prime producers both in this country and in the world marketplace.

Q. You purchase this product overseas also?

A. Yes.

Q. How long have you been purchasing aluminum ingot overseas?

A. Oh, perhaps eight or nine years. When aluminum was difficult or was short in supply, back in the early fifties, we first started purchasing on the foreign market.

Q. You had difficulty securing supplies from domestic producers?

A. Yes, we did.

Q. You went overseas to secure supplies?

A. Yes.

Q. Are you still purchasing quantities overseas?

[fol. 706] A. Yes, we are. There was an interim period, however, where we purchased most of our product raw materials domestically, but more recently we have again been purchasing considerable quantities on the world marketplace.

Q. During what period of time was this when you were purchasing most of your materials from domestic producers?

A. I would guess it was after Korea, between, oh, perhaps 1954 and 1957. In this period.

Q. During this period you were in a position to secure ample supplies from domestic producers?

A. Yes.

Q. Then did you begin securing supplies from foreign producers again?

A. Yes.

Q. At what period of time?

A. I believe in 1957 we may have started rather heavily again. In 1958 on through to the current time.

Q. You are still procuring substantial quantities overseas?

A. Yes.

Q. Would you explain why you buy ingot overseas rather than from domestic companies?

[fol. 707] A. Right now the price is cheaper, and the quality is in some cases, the purity is higher; but generally I would say price is the main factor.

Q. Price is the main factor?

A. Yes.

Q. Now, are there any problems, from a business standpoint, in your view, in procuring primary aluminum from foreign producers?

A. There are one or two. The main objection is in dealing with some customers who have a feeling about our purchase specifications, and this presents a problem in some cases.

Q. Do you feel this feeling on the part of your customers in any way affects your sales to them?

Mr. Bergson: I object to the form of that question.

The Court: Yes. If I understand the question you are asking him to give a feeling not of himself but of somebody else.

Q. I will rephrase the question. Have any of your customers ever expressed to you a view with respect to purchasing from you rod or other product made from foreign produced aluminum?

A. Yes, they have.

[fol. 708] Q. What have they stated?

Mr. Bergson: I object, your Honor.

The Court: Well, we better have the time, the place and so on. Nobody can meet such a statement without any basis.

Q. Do you recall a specific incident when a particular customer may have made a comment with respect to foreign ingot to you?

A. Yes, we just happen to have had one in about the last two weeks where a customer was questioning our source of supply, and in this particular case we have not completely satisfied him that our quality and service will be adequate. However, I am certain we will convince him that our product will meet specifications and will perform adequately.

Q. Did his question have to do with the fact of foreign produced ingot?

A. Yes, it did.

Q. Do you presently have any supply contract for the purchase of aluminum ingot from domestic producers?

A. We are purchasing domestic, but we do not have any regular supply contract.

[fol. 709] Q. Have you ever acquired aluminum ingot from Alcoa?

A. Yes, we have.

Q. Can you state—excuse me.

A. Well, I presume you want to know when.

Q. That's what I was going to ask.

A. In our early years we purchased some rod from Alcoa, and when we started on rod mill we purchased pig from Alcoa, or I should say through Alcoa. I believe nearly all of our material we obtained from Alcoa was available to us in government set-aside programs however.

Q. Would you explain what this government set-aside program is, if you know?

A. I am just a little bit hazy on it at the moment, but it hinged around new facilities that were obtained through fast tax write-offs either during Korea or prior to Korea, and I believe it was in a small business set-aside that we participated. I am frankly a little bit hazy on whether it was a small business set-aside or not.

Q. Is it your understanding that the aluminum you acquired from Alcoa during this period came pursuant to those government requirements?

[fol. 710] A. Yes, I recall most of our—well, most of our orders or all of our acknowledgments clearly defined this was not Alcoa metal, but was set-aside metal.

Q. I see. Do you know whether or not Alcoa ever sold to you aluminum pig which was not set-aside pig?

A. I believe they have sold us some small quantities. My recollection is, however, that they were very small in relation to our requirements.

Q. Did you desire to purchase from them larger quantities than you did secure from them?

A. We have on several occasions, yes.

Q. What was their response to your request for supplies of aluminum?

A. Well, generally their pig and rod, or aluminum was

used in their own fabrication operations, and it was my understanding they were preferring to sell a finished product rather than back at the pig stage.

[fol. 711] Mr. Bergson: I move to strike that answer, Your Honor.

The Court: Well, it is not quite responsive. No time fixed for it at all. I don't know whether this is now under the pressure of war time.

Mr. Melchior: I will inquire of the witness.

The Court: Yes. When this comes in like that it proves nothing to me.

By Mr. Melchior:

Q. Can you state the period of time, the approximate period of time when you did acquire, or attempted to acquire from ALCOA aluminum pig, other than set aside pig.

A. Well, the period immediately following, the first time was back, right after Korea, I would say, was the first time when ALCOA handled their sales program on an historical purchasing basis and we, of course, had no purchasing pattern. And at various times during periods of shortage we attempted to secure raw materials from ALCOA and other prime producers.

Q. This was generally during periods of shortage, you say?

[fol. 712] A. Yes, generally it was in periods of shortage. In periods of over-supply or of an excess of aluminum, ALCOA has offered pig to us and has offered pig contracts to us.

Q. Have there been a number of times since Korea when aluminum pig has been in short supply, to your knowledge?

A. There was one period, I believe, the pig did not become in over-supply until 1957 or '58. Until then pig was either in balance or in short supply.

Q. Who were your most significant competitors in the field of aluminum wire and cable, Mr. Schoerner?

A. There are eight or nine of them, all of the prime producers, or nearly all of the prime producers, ALCOA, Kaiser, Reynolds, General Cable, Anaconda, Olin, Nehring, Central Cable.

Q. Now, which of those competitors that you have listed are not producers of primary aluminum or primary copper?

A. Central Cable and Nehring Electrical.

Q. And all the other competitors that you have listed are primary producers of either aluminum and copper, or both?

A. In the case of General Cable, I believe it is not a direct relationship but, through intercompany [fol. 713] common stock ownership.

Mr. Bergson: I think it is conclusory on the witness' part.

The Court: Yes. If he doesn't know. I think you better say, Witness, because I can't do much with a statement "I believe" something. I don't know whether it is true or not.

Q. Do you know whether General Cable has——

A. I know there is a relationship between General Cable and A.R. & R. and Revere.

Q. What sort of a relationship?

A. I don't recall the exact percentage, but I believe it is about a 25 per cent ownership.

Q. Is this a stock relationship?

A. Yes.

Q. But you are not sure what the precise stock relationship is?

A. No. The others are prime producers.

Q. I see. Now, how do you purchase domestically produced aluminum ingot?

A. On a delivered price basis, price in effect at the time of shipment.

Q. I didn't hear your last statement.

A. Price in effect at the time of shipment.

Q. At the time of shipment?

[fol. 714] A. Yes.

Q. Do you buy on a pound or ton basis?

A. Usually by the pound.

Q. By the pound?

A. The million pounds.

Q. And you buy it in ingot form, is that it?

A. Yes.

Q. Now, how do you sell your aluminum wire and cable, which is made from the primary ingot?

A. We sell it on a delivered basis. The pricing books would generally say price in effect at the time of shipment, but for competitive reasons in recent years firm prices are usually or frequently developed.

Q. I am not sure I understand your last response.

A. A large number of our sales are on a firm price basis. Some are in effect on a price firm shipment.

Q. Is that firm at the time of making contract?

A. Yes. Generally the contracts would be firm against increase, but with an acceleration down, if the market goes down or competition moves the market down.

Q. Are we to understand when you make a sales contract for the sale of aluminum wire and cable, it is firm except in certain circumstances?

A. Yes.

[fol. 715] Q. Will you explain that?

A. Firm against increase is another way of saying it.

Q. You can't increase the price?

A. That's right. But if the market goes down you would be expected to meet market prices.

Q. I see. On occasion has the market gone down since you have made a so-called firm contract for aluminum wire and cable?

A. We have had cases, yes.

Q. Have you found it necessary to drop your price then?

A. Yes.

Q. In purchasing your ingot do you have the same option? Is that a firm price?

A. On domestic pig.

Q. And ingot has been sold on the price in effect at the time of shipment basis?

A. At the time of shipment.

Q. Has the price of ingot gone down materially during the period since you have been in business from 1950 to date?

A. No. General trend has been up since 1950.

Q. I see. Is the price of ingot today higher than it was in 1950, domestic ingot?

A. Yes.

Q. What would you say as to the price of aluminum wire

and cable generally today as compared to what it was in [fol. 716] the market in 1950, if you know?

A. Well, the price is considerably higher than it was in 1950. However, in relation to the price of ingot the differential has many times been narrowed, if I make myself clear.

Q. Does this mean that your opportunity for profit has been lessened in any way?

A. Yes.

Q. Now, you listed a number of wire and cable products that you manufactured, and I believe you listed transmission and distribution wire and cable?

A. Yes.

Q. Both aluminum and copper?

A. Yes.

Q. And building wire?

A. Yes.

Q. Service drop?

A. Yes.

Q. Service entrance?

A. That is correct.

Q. Does this make up pretty much the bulk of your sales of conductor wire?

A. Yes, plus rod. We sell E.C. rod. We also handle copper rod.

Q. Directing your attention solely now to conductor [fol. 717] wire and cable as opposed to rod?

A. Yes. This constitutes the majority of our sales.

Q. And who are your customers for the majority of these products?

A. Electrical utilities.

Q. Electrical utilities. Now, if you can, will you state what the most important factor of cost is involved in the manufacture of aluminum wire and cable?

A. The cost of aluminum.

Q. The cost of the aluminum conductor?

A. Right.

Q. I am going to ask you to estimate, if you can, in the rough percentage, as to approximately what the percentage may be. I know it would vary from wire to wire, but in general?

A. Oh, 75 to 80 per cent.

Q. I am directing your attention to copper wire and cable products, which you sell, could you find an estimate as to what the approximate share of the total sales price may be made up of the metal conductor?

A. Approximately the same. Perhaps a little higher.

Q. I see.

A. Perhaps 85 per cent.

Q. Now, over the years that you have been in the conductor wire and cable business, you have changed your [fol. 718] price on aluminum wire from time to time?

A. Yes, we have.

Q. Generally, it prompts a change in the price of aluminum conductor wire, what would be the most significant factor which would bring about a change?

A. Well, one factor, of course, is the price of base metal, the price of aluminum pig.

Q. Aluminum pig?

A. Yes.

Q. And that is an important factor?

A. Oh, yes.

Q. If the price of pig goes up, would it be expected the price of your aluminum wire and cable products would go up, if other factors remain the same?

A. Yes.

Q. Now, directing your attention to copper wire and cable, what would you say the most important cost factor in the production of copper wire and cable is?

A. The base metal, the copper.

Q. The copper. In other words, if the cost of the electrolytic copper goes up, other factors remaining the same, what would happen to the price of copper conductor wire?

A. It would generally go up.

[fol. 719] Q. Now, can you generally compare the price of conductor wire and cable made of aluminum with the price of conductor wire and cable made of copper and tell me if you would compare conductors which would do the same approximate type of job or what the price relationship between the two would be? Is one higher than the other or are they about the same?

A. No. Aluminum would be considerably cheaper on an equal job basis.

Q. In other words, to do a particular job if you were

buying aluminum conductor or copper conductor, do I understand your answer to be that aluminum would be considerably cheaper?

A. Yes. In many cases half the price.

Q. I see. Now, I would like you to tell me what would happen if we had this type of aluminum conductor and copper conductor to do a particular job, and the price of the copper conductor went up, would the price of aluminum conductor necessarily follow from your experience?

A. No.

Q. In other words, is there much relationship between the price of the aluminum conductor and the price of the copper conductor?

[fol. 720] A. I don't feel there is any direct relationship. Of course, the general economic conditions that might affect one metal might be affecting the same metal, but I think item by item, I don't think there is any relationship.

Q. In other words, the response of the copper metal and aluminum metal is not very great. Is that your conclusion?

A. Yes.

Q. Now, you said that I believe a large percentage of the wire and cable products that you manufacture are sold to utilities, and among these products which you sell are transmission wire and cable, distribution wire and cable?

A. Yes.

Q. And service drop?

A. Yes.

Q. Wire and cable. Now, from your experience in selling these products to utilities and others, to what extent is the wire and cable that you sell for overhead transmission made of aluminum?

A. Aluminum has virtually taken over 100 per cent of the market, or say nearly 100 per cent.

Q. For overhead transmission?

A. Yes.

[fol. 721] Q. Would you make the same comment with respect to the wire and cable you sell for overhead distribution?

A. It has taken over a large portion, but I would, I do not feel it is quite as much. There still is some copper used and maybe 80 per cent aluminum or 90 per cent aluminum.

Q. 85 or 90 per cent would be aluminum?

A. Yes.

Q. Now, with respect to service drop cable, which you earlier described as being of the multiplex or triplex variety, to what extent is the wire and cable of that sort you sell made of aluminum?

A. Well, in our case it is virtually above 90 per cent now. A very large per cent. Probably as much as 95 per cent.

Q. And the service drop cable is the type of cable that is used overhead?

A. Yes.

Q. Now, directing your attention to insulated and covered distribution wire and cable made from aluminum—strike the question, please.

Do you ever sell aluminum wire and cable products in conjunction with other products?

A. Yes, we do.

Q. To what extent do you sell this?

[fol. 722] A. Well, we try to, this is one of our selling points, we try to sell with copper, steel, cable accessories, ground wire, and this would be the general categories.

Q. This is a means you have of doing business?

A. Yes.

Q. You feel that you can make sales more easily by offering your customer a broader line of products?

Mr. Bergson: That is a leading question, Your Honor.

The Court: Well, overruled. I will take it.

Q. You may answer the question.

A. Yes.

[fol. 723] Q. Are these accessories that you sell in conjunction with your conductor wire and cable important products in your sales effort?

The Court: Financial-wise, or what do you mean, important?

Mr. Melchior: From a sales standpoint.

The Court: You mean dollars?

Mr. Melchior: Dollar-wise.

A. I feel they should be and could be. More recently our accessory volume has not been in relation to our wire volume.

Mr. Bergson: I don't think that is a responsive answer.

Q. I am not sure what your answer was.

A. Would you give me that question again, please?

Q. All right. Are the accessories which you sell along with your conductor wire and cable products from a monetary financial standpoint an important part of your business?

A. At the present time our accessory sales are not an important part of our business. In past years they have been an important part.

Q. Now, do you manufacture very many of these [fol. 724] accessories which you sell?

A. No, we do not.

Q. How do you procure these?

A. We purchase them from either Alcoa—or, I should modify that—in that we obtain them through Alcoa currently as an agent on an agency agreement sale rather than a purchase sale, and from four or five other independent fabricators of accessory items to round out our line.

Q. How long have you been purchasing these products?

A. Oh, ever since we started in 1950. When we first started. We started purchasing accessory items to round out our line.

Q. Who did you purchase them from in 1950?

A. We purchased them nearly exclusively from Alcoa.

Q. What percent of your purchases back in 1950, 1951, 1952, the early years of your company, what percent of your accessories did you purchase from Alcoa, if you know?

A. We purchased the majority—I would guess 80 percent Alcoa, 20 percent other suppliers.

Q. Were there very many suppliers of accessories [fol. 725] in those days of this type?

A. I believe Alcoa was the only company producing a complete line of aluminum accessories.

Q. Now, have you continued to purchase these accessories from Alcoa continuously from 1950 on?

A. No. Some few years back, I would just guess perhaps 1956 or 19[illegible], somewhere in there Alcoa changed its sales policy and instead of selling us accessories for resale, set us up as an agent and we then handled their accessories on an agency basis.

Q. From your standpoint, do you consider this as satisfactory as purchasing the accessories outright?

A. No, this is a very undesirable arrangement as far as we were concerned, because it put us in the same pricing basis as the distributors to whom we had to sell the products, so it virtually removed any element of profit for our company.

Q. Have you since that date been able to buy these accessories from Alcoa, to purchase them as opposed to this agency arrangement?

A. We have not.

Q. You have not. Are you still acting as agent for Alcoa in this respect?

[fol. 726] A. Yes, we are.

Q. Now, are there other producers or other sellers of accessories in this country?

A. Yes, there are. I don't believe any of them have as complete a line, but by purchasing from two or three other suppliers, the whole line now can be developed to be competitive.

Q. By resorting to purchases from several, two or three companies, you can work out a full line of accessories?

A. I believe that's correct, yes.

Q. Is that your testimony?

A. Yes.

Q. Does Alcoa still have a full line of accessories? Does it still offer a full line of accessories?

A. Yes.

Q. But does not offer them for sale to you; is that correct?

A. That's correct.

Q. Now, does the fact that you must acquire accessories from Alcoa on this agency arrangement, or the fact that you have to, in order to get a full line of accessories, pur-

[fol. 727] chase from two or more companies in order to get all your requirements—does this affect you in your business in any way? Does it affect your profit?

Mr. Bergson: Your Honor, I can't fathom the relevancy of this acquisition.

The Court: Well, I can't either.

(The pending question was read by the reporter.)

Mr. Melchior: We are trying to show, your Honor, that in order for South Wire to compete effectively in getting wire and cable contracts it will be necessary on occasion for them to offer not only conductor wire and cable but these very valuable and necessary accessories. Now, South Wire does not produce these accessories, South Wire must acquire them from others. According to the testimony, the only company domestically who has a full line for sale, or who manufactures a full line, is Alcoa. And Alcoa, of course, according to the testimony, will not make these available to South Wire except under an agency arrange-
[fol. 728] ment. And we think this is another indication of some of the practices utilized by Alcoa and other integrated companies in a manner which affects market conditions and makes life more difficult, makes it a competitive life for non-integrated producers of wire and cable, and precarious and difficult. This is the relevance of this line of questioning.

The Court: It is quite a ways out in left field.

Mr. Melchior: We feel it is directly involved, because——

The Court: Look at all the rest of these companies in this country in the same position as South Wire.

Mr. Melchior: I am not so sure there are so many companies left in this position.

The Court: I realize no company is exactly alike. This gentleman testifying this morning that had the Rigid Conduit, is it your argument that he should have this complete line of accessories?

[fol. 729] Mr. Melchior: No. What we are trying to show by most of this testimony, your Honor, is this. We are first trying to show, we are going to try to show market conditions in the wire and cable field, and after we have shown what the competitive impediments and hazards faced by the non-integrated producers in this field are, we will then attempt to show that the dominance of Alcoa against the backdrop of these competitive conditions is magnified by the addition of Rome's facilities to Alcoa's. In other words, we look at the economic conditions first, and then see what the addition of Rome to Alcoa will do to it.

The Court: What is the question?

(The pending question again read by the reporter.)

By Mr. Melchior:

Q. Do you understand the question, Mr. Schoerner?

A. I believe so.

Q. Can you answer it?

[fol. 730] A. It has affected our profits in the past, yes.

Q. Can you cite to the Court any specific instances wherein your inability to secure adequate supply, adequate and timely supplies of accessories may have been instrumental in your losing a particular contract?

Mr. Bergson: I object, your Honor. That is highly speculative.

The Court: Sustained. Every day, in every business in the world, I suppose that happens. I don't see how that gets down to what we are involved in here.

Mr. Melchior: Well, the question was——

The Court: If a contractor can't get a steamshovel, he may lose a contract. I suppose it happens every day. I can't think of a business in the world where it doesn't happen.

Mr. Melchior: But here we have the situation where, if the witness would be permitted to testify, he may be able to show that he could not bid successfully on a particular [fol. 731] contract because he was unable to procure accessories and Alcoa was the company that had the key to that.

The Court: Well, I don't know how tight a key they have got. This witness tells us he can get the same things by dealing with two or three other companies. By taking part of a line from Kaiser, part from Reynolds, part from somebody else, he has the same thing.

Do these other companies also work on this agency agreement too?

The Witness: I don't know. I believe not. As far as I know, none of the others do.

The Court: So that as far as you know, you can obtain these accessories by an arrangement with any two or three of those companies whose combined merchandise would cover the whole line of accessories.

The Witness: Yes, it is possible, in many cases it is difficult, and some cases impractical, but it's possible and we have done it.

By Mr. Melchior:

[fol. 732] Q. Is it more expensive to do it?

A. Yes, it is more expensive.

The Court: Why is it more expensive?

The Witness: Well, one time I spent nearly a week of my personal time trying to put together a little package, between Italy and the States and all around, so that it becomes a much more cumbersome way of doing business.

The Court: Oh, sure, we all know you get into those kind of things where you deal with Italy, Germany, or somewhere else. If you only have to spend a week of your time on it, you are lucky.

Mr. Melchior: We think the important thing in this testimony, your Honor, is that the company has to go overseas to get these products when there is a company who has——

The Court: Counsel, you are off on another tangent again. We are not overseas at all. All we are talking about is an [fol. 733] agency agreement whereby a full line can be obtained, and a private agreement or a personal agreement from two or three, where the same thing can be obtained. That's all we are talking about.

Mr. Bergson: I have heard Mr. Melchior on two or three occasions during this trial talk about the trials and tribulations of going overseas. I don't know of anything in the anti-trust laws that says you have got to go overseas or you don't have to go overseas. If it is there, it is there. It doesn't make any difference where.

The Court: We haven't heard so much about trials and tribulations. Business is full of trials and tribulations just like judges, I suppose. It requires as much effort to make up some packages as it does others. I would like to get down, and perhaps you are; I don't want to find any fault; this case has gone fast. I am having an awful job equating an awful lot of this evidence to the real problem you've got. [fol. 734] You've got three problems. Lines of commerce, market, effect on competition. That's what you have got.

Mr. Melchior: Well, we submit that the probable effect on competition must be judged in the light of market conditions as they exist now, as they may exist in the future, and what the impact of Alcoa's position is in this marketplace.

The Court: Oh, yes, we have to go into it. It seems we are a long ways away from it in a good many instances. A minute ago you were making a statement about trials and tribulations in the foreign field.

Mr. Melchior: This was Mr. Bergson that made that statement, your Honor.

The Court: I thought you did. Well, go ahead with the lawsuit.

By Mr. Melchior:

Q. I believe you testified earlier, Mr. Schoerner, if I recall correctly, that your prices, your selling prices generally of aluminum wire and cable since 1950 have been generally in which direction—the selling prices of aluminum [fol. 735] wire and cable?

A. Well, since 1950 the prices are up. However, since 1957 or '58 the prices have been down.

Q. Since 1957 they have been down.

A. Yes.

Q. Now, what has been the price trend, if any, on the price of the raw material which you purchase to make the aluminum wire and cable—that is the ingot?

A. It has been generally up.

Q. It has been generally up?

A. Yes.

Q. The raw material prices have gone up, and your selling price of aluminum wire and cable has gone down. What has been the effect, if any, upon your profits in these lines?

A. It has had an adverse effect. It has made it difficult to continue to make a profit.

Q. Now, I suppose during this period when your profits were being squeezed, you made every effort to cut down costs?

Mr. Bergson: I object, your Honor.

The Court: Well, no, there isn't a businessman in the [fol. 736] world that would say no to that. He is always trying to cut down costs.

The Witness: That's correct.

The Court: And the more efficient the company is the more they cut down costs and devise new methods and so on. Why, of course, that man will increase his profits,

where a slip-shod competitor will go out of business; isn't that a fact?

The Witness: We like to think so.

The Court: All those things are so common; so well understood. They don't need constant repetition.

By Mr. Melchior:

Q. Have you ever attempted to reduce your production costs by purchasing hot metal?

A. Yes, we have.

Q. What is hot metal?

A. It is molten metal taken directly from a pot line or a holding furnace, before it has been permitted to solidify.

Q. Is this the liquid form of the ingot?

A. Yes.

Q. Who would you buy the hot metal from?

[fol. 737] A. It would have to be purchased from a prime producer.

Q. From a prime aluminum producer?

A. Yes.

Q. Now, does hot metal, as sold on the marketplace, sell at a lower price than ingot, aluminum ingot?

A. Yes.

Q. If you know, can you tell me what the difference in price is?

A. I read one testimony some years ago, I believe it was 17 percent. Approximately 17 percent.

The Court: The question is, do you know. I suppose he means now. Do you know the difference in the price?

The Witness: I don't know exactly the difference in the price.

Q. Do you know that the hot metal today can be bought cheaper than at the price of the ingot?

A. Yes.

Q. You know that?

A. Yes.

Q. Have you ever made any attempts to purchase hot [fol. 738] metal in order to reduce your own production expenditures?

A. Yes.

Q. Can you tell me with what success?

A. We were unable to obtain any commitments to deliver hot metal to the trucks.

Q. Did you approach Alcoa?

A. Yes, we approached Alcoa, Kaiser and Reynolds.

Q. The three primary producers?

A. Yes.

Q. Of your own knowledge, do you know whether they sell hot metal to any other companies?

A. They all told me they were selling hot metal to other companies, at least one other company.

Q. But they wouldn't sell it to you?

A. No, because the other companies were not in the wire business. They were not selling any to any people in the wire business.

Q. Did they give you any reason why they wouldn't sell it to you?

A. Not any real reason.

Q. Not any real reason.

The Court: What do you mean by that?

[fol. 739] The Witness: Well, just basically, they took the position that they did not choose at this time to sell hot metal to the wire industry.

Q. They gave you no reason beyond that?

A. No.

Q. Did you indicate that you would have facilities available to take this hot metal?

A. Yes, we did.

Q. Did you offer to transport it yourself?

A. Yes, we did.

Q. Were there any impediments you knew that you put in the way of these companies to selling you hot metal?

A. No.

Q. Have you ever received a transportation allowance from any of the primary aluminum producers when you were purchasing ingot from them?

A. Yes, we did.

Q. What is a transportation allowance?

A. Well, aluminum, generally the terms, generally were f.o.b. shipping point with full freight allowed to destination, so since we operated our own fleet of trucks, we have

always tried to take advantage of the freight cost element [fol. 740] to provide us with a backhaul to our plant, so that we could utilize our trucks coming and going.

Q. Could you effect a cost saving?

A. Yes.

Q. Which of the companies gave this transportation allowance?

A. All the aluminum companies gave this transportation allowance.

Q. Did Alcoa give it?

A. Yes.

Q. Did Kaiser give it?

A. Yes.

Q. Did Reynolds?

A. Yes.

Q. Do you still get this transportation allowance?

A. We do not.

Q. When did you stop receiving this transportation allowance?

A. I believe it was during 1959.

Q. Was any explanation given to you as to why the allowance would no longer be given?

A. No explanation was given to me that satisfied us as [fol. 741] to the reason for not giving a true transportation allowance.

Mr. Bergson: That is not a responsive answer.

The Court: Was there any explanation given to you, whether it satisfied you or not?

The Witness: Well, really, I believe that there was very little explanation given, if any. The pricing policy was changed to discontinue transportation allowances.

Q. Has this had the effect of increasing your cost of manufacturing rod and aluminum wire and cable?

A. It did for a while, yes.

The Court: What do you mean by that? It did for a while?

The Witness: Well, we have found other ways to offset this.

Q. What do you mean?

A. Well, we are now utilizing the hauling of exempt com-

modities to make up backhauls to return our trucks to the plant. This has not been quite as satisfactory, but it is an intermediate means of accomplishing the same end.

Q. Do you presently produce EC aluminum rod?

[fol. 742] A. Yes, we do.

Q. By what process?

A. By continuous casting and rolling process that is generally referred to by the maker of the equipment called Properzi.

Q. And how long have you been producing aluminum rod in this fashion?

A. Since 1953.

Q. Are there any other aluminum wire and cable companies, to your knowledge, other than the integrated aluminum producers, who are utilizing this process to produce rod today?

A. Electrical conductor, or——

Q. Yes, EC rod.

A. No.

Mr. Bergson: Would you please define what you mean by "integrated aluminum producers"?

Q. Do you know what the term integrated aluminum producers means?

A. I assume you mean the ones that have primary reduction facilities and make their own pig.

Q. That's correct; that's what I mean. Which companies [fol. 743] are these who are integrated aluminum wire and cable producers?

A. Alcoa, Kaiser, Reynolds, Anaconda, Olin, Harvey.

Q. To your knowledge, since 1950 have there been any other companies who have manufactured EC aluminum rod by the Properzi process other than the integrated aluminum producers?

A. Yes, there have been.

Q. I direct your attention to the year 1957. Do you know how many producers there were at that time?

A. Rome Cable, General Cable, Essex, Southern Electrical had a similar continuous casting operation, continuous casting and rolling. I believe that's all.

Q. Do you know whether there is any other company

producing EC rod on the market today, other than South Wire and integrated aluminum companies?

A. There is not.

Q. To your knowledge?

A. To my knowledge.

[fol. 744] Mr. Melchior: You may examine.

Cross-examination.

By Mr. Bergson:

Q. Mr. Schoerner, when your company went into the wire and cable business in 1950, did it make both copper and aluminum?

A. Yes.

Q. Cables. Did it use the same machinery for drawing, stranding and covering?

A. We could have the same machinery, yes.

Q. You could have. And can these machines be used interchangeably?

A. Yes.

Q. What has been the sales trend of your company since 1958?

A. '58? Are you talking about aluminum?

Q. I am talking about aluminum.

A. 1958 was a very depressed year. Since then our sales have been up appreciably.

Q. And have they improved in '59?

A. Yes.

Q. Improved over '58?

A. Yes.

Q. And improved in '60 or '59?

[fol. 745] A. Yes.

Q. And how are they this year, 1961?

A. Improved over '60.

Q. Of course, you know that this case is about the acquisition of ALCOA of Rome Cable?

A. Yes.

Q. Has that acquisition hurt you in your business?

A. To date we could not discern any hurt.

Q. Now, where are you getting your pig and ingot supply today?

A. From prime producers.

The Court: Keep your voice up.

The Witness: From prime producers.

Q. Both in this country and I quote "across the seas?"

A. From foreign sources. Some from Canada, which is not across the seas.

Q. I was going to ask whether Canada was across the seas. Have you got a fairly substantial amount of your requirements from Canada and from foreign sources?

A. Yes.

Q. Now, is the ingot that you purchase from Canada and from foreign sources classified as E.C. pig or ingot?

A. No.

Q. It is just a high purity pig?

[fol. 746] A. A high purity pig.

Q. And when you cast that ingot and pig, how do you get the rod that is called the EC redraw rod?

A. Although we do not purchase metal as EC, which would be boron treated, we frequently do have, we don't object to receiving boron treated metal, and in some cases we do receive boron treated metal. When we do any, we do treat that boron in our own plant.

Q. You add the boron yourself?

A. Yes.

Q. And the purpose of the boron is to take out of the pig certain impurities that affect the conductivity of the metal?

A. Generally that is so, yes.

Q. Have you ever heard of a company called Thomas & Betts?

A. Yes, we have.

Q. Do you do business with them?

A. We have and do, yes.

Q. Thomas and Betts is a supplier of accessories; is it not?

A. They are.

Q. Don't they have a pretty full line of accessories?

A. I believe now that their line, they were one of the [fol. 747] companies that I was referring to that would make it possible to produce a complete line of accessories competitive with ALCOA.

Q. And when ALCOA Put you on this agency arrangement that you referred to, when was that?

A. I don't recall the exact year. It has been some years ago. Perhaps five years ago.

Q. Five or six years ago?

A. Something, yes.

Q. Before the merger?

A. Yes.

Q. Have you since the merger expanded your capacity to make aluminum wire and cable products with aluminum conductor?

A. Yes, we have.

Q. How extensive has it been?

A. Since the merger, did you say?

Q. Yes.

A. Which was in——

Q. April, 1959.

A. We have perhaps developed approximately——

Q. Doubled your capacity since '59?

A. Yes.

Q. Now, when you sell wire, insulated wire and cable products, do you sell accessories with insulated [fol. 748] wire and cable products?

A. Yes, in some cases.

Q. But most accessories sold in connection with the transmission lines are bare ACSR products?

A. And distribution lines.

Q. With the bare?

A. Well, of course, additional accessories are used on the insulated wire. Generally the accessories that we would identify with the ALCOA line of accessories was transmission and distribution.

Q. The bare?

A. The bare, that's right.

Q. Now, I mentioned Thomas & Betts. From what other sources are accessories available?

A. They are available from a company called Bethea; and I know two or three other names, but I just can't recall them at the moment. Ohio Brass, and on the world market place available from an Italian manufacturer, a French manufacturer. The Italian manufacturer has recently entered into an agreement with Kaiser to sell in

this country exclusively, and smaller accessories are available from Anderson Brass. Is that enough?

Q. I think it is enough, yes. Now, you mentioned [fol. 749] in your direct examination that the price of pig generally has been going up since 1950; but the price of the conductor products have gone up to 1956 or '57, and then they have started to decline; is that right?

A. Yes. Or at least a conversion, or the spread or the differential has declined.

Q. Let me ask you this, what form did the last price action in pig take? What it up or down?

A. The last price given was down.

Q. How much?

A. Two cents a pound.

Q. What percentage of the price would that be?

A. 8 per cent.

Q. When you were talking about your difficulties in obtaining domestic aluminum back, you said that they ran after the period of the Korean War, this was a period of about, the shortage that was generated by the industrial activity right after the war; was it not?

A. I believe that is correct, yes.

Q. And wasn't it an abnormal situation?

A. Well, the whole period from our inception in 1950 until—normal is a very difficult thing to decide. These were difficult days.

[fol. 750] Q. Has there been any shortage say since 1956 or '57?

A. Certainly none since 1958. Or 1957, certainly none.

Q. And if you chose to buy, if you favored ALCOA With an order in 1957 or '58, they would have complied with your request?

A. Yes.

Q. And probably been glad to sell you?

A. I believe we did make some nominal purchases in that period.

Q. But in a period of long supply you didn't choose to buy from ALCOA; you chose to buy from other sources?

A. Our purchases were from other sources. But we certainly did purchase from other sources.

Q. When aluminum was short then you looked to ALCOA for help?

A. We looked to other people for help all during this period. Other people did help us when ALCOA only provided us with set aside metal. I would say that this was one of the considerations favoring other producers.

Q. Wasn't ALCOA set aside metal a pretty substantial amount of aluminum?

A. Well, I don't know what you mean by substantial. It wasn't the biggest part of our usage at that time. [fol. 751] Q. Wasn't the amount that ALCOA was required to set aside or under their supply contracts, or their contract with GSA, far in excess of any quantity of metal that you might use?

A. You mean in the country? Total industry?

Q. Yes.

A. Oh, yes.

Q. Now, when ALCOA accepted the orders from you on that set aside basis, they did it on the basis of a historical basis?

A. I believe the set aside was on the basis of allocation from the Light Metal Division.

Q. It had nothing to do with ALCOA?

A. I am not certain what the relationship was between ALCOA and the Light Metals Division in the set aside contract you mentioned.

Q. The Light Metals Division of BDSA was then—well, BDSA at that time?

A. Yes.

Q. Decided how much each company should get?

A. Yes.

Q. And ALCOA provided that amount?

A. A portion of that amount.

Q. And if they had provided any more they would have [fol. 752] been in violation of the set aside of BSDA; would they not?

A. During Korea, I believe this is correct.

Q. Now, how do foreign prices connect with domestic prices? I think you said they were generally lower?

A. Yes.

Q. How were they sold? How was foreign metal sold? Is that sold on price at time of shipment or is it sold on price at time of contract?

A. It is sold both ways.

Q. How does ALCAN sell?

A. Price at time of shipment, at the moment.

Q. And who are the other foreign services?

A. By country? I don't know if I could—France.

Q. France is a very significant supplier, isn't it?

A. France is a good supplier. Africa. Norway. Spain.

Q. There are lots of foreign services of aluminum if you want to take the trouble to go and buy it?

A. Yes.

Q. At lower prices than the domestic price?

A. Yes.

Q. Now, let's talk about hot metal for a minute. Do you know whether there is any so-called EC grade of hot metal?

A. I do not believe there would be. To my knowledge [fol. 753] there was no grade EC metal where we were trying to buy EC metal.

Q. You weren't trying to buy EC metal?

A. No.

Q. You were interested in just plain——

A. Hot metal.

Q. (Continuing)—hot metal. Do your know to whom ALCOA sells hot metal?

A. I did know, but I have forgotten it. It was one of the automotive companies.

Q. Let me put the question this way: Do you know of any company in this country, regardless of what its business is, other than the automobile companies, that has a hot metal contract with any producer?

A. I know of no companies other than the automotive industry. I might add that we felt we would be eligible for a hot metal contract inasmuch as we were the only rod producer at the time that could use hot metal. We were the only rod producer.

Q. But in refusing to sell you hot metal, as you say ALCOA did, it was not discriminating against you as between any other type of manufacturer in the United States with the possible exception of the automotive ones; is that correct?

A. That is correct.

[fol. 754] Q. And could you use hot metal in the quantities that the automotive companies use hot metal?

A. I believe so.

Q. In the million, hundreds of millions of tons a year?

A. In the millions of tons.

Q. Hundreds of millions of tons?

A. I was not aware that their requirements were that substantial.

Q. And now, Mr. Schoerner, you testified on direct examination that by far the major proportion of your sales of wire and cable for transmission and distribution and service drop purposes were in aluminum, used aluminum as a conductor, rather than copper; is that correct?

A. That's right.

Q. Now, how long has this situation existed?

A. Well, aluminum was steadily increasing since we started in 1950. Aluminum was the major factor, but it has continued to take a larger share of the market since 1950.

Q. Has it changed appreciably since 1958?

A. No, I wouldn't say it has.

Q. I have some figures here, Mr. Schoerner. I am not so sure I know what they mean, but I will ask you to explain them to me.

[fol. 755] Mr. Bergson: Would you mark as Defendants' Exhibit AR-11 for identification a letter from Southwire to Mr. Robert A. Bicks, Assistant Attorney General, Anti-Trust Division, United States Department of Justice, dated November 16, 1960, and signed for the Southwire Company by Harry L. Cooper, General Manager.

(Letter dated November 16, 1960, as identified above, marked as Defendants' Exhibit AR-11 for identification.)

By Mr. Bergson:

Q. I show you Defendants' Exhibit AR-11 for identification and ask you if that is Mr. Cooper's signature?

A. Yes.

Q. Now, would you look at the attachment to this document and there is a tabulation which is entitled "1958—" what is that?

A. It looks like it is "manufactured products by Southwire."

Q. "—manufactured products by Southwire Company." Now, let's look at production code No.—here—120.

Mr. Melchior: May I see what you are looking at, Counsel? What document?

[fol. 756] Mr. Bergson: Yes. It is a document which you furnished us.

Mr. Melchior: I know, but we furnished you a number of them.

By Mr. Bergson:

Q. Do you mind if I look over your shoulder?

A. No. No.

Q. Code No. 120 is copper neoprene line wire.

A. Right.

Q. And dollar value in sales in 1958 was what?

A. Five hundred and ten thousand dollars.

Q. And in aluminum neoprene line wire, which is the next production number, next item numbered Production 125, what is the dollar volume of sales?

A. $221,000.

Q. Now, Item, Code No. 130 is copper polyethylene line wire?

A. Yes.

Q. And the dollar volume of sales was what?

A. Fifty nine thousand dollars.

Q. And the next item is aluminum polyethylene line wire, and the dollar volume for it is how much?

A. $27,000.

Q. And the next item is copper vinyl line wire, and the dollar volume is how much?

[fol. 757] A. Twenty-seven hundred dollars.

Q. And the next item is aluminum vinyl line wire, and the dollar volume is how much?

A. Twenty-two hundred dollars.

Q. So that in each of these instances your dollar volume of sales in 1958 was higher in copper than it was in aluminum; is that right?

A. That is correct. Do you want me to explain now?

Q. Well, I don't care, if you want to explain it, go ahead.

A. Well, in 1958, or the first, was the year of the most vigorous price squeeze in aluminum, and this was our worst year from a spread standpoint. It was this year that our volume dropped in '57, in aluminum, tremendously, and it

was this squeeze which "encouraged" would be the word, us to find other ways of producing aluminum lower so that we could get a proportionate volume of both aluminum and copper business. These percentages are not, I don't believe, typical with the industry usage in total. They represent Southwire's decreasing proportion of aluminum in relation to our copper.

Q. But, nevertheless, it shows that in these products which are covered, or which are insulated line wire [fol. 758] products that copper and aluminum were in there fighting, so far as Southwire is concerned?

A. I think these are misleading figures when you take Southwire against the rest of the industry.

Q. We are talking only about Southwire.

A. Aluminum wasn't fighting with copper. We were fighting for our position in the aluminum industry.

Q. Well, unfortunately, I had to use dollars here because the figures were given in pounds for copper and feet for aluminum, and I thought we would be going through too many mental gyrations to make a proper comparison.

Do you use any secondary metal in your fabrication of aluminum wire and cable?

A. In electrical conductor we just use our own turnabout scrap.

Q. And you handle that yourself? You don't have to send it out for toll conversion?

A. No, we handle it ourselves.

Q. How many properzi machines do you have?

A. We own three.

Q. When you started, how many did you have when you started the rod business?

A. We had one.

[fol. 759] Q. And then you added a second?

A. We took out our original unit and sent it to Brazil and replaced it with a larger unit.

Q. And then did you add an additional one?

A. We have since purchased an additional one.

Q. Do you now operate two or three in the United States?

A. In the United States at the moment we are only operating one. The second unit has not yet—is not yet producing.

Q. But you are planning to put it into operation?

A. Yes.

Q. Do you—and I know you said this, doesn't General Cable make its own rod?

A. They have operated two Properzi units, one in Tampa I know is closed down. The other unit, I understand was also closed down recently.

The Court: Take a short recess.

The Clerk: Court will be in recess.

(Whereupon, at short recess was taken after which the trial was resumed.)

[fol. 760] By Mr. Bergson:

Q. I have just one or two more questions to ask you. Has South Wire ever exported EC rod?

A. I don't understand the question.

Q. Have you sold EC rod out of the country?

A. Oh, yes, we have. I thought you said exploited.

Q. When did you do that?

A. Well, we have done it for several years. The first time perhaps was as far back as 1955.

Q. And to what countries do you export it?

A. We have exported to Ireland, Mexico, India, Australia.

Q. And in 1955, when you exported, do you recall to what countries you exported then?

A. I believe to these same countries.

Q. Do you have any idea of the volume of the exports?

A. Well, our ability to export followed the position of our country and our company in the world marketplace. We were competitive during 1955 and 1956. In 1957, 1958 and 1959 we were not competitive in the world marketplace. More recently we have found the mechanics to again get [fol. 761] into some export business.

Q. 1955 and '56?

A. These years—it may be 1956 and '57, or 1954 and '55. It was several years ago.

Q. Were these the years in which there was an aluminum shortage in this country?

A. These were years—these were after war years when there could have been an aluminum shortage.

Q. So that you were exporting rod in a period when there was a shortage?

A. And importing pig. We basically were in these cases and now in the export market, a converter. We would bring in and export either for drawback. Duty drawback.

Q. When you say basically a converter you mean you converted someone else's pig?

A. In some cases we have converted other people's pig.

Q. But in other cases you bought pig?

A. And re-exported it.

Q. And you did this in some instances during the period of shortage in this country?

A. Yes.

[fol. 762] Mr. Bergson: Thank you. No further questions.

The Court: Anything else?

Redirect examination

By Mr. Melchior:

Q. Mr. Schoerner, I believe on cross-examination you said that in 1961 your profits improved, is that correct?

A. Over 1960, yes, there was an improvement.

Q. Could you tell me how much of an improvement on a percentage basis perhaps?

A. Our 1960 profits were less than one per cent. 1961 profits will be—we actually haven't finished our final accounting—but somewhere in the neighborhood of one and a half to two percent.

Q. Is this a substantial increase, in your mind?

A. Well, in relation to our 1960, it would be a double percentage, but in relation to what we would like to be doing, or we did do in prior years, we would consider that it is a very nominal profit. We are happy with any profit.

Q. What were the profit percentages in years past?

[fol. 763] A. I believe the first year in business the profit was four and a half percent. In 1956 it was perhaps close to four percent, three and a half percent, something like that. Our poorest year, I believe, was in 1958 when our profits were, I believe the percentage was .38 percent.

Q. I see. Now, I believe you testified that there was a recent drop in the price of aluminum pig.

A. Yes.

Q. How much of a drop was that?

A. Two cents a pound.

Q. Do you know of your own knowledge who initiated that price drop?

A. Alcan, I believe, was the first, for foreign pig was the cause of the price drop in this country.

Q. Directing your attention to these set-aside contracts which have been instrumental in your getting some aluminum pig during certain periods——

Mr. Bergson: I would like to have that question re-read if I may.

Q. I will strike the question and rephrase it. Directing your attention to these set-aside contracts that were discussed with you by Mr. Bergson on cross-examination, isn't it a fact that these set-asides are by government order?

[fol. 764] A. I believe that is correct, yes.

Q. Now, directing your attention to these hot metal contracts which you spoke of on direct examination and cross-examination and you were asked whether you were aware of any company that was successful in arranging a hot metal contract with Alcoa, and I believe you mentioned an automobile company.

A. The automotive industry.

Q. Would it involve more than one purchaser?

A. I believe General Motors, Ford, Chrysler all have some type of hot metal arrangements with prime producers.

Q. Do you know whether any other companies outside of the automotive industry have been successful in entering into such a contract with Alcoa?

A. I do not know of any.

Q. Do you know that they have not been successful?

A. No, I do not.

Q. Directing your attention to the tabulation AR-11 for identification that Mr. Bergson asked you certain figures concerning——

A. Yes.

[fol. 765] Q. These are represented in dollars?

A. Yes.

Q. If they would have been represented in feet would there have been an appreciable difference?

A. Yes, the ratio would have been in favor of aluminum, perhaps two and a half to one or something in that proportion.

Q. I see. No further questions.

Recross-examination.

By Mr. Bergson:

Q. I think Mr. Melchior misconstrued my question. I asked whether volume had increased, not whether your sales had increased, but now that he brought up the question of profit—you said they were one percent, and then two percent, maybe two percent in 1961. It is one percent of what?

A. Sales.

Q. And not of investment?

A. No.

Q. And two percent of the sales?

A. Yes.

Q. And not of invested capital?

A. Yes.

[fol. 766] Mr. Bergson: That's all.

Mr. Melchior: No further questions.

Robert Charles Moeller, Jr., called as a witness on behalf of the Government, being first duly sworn, testified as follows:

Direct Examination.

By Mr. Mahaffie:

Q. What is your occupation?

A. I am with the Collyer Insulated Wire Company, Pawtucket, Rhode Island. I am the president.

Q. You are the president of the Collyer Insulated Wire Company of Pawtucket, Rhode Island?

A. Yes.

Q. How long have you been president of the Collyer Insulated Wire Company?

A. Since the beginning of 1956.

Q. Would you state the approximate size of the Collyer Insulated Wire Company in terms of annual sales?

A. Between fifteen and twenty million dollars.

Q. Mr. Moeller, would you describe the product line as of today produced by the Collyer Insulated Wire Company?

[fol. 767] A. About half of our product is what we call building wire which we make for stock in anticipation of business. The other half is principally custom made on order consisting of power cables, control cables, insulated asbestos, polyethelene, vinyl chloride, and in combination.

Q. About what percentage of your total business today is represented by aluminum conductor products?

A. Between one and two percent.

Q. Now, do you make a product known as shipboard cable?

A. Yes.

Q. And do you make a product known as welding cable?

A. Yes.

Q. Do you make a product known as portable power cable?

A. Yes.

Q. Do you make control cable?

A. Yes.

Q. And do you make switchboard wire cable?

A. Yes.

Q. Do you make a product known as a tree wire?

[fol. 768] A. Yes.

Q. Would you state what tree wire is, sir?

A. It can be a variety purpose of constructions. The customer in this particular case, the utility, has his own specification of the tree wire. We have been making as an aluminum conductor with rubber insulation for 5,000 volts and a special heavy duty grade covering, and a special hard finish of the grade of sudden abrasion by trees through which this wire passes.

Q. This wire is used by electric utilities?

A. Yes.

Q. And do you manufacture today a product known as line wire?

A. To a degree, yes.

Q. How about service drop cable?

A. Yes.

Q. And underground cable?

A. Yes.

Q. Now, the latter three products are sold to what class of customers? That is line wire, service drop cable and underground cable.

A. These are utility products. Take your last designa-
[fol. 769] tion, underground cable, is a network cable, 600 volts, and network we think of as underground cable.

Q. That is a product used in cities for the distribution of electric energy?

A. Yes.

Q. About what percentage of your total business is made up of these products which are sold principally to electrical utilities?

A. Possibly 15 percent.

Q. And with respect to your total production line which specific products do you manufacture with aluminum conductors?

A. You are speaking of all our products?

Q. Yes, your total products.

A. We make several items in aluminum. Building wire principally; the type known as THW; building wire, and we make some aluminum service entrance cable. These are the building wire items.

Q. Yes.

A. And we make aluminum tree wire and secondary aluminum line wire.

Q. Line wire. Now, is your line of building wire products substantially comprehensive? Is it what is usually called a full line?

[fol. 770] A. Yes.

Q. And in that—strike that. Could you give an estimate of the number of individual products that would be included in a full line of building wire? I don't mean by size, Mr. Moeller, I mean by types.

A. I would think seven or eight types would cover the building wire category.

Q. Is there a demand for building wires with aluminum conductors today?

A. We find a spotty demand. As far as we are concerned we find it in certain parts of the country only.

Q. And is that demand limited to type THW that you describe?

A. THW and RHW. But we are more concerned with THW.

Q. Mr. Moeller, is there a demand for aluminum conductor shipboard cable?

A. Not that I know of, except that we do use aluminum incidentally an armor covering on shipboard cable, not as a conductor.

Q. That aluminum serves what function in the cable?

[fol. 771] A. Physical protection.

Q. It does not conduct electricity?

A. No.

Q. Why, if you know, sir, is there no demand for aluminum in shipboard cable?

A. I don't know except that shipboard cable is made to specifications. The Navy has its specifications. The Maritime Commission has its specification known as AIE No. 45, to which most commercial ship builders specify and buy cable. I have no knowledge as to why it does not include aluminum conductor.

Q. Is there any physical characteristic of aluminum, which would be relevant or which would be a disadvantage in its use in shipboard cable?

A. Yes. I think aboard ship space is sometimes important, particularly to the Navy in their installation. The use of aluminum conductor would require larger sizes of conductor, which in turn would require more covering and a greater overall diameter of cable, which would become a problem space-wise in installation.

Q. If aluminum were used?

[fol. 772] A. If aluminum were used.

Q. Mr. Moeller, have you noted a demand for aluminum welding cable?

A. There has been an interest, but not an extraordinary demand from the people we do business with.

Q. You do produce aluminum welding cable?

A. We experimented with it and found it unsatisfactory, so we do not make it.

Q. Parenthetically, what is welding cable?

A. Welding cable supplies the electric current from the —to the electrode holder which the welding operator uses, the hand device in welding.

Q. This is cable that trails behind the welder?

A. Yes.

Q. What are the reasons for your lack of success in using aluminum in welding cable?

A. The welding cable has to be flexible and in the copper construction flexibility is achieved by drawing copper to fine sizes and using a great many fine copper wires bunched together and covered. Aluminum wire cannot be drawn as far as we are concerned successfully to the same small sizes. Aluminum would tend perhaps to buckle, with [fol. 773] its less tensile strength to break or to bend. It is too brittle.

Q. Mr. Moeller, have you noted a demand for aluminum portable power cable?

A. No.

Q. What is portable power cable, sir?

A. This is a cable which has to be moved or reeled or unreeled in its normal use. Therefore it has to be flexible and has the same fine wire construction as copper.

Q. Would it be correct to say that the reason for aluminum's lack of welding cable would also apply to portable power cable?

A. I think that is one reason. Secondly, substituting aluminum you would have to use a larger size conductor and therefore a greater amount of material, which would offset the economic advantages.

Q. Is there a demand for aluminum control cable?

A. Not that I know of. Not in our experience.

Q. Again let me ask you what is control cable?

A. Control cable generally is a multiple conductor cable possibly ranging from two conductors on up. I would say that an average range would be up to 45 conductors, or that sort of thing.

Q. What is it used for, Mr. Moeller?

[fol. 774] A. It is used to carry impulses which operate switches and devices which activate the flow of current.

Q. Would there be any control cable in this building?

A. I am sure there is. The control cable in connection with the elevator.

Q. I see. Now, Mr. Moeller, why, if you know, is there no demand for aluminum in control cables?

A. I think this is again a problem of space and economics. To get the same current carrying capacity in aluminum where substituted for copper you have to have a larger size conductor, which means greater amounts of insulating material, greater diameters, and the additional cost of the covering offsets the saving in substituting the less expensive metal.

Q. I believe you stated there is in addition a size problem.

A. I think so, yes.

Q. All right now, what about switchboard cable? Is there a demand for aluminum in switchboard cable?

A. Not in our experience.

[fol. 775] Q. And why is there no such demand?

A. Well, I think switchboard wire, again, has to do with space and size of the conductors. Also I might say that these are not determinations that we make. Basically we respond to our customers' desires and to the customer's feelings that prevail.

Q. Yes, but you are aware generally of the reasons that your customers do not go into this?

A. Yes.

Q. Mr. Moeller, in what form does Collyer buy copper?

A. In rods.

Q. And in what form does Collyer today buy aluminum?

A. In wire or strand, ready to insulate.

Q. Why does Collyer not buy aluminum rod?

A. Our wire drawing facilities are now operating at capacity on copper. It would be inconvenient for us to interrupt our copper wire drawing to introduce the drawing of aluminum.

Q. Would any equipment changes be necessary if Collyer were to begin drawing aluminum?

A. Yes, we have to change the lubricants and the dies in [fol. 776] our wire drawing units particularly, and in our own operation we have no annealing oven, so that if we were to draw aluminum it would be hard drawn aluminum only. We couldn't anneal. We anneal our copper continuously in our wire drawing machine. We do not know how to do this drawing aluminum.

Q. Would you explain what annealing is, Mr. Moeller?

A. In drawing copper and aluminum, just the physical process, stretching it and pulling it down to size, it rearranges the molecules in a fashion which makes the conductor stiff and somewhat brittle in small sizes. Annealing rearranges the molecule structure so that flexibility is again introduced.

Q. Now, to draw aluminum, I believe you stated it would be necessary that you install an annealing oven.

A. Yes.

Q. And as your machinery is presently set up you do not need an annealing oven?

A. That's right.

Q. Mr. Moeller, has there been any change in recent years in the amount of Collyer's total production of aluminum conductor products?

[fol. 777] A. I have some figures I can refer to, showing our use of aluminum conductor, back several years, if you will let me find them.

Q. Take your time, sir.

A. Would you like me to read these figures?

Q. Yes, sir, I think that would be the easiest way.

A. These are figures we reported to a department of the government on a form BDSAF-122. In 1955 we used 188,615 pounds. In 1956 we used 258,145 pounds.

Q. Mr. Moeller, these are pounds of aluminum?

A. Pounds of aluminum. Is that what you asked?

Q. Yes. Go ahead.

A. In 1957 we used 35,559 pounds. In 1958 we used 3,119 pounds. In 1959 we used 20,588 pounds. In 1960 we used 56,463 pounds.

Q. In 1955 and '56 what aluminum conductor products was Collyer manufacturing which it does not manufacture today?

A. We were making ACSR conductor, and we also were making—we had some aluminum conductor, neoprene cov-

[fol. 778] ered line wire business which we do not now have.

Q. How about service drop cable?

A. We were not, as I recall, active in service drop cable. With some exceptions. We had some business on service drop cable at that time.

Q. So you did, in 1955 and 1956, manufacture ACSR,

aluminum line wire and some aluminum service drop cable?

A. Yes.

Q. And you manufacture none of these products today?

A. Well, we make no ACSR. We make a small amount only on special order only of aluminum neoprene covered line wire, and I believe at the present time we have no business on aluminum service drop cable.

Q. Why does Collyer no longer manufacture ACSR?

A. During those years 1955 and 1956 the competitive prices permitted us to buy the necessary steel wire and aluminum wire and assemble strand, or assemble the conductor and sell it at a profit, and I believe this has been proven to us that we can't do that now.

[fol. 779] Q. I see. Same reason applicable to your drop-off in the manufacture of these other aluminum products, service drop and line wire?

A. Yes.

Q. Mr. Moeller, what is the principal cost factor in your manufacturing operation today?

A. Cost of material.

Q. And what is the prime material that you use today?

A. Copper.

Q. Copper rod?

A. Yes, sir.

Q. Has there been any change in recent years in the profit of your operations?

A. Yes.

Q. Could you state what that change has been, in terms of actual net profit?

A. Yes:

Q. Would you do so, please, sir. Are you able to state as far back as 1956?

A. Yes. If it will be sufficient, I will round this off to the nearest thousand.

Q. Yes, sir.

[fol. 780] A. In 1956 we had a net profit after taxes of $959,000. In 1957 we had a net profit after taxes of $646,000. In 1958 we had net profit after taxes of $337,000. In 1959 we had net profit after taxes of $293,000. In 1960 we had net profit after taxes of $154,000 and in 1961 we had a net profit after taxes—the estimated figure—it hasn't been,

prepared for our stockholders yet, but it will be less than $154,000; possibly about $100,000.

Q. During this period has there been any change in the prices of your finished product, as a general matter?

A. Yes.

Q. What has that change been?

A. It has been a decline due to competitive pressures.

Q. And has there been a corresponding change in the price of copper rod?

A. No.

Q. Has your drop in profit been related to the change in the spread between copper rod and the price of your finished product?

A. Yes.

Q. Now, Mr. Moeller, can you give an example [fol. 781] of the way in which this spread has changed since 1956? Any one of your products.

A. Well, I have some notes here on a typical item. It is typical because it is most commonly used in wiring buildings. Commercial or industrial or even—well, all non-residential buildings.

Q. What is the item?

A. This is known as size 12 solid copper type TW. This is an Underwriters Laboratories and National Electric Code designation, thermo-plastic insulated branch circuit wire product. In 1956 the competitive price which we sold this item, less the price we paid for copper rod, gave us an amount of approximately $6.50 per thousand feet for what we contribute as insulators to the value of the product.

Q. This $6.50 is the area within which you must conduct your operation and make a profit, if any?

A. Right. This provided us, or permitted us to supply labor and overhead and allow for cash discounts, to pay freight, sales commissions, and the whole cost of operating our business.

Q. I see.

A. In December—there has been no change in the physical nature of this product, but in December, [fol. 782] 1961 we sold this item at a competitive price, and our cost of copper rod left us $3.18 to provide the same services. This is below our cost.

Q. So since 1956 the spread between the price of copper rod and the amount of money which you get for this one product has changed from $6,50 to $3.18 which figure is, I believe you stated, below your cost of manufacture?

A. Yes.

Q. Mr. Moeller, do all of your competitors operate within the same spread that Collyer operates within?

Mr. Bergson: I object, your Honor. I don't see how he could possibly know.

The Court: If he can answer that, he should.

Q. Well, I will try to rephrase it. Do you compete, Mr. Moeller, with manufacturers of copper rod—that is, do you compete in the sale of finished wire and cable products with manufacturers of copper rod?

A. Yes.

Q. Do these competitors, these manufacturers of copper rod, have any significant competitive advantage [fol. 783] that you don't have?

Mr. Bergson: Object, your Honor.

The Court: No, I will take it. I suppose what you mean is, they make their own rods, I suppose. Is that what you mean?

Mr. Mahaffie: Well, that and anything else that——

The Court: Overruled.

Q. Do you want the question back, Mr. Moeller?

A. Pardon?

Q. Do you want the question read back?

A. No. Shall I answer it?

Q. Yes.

A. Our competitors who are bigger and who have the advantages of rolling mills and perhaps advantages beyond that, of copper mines, have several advantages not specifically in relation to rolling mills, but their bigness seems to present several problems to us. One is in the way we must buy copper, at prices in effect at the time of shipment and competing perhaps with these larger producers who are willing to sell a finished product, the wire product, at firm prices for delivery at sometime [fol. 784] in the future, possibly as far as a year away, in connection with certain building construction products,

which buildings—where the buildings won't be ready for installation of wire for some period of time, nine months or a year, or even longer.

This is a disadvantage to us because we feel that we don't know what our cost of copper will be at the time that we would have to manufacture and deliver the wire. Whereas that business, we will lose that business to these larger companies who are integrated or protected against that changing cost of copper.

Also we find in competing with larger companies we have the problem where certain opportunities are closed to us because of the reciprocity that larger companies can develop. A wire mill itself, with whom we are competing, may not have a reciprocal claim on a potential wire customer but in some way in other associated companies there is some sort of reciprocal claim at times that seems to close the door to us, to get them the business.

The Court: I don't understand any of that.

[fol. 785] Q. What do you mean by "reciprocal claim," Mr. Moeller, and how does this actually work?

A. We have had two experiences. One where we actually had an order, a firm order in hand from an industrial manufacturer of steel products. The wire was about ten or twelve thousand dollars worth of control cable to be used in that steel manufacturer's plant. The steel manufacturer asked us if we would release him from the commitment of the order he had given us because one of our competitors through an associated company——

Mr. Bergson: I object, your Honor.

I think that he——

The Court: I will let it in. Again it seems to me this is quite a ways away from the merger. Go ahead and finish it. I don't know what we are coming to.

Q. Go ahead, sir.

A. Our competitor, wire mill competitor had brought pressure to bear on the customer through an associated company which was a producer in turn of the products of that steel manufacturer.

Q. I see. And that in general——

A. This is the illustration of reciprocity.

[fol. 786] Q. (Continuing) —that is in general what you mean by the term "reciprocity"?

A. Yes, sir.

Q. Is there anything else in the nature of practices engaged in by your larger and or your integrated competitors which are significant disadvantages to you in this field of business?

A. Well, I think their strength permits them to do business in building wire products on a consignment basis, which seems to close other opportunities to us where they offer to a distributor of electrical supplies to work in stock. By that I mean an assignment of wire products on consignment whereas as a smaller independent wire manufacturer we cannot afford to make the same offer, and it is difficult for us to get that distributor to buy our product, whereas he can have the stock without fears of inventory losses.

Mr. Mahaffie: No further questions.

Cross-examination.

By Mr. Bergson:

Q. Mr. Moeller, just a couple of questions. I gather from your testimony that you were talking primarily about the copper industry?

[fol. 787] A. Yes, sir.

Q. Has the merger between Alcoa and Rome adversely affected you?

A. As far as I know, it hasn't.

Mr. Bergson: No further questions.

The Court: Just one question that I would like cleared up. We speak about this spread between the cost of the primary product, which in your case would be copper rod and the finished product. Now, over these years, from '55 to '56, I think we have been talking about, down to date, that spread does not remain constant? It hasn't remained constant? It has fluctuated; hasn't it?

The Witness: It has been fluctuating, but the overall trend has been down.

The Court: Now for instance you take a copper rod—

I don't know how it is sold, by the foot; by the pound or by the ton or—how is it sold?

The Witness: By the pound.

The Court: All right. What was the price per pound, roughly, in '56 or whatever year you started?

[fol. 788] The Witness: Well, 1956 was an unusual year. That was a period of strikes, I believe, when copper went to forty odd cents per pound. 1955 I think perhaps the price of copper was thirty-five or thirty-two cents.

The Court: All right. Suppose we take the thirty-two cents. Now what was the price of the finished product for the same year?

The Witness: I will refer to my note again. The particular item we are talking about, twelve solid TW in 1957 was sold at a net price. This is list, less certain trade discounts, in the first half of the year, at about twelve dollars fifty per thousand feet. And our cost of the copper rod was $34.75 per hundred pounds. Or $7.00 per thousand feet, approximately; leaving us a spread for insulating of $5.50 per thousand feet.

The Court: Well, if I understand it right the price of the copper rod has increased, to you, over the period of some years.

The Witness: In this illustration, no. Because in 1957 we were paying $34.75 per hundred pounds for rods, and today we are paying thirty-three cents or thirty-three dollars per hundred pounds, or thirty-three cents per pound for the same rod.

The Court: Then the price has not increased?

[fol. 789] The Witness: In this illustration the price today is slightly under that, in the first half of 1957. At the same time the finished wire product we have been talking about, wire sold for $12.50 per thousand feet to our distributor customers, and today we are selling it for $9.78 and actually there are competitive prices lower than that.

The Court: That is what I am getting at. Where the cut on the competitive price is on the sale of the completed product to a greater extent than on any increase in the primary product.

The Witness: The pressure has been on the price of the finished wire product.

The Court: Of the complete product.

The Witness: Yes.

The Court: And you have many competitors in the completed product; don't you?

The Witness: Yes.

The Court: And that large amount of competition—there is a great amount of competition in this country; isn't there?

The Witness: Yes.

The Court: And that seems to have forced the price of the completed goods down?

The Witness: Yes.

[fol. 790] The Court: While the price of the fundamental or primary metal, while it might have fluctuated some it hasn't fluctuated as much as the price of the completed product?

The Witness: That's right. The unfortunate position we find ourselves in is as insulators, is that these prices at which we are selling today, competitive prices is below our cost.

The Court: Yes.

The Witness: And this is reflected in our earnings statements. For a limited time only can we stay in this kind of price fighting, whereas our competitors who are protected either through an integrated organization or diversified organization and do not have to report their earnings separately and individually for the knowledge of their stockholders, so these other competitors can afford to stay in this price fight for a longer period than we can because we have no one on whom to lean.

The Court: In other words it is the old rule of the stronger will survive?

The Witness: Yes.

The Court: But now when you are talking about the others, there is only about four or five integrated, or is [fol. 791] there that many, integrated, and of course we are talking about copper?

The Witness: Yes.

The Court: How many of them are there?

The Witness: In my comment I feel the same way about diversified companies as I do about integrated.

The Court: How many are there of those that you call integrated copper concerns, roughly?

The Witness: Perhaps four or five.

The Court: Four or five. Well, of course you have a great many more competitors in the finished field than those four or five integrated concerns?

The Witness: Many of these competitors have joined groups of diversified companies.

The Court: Yes. But I would just like to take one thing at a time. The number of competitors that you have in the finished field probably runs into the hundreds or thousands?

The Witness: In the building wire we are talking about our principal competitors are no more than twenty.

The Court: I see. Twenty. And of those twenty four are integrated; is that right; substantially?

[fol. 792] The Witness: Yes.

The Court: So that you have—this sale is governed by the action of four integrated and sixteen non-integrated companies?

The Witness: Well, I would classify them differently. I would say four integrated companies and perhaps eight or so companies in diversified groups.

The Court: Of course, I understand no companies are necessarily the same; some have broader lines than others; some more diversified than others.

The Witness: I don't mean diversified in the wire business. I mean diversified with companies in different lines of business.

The Court: Well, all right. All right.

(Witness excused.)

The Court: Recess until tomorrow morning, ten o'clock.

The Clerk: Court's in recess until ten o'clock tomorrow.

(Whereupon, at 5:10 p.m. o'clock an adjournment was taken to Wednesday, February 14, 1962, at ten o'clock a.m.)

[fols. 793-794] [Title omitted]

Transcript of hearing—February 14, 1962

* * * * * * *

[fol. 795] The Court: All right, gentlemen, I guess we can proceed in this case.

Mr. Wertheimer: Mr. Akin.

ROBERT MACOMBER AKIN, JR. called as a witness in behalf of the Government, being first duly sworn, testified as follows:

Direct examination.

By Mr. Wertheimer:

Q. Will you state your full name and position?

A. Robert Macomber Akin. President of Hudson Wire Company, Ossining, New York.

Q. How long have you been president of Hudson Wire Company?

A. Since 1948.

Q. How long have you been with Hudson Wire Company?

A. Approximately 35 years.

Q. How old a corporation is Hudson Wire Company?

A. Hudson Wire was first formed as a partnership, Royle & Akin, in Newark, New Jersey, in 1902; moved to Ossining, New York in 1904; became the Hudson Wire Company in 1907.

Q. Who founded it?

A. My father and Joseph Royle.

Q. What products does Hudson manufacture?

[fol. 796] A. We have three divisions. The products manufactured in two of the divisions are similar. Winsted, Connecticut makes magnet wire and high frequency conductors such as litz wire. The plant in Assopolis,

Michigan, makes a similar product. And the plant in Ossining, New York manufactures bare wire in fine sizes.

Q. What has been the general range of your sales in recent years?

A. Our sales run from, anywhere from six to ten million dollars a year for all three divisions.

Q. What is magnet wire?

A. Magnet wire is a film coated wire that is used to wind coils to produce a magnetic field, and where you are converting electrical energy into mechanical energy such as your doorbell, it contains a little magnet surrounded with magnetic wire. The coil on your car, the ignition coil is one, with two sizes of secondary wire, primary wire and secondary wire, and its primary use is for magnetic fields and this is used in high frequency conductors where it becomes a matter of current traveling on the outside of the wire. This is wire that is usually referred to as litz wire.

Q. I show you a piece of wire. Would that be magnet [fol. 797] wire?

A. Yes, that is magnet wire covered with—well, this is from General Cable, and this is Enamel G. That would mean it is a solderable type wire.

Q. What is a solderable type wire?

A. This insulation is familiar to the layman. We put in the category of some of those self-polishing floor waxes. The formulation is different because of the heat that we use. But the sheets that we use in magnet wire is very similar to floor wax and car wax.

And the difference between the solderable type and the thermal type materials—this is a thermo-plastic—that means it can be deformed with heat, and by applying a soldering iron and temperature of 600 degrees Fahrenheit to this wire, we can solder, while in the other types it has to be scraped and cleaned before it is soldered. It has to be mechanically assembled.

Q. Now, is Hudson's range of magnet wire generally larger or smaller than this? First, what size——

A. Well, this would be the type of wire that would be on the border line with Hudson wire. Our wire is primarily fine.

Q. What size range?

[fol. 798] A. Well, we make wires in the form No. 18 B&S, Brown and Sharp gauge, to approximately 56 wire. 18 wire and 20 wire is in the neighborhood of 25 to 30 thousandths, to triple 05, which is 8/10 of a thousandth inch. In other words, this would mean a thousand wires laid side by side of the bare conductor before it is enameled would approximately take up the space of one inch.

Q. Then your wires are generally of the fine wire variety?

A. That's right.

Q. Smaller than this one?

A. Oh, much smaller.

Q. What size would you say this would be?

A. Well, they have it marked. 26.

Q. Then your wires would be much thinner?

A. Well, we do make that, but we would much rather make the fine wires.

Q. The coating we spoke of on the magnet wire makes it insulated?

A. Yes.

Q. I see. What metal do you use in making magnet wire, Mr. Akin?

A. Primarily copper.

Q. Do you make it of aluminum?

[fol. 799] A. Yes, some.

Q. About how many pounds of aluminum and how many pounds of copper have you used in recent years for magnet wire?

A. Well, our copper and copper alloys, we will use roughly seven million pounds a year, and in the aluminum —well, let's look at the year 1959—we used roughly about 15,000 pounds altogether.

Q. Fifteen thousand pounds of aluminum, as opposed to seven million pounds of copper?

A. Yes.

Q. Why don't you make more aluminum magnet wire?

A. Well, primarily, our customers do not ask for it in the fine wire. The market isn't there. And, secondly, we run into considerable difficulties in drawing extremely fine sizes of aluminum—and I will define "fine" as meaning from ten-thousandths of an inch and finer.

Q. What are the difficulties in making aluminum magnet wire?

A. Primarily, the nature of the metal. The lubricants required. They differ from copper. And the tensile strength of the metal itself is very low, and for that reason we have to change the practice of drawing from standard B&S sizes [fol. 800] to half sizes, maybe only a quarter of a size. In other words, we would use four times the number of dies to make the same reduction and the same increase in length.

Q. Are they the same dies?

A. Yes; the shapes are a little different. But they are diamond dies. Commercial diamonds with a tapered hole in them.

Q. Do these additional processes you describe result in any difference in the price of aluminum magnet wire, compared with the price of copper magnet wire?

A. Oh, yes. You have to consider your labor and your materials and it makes it much more expensive. I could give you a rough example. Within the last two weeks we had an order for triple 08 aluminum—that is .8 of a thousandth. And it took one operator full time 144 hours to make a quarter of a pound of this material, while with copper he would use only one-tenth of his time and he could make that same quarter of a pound in four or five hours.

Q. Are there any differences in the type of winding one can get with the use of copper magnet wire and——

A. Oh, I would say yes, much smaller.

Q. Which?

A. The copper is. In component parts, the tendency in electronics is to go towards the smaller size, and as [fol. 801] a result the small transformers are wound with copper that would be very much larger made of aluminum to get the same conductance, same amount of current, through the wire.

Q. Do you mean by this that copper is more desirable?

A. In fine wire, yes.

Q. I see. Because of the space consideration?

A. Space, primarily, and other technicalities that the engineers are acquainted with, that have to do with magnetic flux, and so on. I'm not acquainted with that.

Q. Is there any difference between the weight of copper magnet wire and the weight of aluminum magnet wire?

A. Well, the aluminum is about half the weight, with the same conductance.

Q. Is this important in the usage of magnet wire?

A. Well, I think that you should know that in large magnet wires it is a very different requirement than in fine wire.

Q. Directing your attention——

A. (Interrupting) In the fine wires I would say—would you kindly repeat your question referring to fine wire?

Q. You have already stated that aluminum magnet wire [fol. 802] in the fine sizes is lighter than copper, and I am asking you whether this is an important consideration in the usage of fine magnet wire?

A. Well, our customers have not required it as such in fine sizes.

Q. I see. Do you anticipate that aluminum will be used in any greater proportion to copper in fine magnet wire in the future?

A. It entirely depends on the research group as to whether they can increase the conductivity of aluminum and improve the mechanical possibilities—improve it mechanically.

Q. Assuming the present conductivity, what would your answer be?

A. I cannot see it at this time, unless we are going to use it in outer space, where weight is a very important factor.

Q. What grade aluminum do you use for your magnet wire?

A. Electrical grade. EC grade.

Q. What is your raw material for copper magnet wire, Mr. Akin?

A. Copper and wire bars. And copper rods. We buy wire bars, and we also buy rods, and then when we have the copper wire bars, we have to be able to have them [fol. 803] converted into rods before we start in to draw.

Q. Is there any relationship between the price of your raw material, the copper wire bar or the copper rod, and the price of copper magnet wire?

A. Yes, when the copper base is increased, we increase the selling price of the magnet wire, and when it's reduced,

we reduce the price, and it's usually done all in the same day.

Q. You say that the increase or the decrease falls on the same day? What is the relationship between price change in the magnet wire and the price change of your raw material?

A. Well, the relationship is the same relationship as the base price. If the base price increased a cent a pound, we would increase magnet wire a cent a pound. If it decreases, it's inversely so.

Q. If the price of aluminum ingot or rod changes, do you change the price of your copper magnet wire?

A. No, sir.

The Court: That is the price of the aluminum.

Q. Yes. Who are your suppliers of copper wire bar?

A. Well, we buy copper wire bar from Kennecott Mining Company, Anaconda Mining Company, American Smelting and Refining Company, and at times we have bought [fol. 804] copper wire bar through our rod suppliers who do the conversion for us.

Q. Do you buy copper wire bar from Phelps Dodge?

A. No. We buy copper rods from Phelps Dodge.

Q. Who else supplies you with copper wire rod?

A. Well, we buy rods from our friends at Rome Cable. We buy rods from Anaconda Wire & Cable Company, and we buy rods from Phelps.

Q. Are any of these companies——

A. (Interrupting) And we buy rods from Kennecott, I might say. We have from time to time bought rods from Kennecott.

Q. Are any of the companies from whom you purchase your copper competitors of yours in the sale of magnet wire?

A. Oh, yes.

Q. Which ones?

A. Well, we have competitors, we are competitors of Phelps Dodge. We compete with the Anaconda Wire & Cable Co. in magnet wire. We do not compete with Kennecott. Their finest size is just about our heaviest size.

Q. Has there been any change in the price of copper magnet wire in recent years, Mr. Akin?

A. Yes, it fluctuated rather rapidly at times. A year [fol. 805] ago this past July it took a sudden drop of 12 per cent. Then here within the last few months there has been a tendency to try to regain some of that 12 per cent, which it seems to be going along with some success. I believe we have regained 5 per cent of it.

Q. Who instituted the 12 per cent drop that you speak of?

A. Well, it was instituted by a number of large corporations. I think the first one, according to the Wall Street Journal, was Phelps Dodge, the Inca Division of Phelps Dodge.

Mr. Bergson: If your Honor please——

The Court: Of course, it is badly hearsay.

Q. Do you know of your own knowledge who instituted the price decrease?

The Court: What knowledge you have was drawn from reading it and word of month; is that right?

The Witness: I read it, sir, and followed it and the other corporations did likewise.

Q. Then you know of your own knowledge that there was a 12 per cent drop?

A. Oh, yes, sir.

[fol. 806] Q. Did the price of copper rod or copper wire bar drop proportionately at that time?

A. No, sir. These are merely the finished prices that were reduced.

Q. What happened to copper rod or copper wire bar at that time?

A. Oh, it might have dropped somewhat. But during that period, during that particular time, it did not drop.

Q. Then your price of your raw materials remained fairly constant?

A. Yes, that's right.

Q. The prices of your magnet wire or finished product dropped?

A. That's right.

Q. What has been the result of this on your profits, Mr. Akin?

A. Well, it has decreased our profits. We made all possible conservative methods to improve our machinery and

output, but wages continued to go up, and it has cut our profits considerably.

Q. What have been your profits at Hudson Wire in recent years, by per cent?

A. What do you mean by "recent"?

Q. Let's start with 1955.

[fol. 807] A. In 1955, before taxes, the corporation made 7.4 per cent in net sales billed.

Q. In '56?

A. 9 per cent of net sales billed.

Q. '57?

A. 6.3 per cent.

Q. 1958?

A. .6 per cent.

Q. 1959?

A. 3.5 per cent.

Q. Do you have figures from 1961?

A. That was a loss of 3.5 per cent.

Q. Did you know the Rome Cable Corporation prior to its acquisition, Mr. Akin?

A. Yes, sir.

Q. What kind of a company was it?

A. Well, they were very helpful to me personally and to our corporation. Their officers and their research people were very helpful. They bought copper for me at times, for the company, when there were times I had trouble in procuring it from other sources. They furnished us with special rolled rods so that we could draw fine wire, and I would say they have always been most helpful to us. And have not competed with us in any way.

[fol. 808] Q. Did you know the REA Magnet Wire prior to its acquisition?

A. Oh, yes, sir.

Q. What kind of a company was that?

A. They are a very high type corporation in that they are very aggressive in their selling. They have very high quality of magnet wire and I find they were real good competition.

Q. They were competitors of yours?

A. Oh, yes, sir. I would say they were our leading competitor.

Q. Mr. Akin, have you considered merger with an integrated company in recent years?

A. Well, I might say we have been approached by a number of corporations. And we have considered it, but we have never got to the point where there was any financial arrangements whatever talked over.

Mr. Wertheimer: Thank you.

The Court: Cross.

Cross-examination.

By Mr. Bergson:

Q. Mr. Akin, you talked about the help that Rome Cable gave you in the past. Has that changed since the acquisition?

A. I don't believe it has changed at all. I feel if I [fol. 809] called on Mr. Fraser tomorrow or Mr. Ralston or Mr. Schatzel, I would be as welcome as I have been in the past.

Q. You mentioned REA Magnet wire as one of your competitors. Is Rea Magnet Wire an integrated copper company?

A. I don't believe so, sir. I never heard that they even had a rolling mill.

Q. They are in about the same position that you are in?

A. Just precisely so. They were privately owned, also.

Q. And they are no captive sources of copper or copper rod?

A. No, sir, not that I could see.

Q. Do you know whether they have any at this present time?

A. I wouldn't know, sir.

Q. You talked about making a small amount of aluminum magnet wire; do you make that aluminum magnet wire on the same machines that you make the copper wire on?

A. Yes, sir.

Q. You use the machines interchangeably whenever you have an order for the particular product?

A. We do, sir, and, of course, as it has been testified, [fol. 810] we use a different lubricant.

Q. Yes, but the part of changing the lubricant is not a major item?

A. It is interchangeable with a small change in the shapes.

Q. You, of course, have been listening to the testimony here at least one day?

A. Yes, I have.

Q. And you know what this case is about?

A. Yes.

Q. Has the acquisition by ALCOA of Rome Cable Company hurt you in your business in any way?

A. Not that I have observed.

Mr. Bergson: Thank you.

Mr. Wertheimer: No further questions.

The Witness: Thank you, sir.

(Witness excused.)

Mr. Wertheimer: Mr. McNair.

LYLE WILLIAM MCNAIR, called as a witness in behalf of the Government, being first duly sworn, testified as follows:

Direct examination.

By Mr. Wertheimer:

Q. Will you state your full name and position for us?

A. I am Lyle William McNair, President of Hazelwood [fol. 811] Engineering and Equipment Company, St. Louis, Missouri.

Q. Keep your voice up, Mr. McNair, please. How long have you been President of Hazelwood?

A. About four years.

Q. What were your activities prior to that time?

A. I was Chief Engineer of Dow Chemical, Madison Division, for about nine years.

Q. Are you an engineer?

A. Yes, sir. Graduate engineer from Iowa State College, Ames, Iowa.

Q. When was Hazelwood Engineering & Equipment Company founded?

A. Approximately 13 years ago.

Q. By whom?

A. We had three stockholders, no, four stockholders. My wife—do you want the names of the stockholders?

Q. Well, were you a stockholder?

A. Yes, sir, I am a stockholder.

Q. I see. What does Hazelwood manufacture, Mr. McNair?

A. Well, for the past five years we have had an extrusion operation, aluminum extrusion operation.

Q. Do you extrude anything but aluminum?

A. Outside of some experimental work we extrude nothing but aluminum.

[fol. 812] Q. I see. What types of products do you produce by aluminum extrusion?

A. We make the usual run of architectural shapes for doors, windows, curtain wall sections; we make sections for boats, trailers. We made rod, and, of course, we made conduit, couplings, elbows, that go into the electrical field, and clamps. We make over 800 different shapes.

Q. I see. Do you make aluminum EMT—electrical metallic tubing?

A. No, I considered getting into that business, but after looking into it quite thoroughly we could not see any economic reason for getting into that field.

Q. Therefore, when you refer to aluminum conduit you are referring to aluminum rigid conduit?

A. Aluminum rigid conduit. I might say we were the first independent producer of aluminum rigid conduit, to my knowledge. We were second in the industry only to ALCOA. In time, not in size.

Q. Is the manufacture of aluminum rigid conduit a substantial portion of Hazelwood's business?

A. Well, it is approximately 25 per cent.

Q. I see. What was the general range of Hazelwood's 1961 sales?

A. About two and three-quarter million dollars. We [fol. 813] pushed over about seven million five hundred thousand pounds of aluminum.

Q. In that year?

A. In that year.

Q. How is aluminum rigid conduit made? What is your raw material? Let's start that way.

A. We start with the extrusion billet, which is a circular billet, 6 inches in diameter, 24 inches long. I might say in the extrusion industry there are all sizes and types of presses, 500 ton and below in size, all the way up to 14,000 tons in size. Billet size range from 2 inches in diameter or less up to 32 inches in diameter, 6 foot long.

Q. Yes.

A. So the industry has all sizes of presses and between that. Our press is not the smallest and it is a long way from being the largest. It is rated at 1250 ton and takes a 6-inch billet, the maximum 25 inches long. Our standard billet is 24 inches.

Q. You start with a 6-inch billet and what do you do with it?

A. We heat the billet up to approximately a thousand degrees. Our billet heater is electrical, by electric conduction. The extrusion press, in simple terms, is a horizontal long truck hydraulic press. The main components [fol. 814] of the press are a die assembly, a container—the container, by the way, is a heavy forgea, electrical heat. It contains a billet. You put the billet in this container. It contains the billet while you are applying pressure. The container is sealed against the die on one side. The billet is inside the container. You come forward with the ram of the press and build up pressure which displaces the metal and the billet extrudes it through the die and it runs down the table.

Q. This is the extrusion process?

A. This is the extrusion process in very simple explanation. Of course, the press has pumps and control valves, and it is all automatically controlled and the presses are built for high speed operation, high production.

[fol. 815] Q. Let's see if I can simplify it even further. You put the billet into a press, pressure is applied from one side, forcing the metal, the aluminum, through a die into the desired shape.

A. Right. I might say that shapes, as far as we are concerned, are basically two classes. What you call the solid shape and the hollow shape. The solid shape, of

course, is the shape that doesn't have a hole through it, like angles, channels, window sash. Those dies are flat dies, fairly simple dies, and the average cost of a die, for example, is around $150. Then you have the hollow type used——

Q. Let me stop you right there. Aluminum rigid conduit is made from a hollow die?

A. Yes. A hollow die. Then tubing can be made with a bridge or port hole type die, or by mandril extrusion. I use the bridge type die and port hole type die. Those dies for conduit run about a thousand dollars apiece up to twelve hundred dollars apiece for each size of conduit.

Q. When the billet comes out of the extruding press for conduit, what is its form?

A. Well, as the billet is being extruded through the [fol. 816] die we have a graphite line run on a table a hundred feet long; the pipe runs down this table, runs out hot, about 975 degrees.

Q. What do you do with it next?

A. It is then cooled. We have air fans, blowers, for cooling it, and it goes to a walking beam table that is a hundred feet long and ten feet wide and transferred across this cooling bed to a stretcher. By the time it reaches the stretcher it is cooled down to room temperature and then we take it through the stretcher, clamp both ends and pull it one percent. That gets it straight. It is then transferred out of the stretcher to a saw table and there it is passed through the saw and cut in the case of conduit to the standard 10 foot lengths and then it is ready for the threading machines.

Q. The threading machines—what do they do?

A. We thread both ends of the pipe and chamfer each end. And then we apply a coupling and a plastic end cap on the opposite end for color coding and we lubricate our pipe with a wax lubricant and apply underwriters' label. All conduit carries the underwriters' label.

[fol. 817] Q. Then the equipment you need for the manufacture of rigid conduit is an extrusion press, stretcher, threading machines, and accessory equipment as you indicated. About how much of an investment does this entail?

A. Well, our press and auxiliaries to the press is somewhere around $300,000 installed. Our threading equipment

—we have real modern threading equipment—in fact, we have the same type equipment Alcoa has. Landis Hydramatic. They are the only company that makes such machines. It is fed automatically to the threader. Both ends are threaded at the same time, chamfered and kicked out. That equipment will takes sizes from a half inch through two inches, and costs approximately $30,000. The larger sizes we again use the Landis machine and it is one end at a time on the larger sizes, and that is about $20,000.

Our extrusion dies for our coupling operation is somewhere in the neighborhood of $25,000. Our coupling machines for tapping coupling and chamfering and so on run another $25,000, so in a sense we are talking about at least $100,000 or more for the conduit operation.

[fol. 818] Q. $100,000?

A. Yes, or more. We also have bending equipment for bending the elbows.

Q. Oh, I see. $100,000 in addition to the press.

A. Yes, in addition to the press.

Q. I see. What is conduit used for, Mr. McNair?

A. Conduit is used for raceways, for electrical wiring—it may be used in concrete or underground, overhead; usually it is used in connecting a motor or a piece of equipment, for example, over to a control box or switch box. It may be used for feeder line of bringing power from a sub-station into a building, and distribution of that power through outlets like you may have in this building, and so on. Control cables. Remote control devices. It primarily is necessary for mechanical protection of the wiring, and neat appearance; looks good. And of course all of it has to meet the various codes and underwriters specs that are prevalent in all areas with respect to rigid conduit. You have to use. Not in every instance, but in most commercial and industrial installations I would say.

[fol. 819] Q. Does aluminum rigid conduit differ from steel conduit?

A. What do you mean by that?

Q. Are there any characteristics of one that are not characteristics of the other?

A. Well, they are different metals, of course. The end use is the same. In other words, whether you use aluminum

or steel, it still does the same job. We think, of course, that aluminum has advantages over steel.

Q. What would these be?

A. Well, the weight saving. Approximately one-third the weight of steel. Labor costs are less in putting it up. It is non-corrosive, or at least is more non-corrosive than steel. It has the aluminum finish, of course. Nice appearance. Non-magnetic, which from the electrician's point of view or electrical designer's point of view is an advantage because of the way he can arrange his electrical conductors in aluminum where he can't do it in steel. It bends readily in the field. That is a major part of the installation of conduit, especially on the bigger sizes. Of course, the material in itself is softer. We have a couple of minor prob-
[fol. 820] lems with it, but frankly wire pulling has been brought up by the steel people as not so good in aluminum, but frankly that's the only thing they have got to talk about, so it doesn't amount to much in my opinion.

Q. Are there any differences in the way aluminum conduit and steel conduit are sold?

A. Well, it is sold through essentially the same people. By that I mean it is marketed through distributors as a rule. There are exceptions to that, like on government projects and so on where they are bid jobs—well, even there usually the manufacturer will go through a distributor.

Q. Let me ask you this. Is steel conduit consigned?

A. No.

Q. Is aluminum conduit?

A. Yes. Aluminum conduit is consigned by the prime producers.

Q. Who are the prime producers?

A. Alcoa, Kaiser, Reynolds and Harvey, I believe. I am not sure of their consigning.

Q. What type of a pricing system is used for rigid alumi-
[fol. 821] num conduit? How are the price sheets set up?

A. Well, the price of the product has been fluctuating quite erratically over the past three years. Various price sheets have been put out not only by ourselves but the prime producers and other distributors, and it seems that the change is always downward. Roughly I would say that since 1958 the price has changed at least six or eight times,

and I don't believe anyone knows today what the price, selling price of the product is. By that I mean I don't think they have a price sheet that means a lot to the salesman. I think they use it as a base, and work from the base, and what that difference is between the base and the sale I don't know.

Q. You say the price——

The Court: Let me interrupt and see if I understand. So that right now in this finished product each company as far as you can see fixes their own price?

The Witness: Well, that is essentially so, yes.

The Court: Well, doesn't that make for freer competition?

The Witness: Well, yes, it does. However, I think [fol. 822] there is a difference probably between competition and cut-throat competition.

The Court: Oh, Yes.

The Witness: And again I am not the one to judge whether it is cut-throat in the conduit business or not, but again it is getting awful close to where it is almost impossible to make a profit on it.

The Court: In other words, competition is so close now that your margin of profit is almost——

The Witness: That's right, your Honor.

The Court: When you say there appears to be no regular price list or any firm price list, that means that one company may well undersell another?

The Witness: That's correct.

The Court: Doesn't that tend to give the purchasing public the advantage of competition between these companies who make the finished product?

The Witness: Yes, it does, and I think too that the price [fol. 823] cutting like that, people buy it more readily. It is a new product. You have to do certain things to introduce a new product. I don't agree with the primary producers that price is the only thing—we have got so many advantages we don't have to sell price all the time. However, price cutting has introduced the product and moved it faster, but again it gets back to the point I said before as to how far can you go in your price structure and still survive, and if you go beyond that, it is no good for anybody in my opinion.

The Court: I agree. I am not a businessman and all I can do is kind of watch these things as they go along. Certainly business, to exist, must make a profit. I don't care whether it is primary, secondary or whatever it is. And this close competition tends to make each of these ultimate manufacturers pare their own costs and increase their own efficiency.

The Witness: Right.

The Court: So that a close competition of this kind [fol. 824] tends to create efficiency in manufacturing, does it not?

The Witness: Yes, sir. Usually the small fellow is handicapped a little bit there because of buying the most modern type of equipment. This equipment is expensive, and a lot of times he gets in trouble there, but usually overhead and other things are less and it tends to compensate some, too. There is give and take both ways. There should be room for both, but again—well, I guess that's why we are talking about it.

The Court: I just wanted to see if my understanding—just looking at it broadly, is the same as yours.

We have a plant at GE here in this city. They are constantly improving methods, or claim they are. I am not mechanic enough to say. And so as to cut their costs of taking base product and turning it into a finished distributable product. They are constantly attempting to cut down that cost, so as to keep that margin of profit, be-[fol. 825] cause if they don't their margin of profit will disappear. It is a common thing that happens to all business.

The Witness: Yes, it is sort of a profitless prosperity in my business. We have to work three shifts to make a profit. It takes us two shifts with our operation to break even. Our profit, if we make any, is on the third shift.

The Court: All right.

By Mr. Wertheimer:

Q. Mr. McNair, I wonder if you could compare the highly competitive state of aluminum conduit with the erratic fluctuating prices that we spoke of and the low profit margins with your prices for aluminum billet.

Mr. Bergson: I find that a very involved question, and I think counsel is testifying.

Mr. Wertheimer: I will rephrase it, your Honor.

The Court: I think it is a little involved. I am not certain quite what you are getting at myself.

[fol. 826] Q. Compare the price structure of aluminum conduit—prices at which you have to sell the product—with the prices of aluminum billet—the prices you have to pay for your raw material.

A. You mean present day prices?

Q. And over the last two or three years.

A. You want me to answer that, your Honor?

The Court: Yes.

A. Well, billet price is approximately 25 cents a pound, 24, 26, somewhere. The average selling price of our conduit—again we get into zone pricing, freight, all of those things, and I have to estimate that somewhere around 37 cents a pound.

Q. This is the present day?

A. This is the present day.

Q. What was it a couple years ago? Was there any greater or smaller difference—margin?

A. If you would like to take the time, I will give you the prices of the billet that I used since 1958.

Q. Fine.

A. In April, 1958, the price was 26.5 cents. In August, 1958, it was 27.2 cents. In July, 1959, the freight allowance [fol. 827] was discontinued. In December, 1959 it was 28 cents. In August, 1960, it was 28.3 cents. In June '61 it was 27.2 cents. In September, 1961 it was 25.5. In December, 1961, it was 25.3. However, there is a scrap allowance set up into some of these prices which affected it a cent one way or the other, but essentially that has been the pattern of billet prices, which is about the same, maybe a cent a pound more than it was when I first started in the conduit business.

Q. Will you characterize these prices as fairly steady? What was the greatest differential there? It went up to 28?

A. It was I think 28.3 to its present price which is the lowest today—around 25.3.

Q. Three or three and a half cent difference?

A. That is with the scrap allowance not in the picture.

Q. How widely have the prices of aluminum conduit fluctuated during the same period?

A. Of course conduit, we being the first independent in the business, we priced our product about ten percent higher than steel, and had considerable success in selling it, and as others got into the business the price then started [fol. 828] to drop, and it is selling today at the lowest price I have ever sold conduit. And it is approximately 25 percent less than what I started selling it at in 1958.

Q. So there has been a 25 percent difference in the price of conduit, and a smaller difference in the price of your aluminum billet?

A. Yes.

Q. You paid book or list price for aluminum billet?

A. Yes, sir.

Q. And you do sell your conduit at book or list price?

A. No, this extrusion business is quite unusual in that respect. The raw material is pretty firm price-wise, term-wise and so on, but once you extrude this through a press the price varies all over the map. It is not stable as to price, terms of sale and so on. I guess the reason for that is that there are more producers, independent producers and others that have presses, and I suppose—I don't know all the reasons—I just know that they exist.

The Court: The demand for your type of finished product [fol. 829] has increased greatly in the last five or ten years?

The Witness: Yes.

The Court: So as the demand increased, why I assume more people go into this extruding process.

The Witness: That's correct.

The Court: From my own observation, we see now these aluminum doors commonly on practically all the new houses anyway.

The Witness: Yes, sir.

The Court: Where five or ten years ago we didn't see them.

The Witness: All wood.

The Court: Yes. So that really what has happened as far as your type of business is concerned is an increased

demand for your product, coupled with an increased number of manufacturers in that type of business.

The Witness: That's correct. You see, the extrusion process is such that for a relatively small investment you can get into the extrusion business. Of course, I don't mean [fol. 830] to say that a half million dollars is small, it is not small to me, but compared to making the same product out of steel, the cost is way beyond. So therefore you have opened up the extrusion market to more independents. The smaller fellow that wants to get in and extrude aluminum.

The Court: There is a big difference in the quality of the finished product in this extrusion process, isn't there?

The Witness: Yes, sir.

The Court: In other words, there are cheap grades and reasonably good grades.

The Witness: Usually in thickness. Nobody wants any metal in their sections anymore. They pay for it by the pound—they want it as thin as possible—and when you put in a window or a door——

The Court: Some of them, when the wind slams the door once, that's the end of the door.

The Witness: That's right. We like heavy sections. The thin ones are hard to process.

[fol. 831] By Mr. Wertheimer:

Q. What type of pipe is used for the manufacture of aluminum rigid condit?

A. The dimensions are by Schedule 40. Standard size as to o.d., i.d. and wall thickness.

Q. Is Schedule 40 pipe used for any purpose other than the manufacture of aluminum rigid conduit?

A. Oh, yes, we sell the same pipe for fence post, sign post and process piping, some process piping, like oillines.

Q. Is the price of Schedule 40 pipe when used for conduit different from the price of Schedule 40 pipe when used for other end products?

A. As a rule, yes. Our conduit, of course, is much cheaper because of commodity pricing setup, I suppose you would call it, at least it is in more demand, there is more volume there so the price is down. As I said before, conduit sells for somewhere around 37 or 38 cents a pound, threaded both ends, coupled end cap and so on. I can sell

that same pipe for fence post and get 43 cents a pound and don't have to do anything to it. Why they don't go out and buy conduit for fence post I don't know. That's what they should do. Some process piping where you sell [fol. 832] 21 foot lengths, we get as much as 60 cents a pound for it.

Q. So the difference in the price of the pipe is determined by its end use?

A. That seems to be the pattern?

Q. Are there any advantages which the integrated producers have over you in the sale of aluminum rigid conduit?

Mr. Bergson: I think that calls for a conclusion, your Honor.

The Court: Yes, it does, but I will take his idea of it. Whether the integrated man has the advantage over the non-integrated.

The Witness: Well, the integrated companies, of course, have to be much larger. They go all the way back to the bauxite.

[fol. 833] The Court: Their investment is very much more.

The Witness: Their investment is higher, more people, and overhead, and so on. However, on the other side they have the profit to work with and I think there is a profit —I am not sure, though—from the bauxite up, ingot or the billet. We have to start with the billet. And get our profit through the extrusion process, and naturally paying 25 cents a pound for your raw material and selling at 37, there is not too much of a margin therefore to work on, because there is a lot of scrapping, your overhead, and so on. But from their bauxite through to their 25 cents a pound, they should have approximately the same margin to work. So, they, in a sense, are selling pounds of alumina and getting the profit all the way through; whereas we are only selling aluminum billet.

Of course, I recognize that they have their headaches, too.

By Mr. Wertheimer:

Q. Do you consign your aluminum conduit?

A. No, sir, I can't afford to.

[fol. 834] Q. And I believe you said before that the primary producers do consign?

A. Yes, to my knowledge, all of them do. That is consign conduit.

Q. What sort of credit terms do the prime producers offer?

Mr. Bergson: If you know.

A. Well, may I answer that in a general way, your Honor, or do I have to——

The Court: Well, if you know, it is all right. If you are just guessing, well, it doesn't help me much.

The Witness: It varies so much that I can't pinpoint it. Again it gets into the area of what the traffic will bear. All I can say it is more flexible on the finished product side than the raw material side.

Q. Let me see if I understand it, Mr. McNair. Credit is generally very liberal on the sale of aluminum conduit by integrated producers.

The Court: Credit by whom?

Mr. Wertheimer: The integrated producers.

The Court: In the first place, I think this man ought to tell whether or not he knows of the credit arrangements [fol. 835] of the integrated producers. Because it is available. And if we are just taking a guess, I am sure the witness doesn't want to guess, because it doesn't help me a bit if he guesses. Because, I suppose it is available.

Q. Mr. McNair, are you familiar with the credit policies of the integrated companies in their sales of conduit, aluminum rigid conduit to distributors?

A. I can tell you how a consignment works which involves credit, but again I am not——

Q. I think we have enough on consignment. Let's just turn to credit terms, the days of latitude you have before your obligation is due. You are familiar with electrical distributors; are you?

A. Yes.

Q. Are you familiar from your own knowledge with the credit terms the integrated companies make available to those distributors on the sale of aluminum rigid conduit?

A. In a general way.

Q. Are you familiar with the credit terms of those same integrated producers in the sale of aluminum billet or raw material to you?

A. Oh, yes, I am very familiar with that.

Q. Is there any difference in the two?

[fol. 836] The Court: Well, let him give what they are, and I will determine whether there are any differences.

Q. All right. Would you state what they are?

A. Well——

The Court: What is your credit term for billet? That is what you want.

The Witness: The credit terms for billet, the book is net 30 days. Freight is paid to your plant. I can't pick it up in my own trucks. They have to deliver it. Now, I am not saying that some of the terms are not deviated from the 30 days. They do. But the book says 30 days. Of course, I suppose the book on extruded products on conduit, well, they have 2 per cent cash prox. period. Everybody gives it. I never have been able to collect that 2 per cent cash. They will take long on credit for 30 days and there is nothing that you can do about it. You can sue them and that takes three years.

The Court: And by the time you get through with your lawyer there is nothing.

The Witness: That's right. And the consignment end of it, just putting the stock in a distributor's warehouse [fol. 837] and having it available to him, and he doesn't have to pay for it until he sells it, and what terms he gets beyond the time he sells it, whether it is 30 days, or what, I think it would depend on the distributor. At least there is a lot of flexibility there with consignment on the consignment end of it. And, of course, by consignment they get a lot of the over-the-counter business. I can't get any of that business because the freight just to send a few hundred feet of different sizes 100 miles or so away—in my area we would come out all right, but at long range, unless I did consign, I can't get that over-the-counter business.

Q. Mr. McNair, what is package selling?

A. As I understand it, in our area it is sort of a name

given to where a distributor goes in and bids a job and sells many commodities used on that job, such as conduit, couplings, elbows, switchboxes, lighting fixtures, panel boards, footing wire, cables and so on. Of course, usually he will bid to get the whole type of equipment. He may give you a break on the price of some items. The main thing he is after is the total, to make a profit on the total of these items, and, of course, depending on the size of the [fol. 838] distributor, whoever is selling the distributor, he can be more flexible in his pricing if he has more products to work with.

Q. How does this practice affect you?

A. Well, of course, since we, in most cases, would only make conduit, couplings and elbows, in such cases we wouldn't have any other products to lean on, so to speak, to come up with a profit, so we make it on these items. I suppose if you are larger and have other products you can be more competitive. Simply because you have more items and more dollars involved and more pounds involved.

Q. What is reciprocity in your business, Mr. McNair?

A. That means you scratch my back, I scratch yours.

Q. How does it work in regard to the sale of conduit?

A. Well, I think it comes into play—I think I sell yours and you sell other products that I make. It is present all the time.

Q. How does it affect you?

The Court: However, he hasn't told us. You have what we call reciprocity in your business, what is reciprocity. It is a little indefinite to me.

The Witness: Yes, sir. It is mainly if you have got something to buy and to sell and you buy and sell between two [fol. 839] individuals, there is an advantage in doing it that way. There is nothing wrong with that type of selling in my book. I think that essentially——

The Court: In other words, the seller takes care of a good customer.

The Witness: Well, yes.

The Court: And a good customer feels that he can go back to the seller if he needs it.

The Witness: Yes, that is one way of it. Or maybe a good customer has a way of helping you get some business. That particular fellow may make a product that you can

use in servicing that business. Well, you would buy it from him because he helped you get the job.

The Court: Oh, sure.

Mr. Wertheimer: That is all, Mr. McNair.

Cross-examination

By Mr. Bergson:

Q. Mr. McNair, we were just talking about these distributor packages. Do you sell through distributors?

A. Yes.

Q. Now, do your distributors handle other items of equipment?

[fol. 840] A. Oh, yes.

Do you mean sell other than conduit?

Q. Other than conduit?

A. Yes.

Q. They sell wire cable?

A. Yes.

Q. Switch boxes, fuses?

A. Yes.

Q. So forth and so on?

A. Oh, yes.

Q. So a distributor handling your conduit could put together the same sort of package that a distributor handling the prime producer's conduit could put together?

A. Well, he could, but if I was selling him two products, more products in that package, he possibly might put together a different package than he could have if he was buying just part from me and part from another.

Q. Are you talking about a distributor as an independent business man? He is not your agent?

A. No.

Q. He buys conduit from you?

A. Yes.

Q. He buys wire and cable from somebody else?

[fol. 841] A. Yes.

Q. He buys switch boxes and fuses from somebody else, and he is interested in making a profit?

A. Yes.

Q. And he is interested in making the same overall profit,

adding up all the other items that the other distributor is interested in making?

A. Yes.

Q. And if he puts together a package and your conduit is in that package, and his overall profit by linking up things together gets him the job, you sell your conduit he gets, he gets the job, and it is no different from anybody else; is that right?

A. Well, not exactly. Maybe he—let's say he has two items from one that he is buying from. He has conduit and light fixtures. From that fellow that handles both of those, he can say to that fellow, "O.K., I will buy the lighting fixture at your price, but on conduit I want your cost—I will buy the lighting fixture at your book price, but on conduit I want your cost, and I will make it up on the lighting fixtures." Then he gets that price. Then he comes in and I only make conduit and he says, "Well, you are high. Here is the competition." That is the difference.

[fol. 842] Q. But take the situation where the distributor has bought from you.

A. Yes.

Q. A stock of conduit. He owns the conduit; doesn't he?

A. Well, yes.

Q. And he owns it for re-sale?

A. Well, he usually doesn't buy it from me in my case unless it is for a job. He has it sold when he buys it from me.

Q. You don't have any distributors?

A. Not stocking them, no. Maybe I misled you before. We sell to distributors but don't sell them stock. Because they want it consigned and I can't do it.

Q. But in any event the distributor to whom you sell can put together and is in a position to put together the same sort of package that the other distributors are in a position to put together?

A. Oh, yes.

Q. Now, you said, I think, that the Hazelwood Company has been in business for 13 years; founded 13 years ago?

A. Incorporated, yes.

Q. Were you one of the original incorporators?

A. Yes. Let's put it a different way. I believe my wife [fol. 843] was. My wife was a graduate engineer and she

was on the original papers, and I was working elsewhere. I had to make a living for somebody else.

Q. What did Hazelwood Engineering do before it went into the conduit business?

A. We ran sheet metal steel form in the electrical trade of making pull boxes and panel boards and control desk, and so on. It had an electrical background.

Q. When did you buy your extruder?

A. About five years ago. In 1957, I believe.

Q. And you went into the conduit business when?

A. In '58.

Q. In '58, and between the time you went into the conduit business and the time you bought the extruder you were in the business of other extruded shapes?

A. Yes. We were unfortunate in our business so that we never got any of the gravy business in the extrusion. The bottom dropped out of things as you will recall in '57. So we went in at the worse time, but we still, we had a little struggle in '57 trying to get new products, trying to get on our feet in the extrusion business.

Q. But you were not in primarily, when you bought your extrusion press?

[fol. 844] A. Yes.

Q. You were thinking in terms of other products than conduit?

A. Yes.

Q. And you would have made an investment in the extrusion press irrespective of whether or not you ever decided to go into conduit?

A. I think so.

Q. So that your expense in going into conduit were these additional expenses of adding the threading machine and the capping device, and the other items that you mentioned?

A. Yes.

Q. You have a pretty efficient threading machine, don't you?

A. I think so.

Q. And a pretty high-priced one?

A. I know so.

Q. There are threading machines that can be obtained for a lot less than the amount that you mentioned?

A. Yes, sir, but you can't get the production.

Q. I understand that. Now, when you first went into the conduit business in 1958 you said you and ALCOA were the only two aluminum conduit——

A. (Interrupting) To my knowledge.

[fol. 845] Q. (Continuing) —makers?

A. I may be wrong, but, to my knowledge, that is so.

Q. Now, what was your principal competition in 1958?

A. Well, I didn't have competition in the sense that we have it today. The problem then was the introduction of a new product and to get someone that would accent its advantages and so on.

Q. You were competing with steel conduit?

A. I was competing with steel, yes, because this business has to come from what steel was getting.

Q. That's right, but the aluminum conduit business to the extent that aluminum has entered the conduit market, it has taken a certain proportion of the steel conduit market?

A. That's right.

Q. And the aluminum conduit doesn't perform any function that is not performed by steel conduit, does it?

A. Well, there is some areas where we can argue about it. I think in a couple of areas there is a couple of functions that you can do with aluminum that you can't do with steel. However, basically it is so. It is still a raceway and the contained wires and so on.

Q. And these areas would represent what percentage of the market which you have?

[fol. 846] A. I am thinking of the magnetic features and it would be maybe 5 per cent.

Q. A very small percentage of the market. Now, let me ask you this, you have given a beautiful explanation as to how aluminum rigid conduit is made. Is there any other way of making aluminum rigid conduit?

A. Well, you can use the mandril type, as I mentioned. The Yoda press rolled sheet. Pipe could be made that way. However, I doubt if the underwriters would approve it because of the weld. But there are other ways of making pipe and you get into the technical end of it whether it is acceptable.

Q. And this welded sheet wouldn't be a very good product?

A. Well, I won't say that it wouldn't work, but I don't believe you would sell any.

Q. I suppose in any business man's book, that means it wouldn't work?

A. Well, this is welded sheet and because of the ridges is objectionable and the thread is different and the underwriters wouldn't buy it.

Q. Now, when you first went into the conduit business, the aluminum conduit business, how did your selling price compare with ALCOA's selling price?

[fol. 847] A. I was lower than your's. You sold aluminum conduit at that time pretty much as a premium product. It was used primarily for acid conditions in the soil, where the metal would lend itself and had to be used either that wa yor get a galvanized pipe with tape around it and so. As I recall the price, the aluminum conduit was somewhere around 40 per cent higher than steel conduit. That was the market at the time I got into it.

Q. So at the time you went into it, when you and ALCOA were the only producers of aluminum conduit?

A. Yes, sir.

Q. And the millstone in this squeeze that was mentioned during your direct testimony was set by yourself?

A. Yes.

Q. And not by ALCOA?

A. Yes, that is correct.

Q. And since then it has been set by competition?

A. Other than you, yes. Pretty much. I would like to comment, if you don't mind, on that price I set. I set it at a price to compete with steel.

Q. Right.

A. The product from the beginning had been sold in competition with steel. I therefore charged more than steel and I still feel because of the advantage of the [fol. 848] product it is worth more than steel.

Q. Right. But you were competing with steel?

A. Yes, I was competing with steel.

Q. And you are still competing with steel?

A. I am still competing with steel.

Q. Isn't it a fact that building contractors ask for quotes on buildings, they ask for alternate quotes on steel and aluminum conduit?

A. In an awful lot of cases, yes.

Q. And it is a question of price and other factors that determine whether or not they will use it?

A. Yes.

Q. And if aluminum is cheaper and has all the desired properties, aluminum will win. And if steel is cheaper, steel will win?

A. I am sorry to say that the price sometimes seems to mean more than anything else. Once in a while you will find an outfit that will give credit to its advantages, but usually it is the price that determines.

Q. Representing ALCOA, I feel like a traitor when I ask a question like this, but does aluminum have certain disadvantages?

A. Well, yes. As I mentioned previously, wire pulling seems to be a bone of contention with the steel people. [fol. 849] They yell about how much harder it is to pull wire. Of course, it is a soft metal. And if they use a steel tube in pulling wire it will tend to cut in around the elbows or bends. We recommend a nylon tape to pull and then we coat it with wax to lubricate the wires when they are pulled through. By doing that, actual tests have been made showing that there is no difference. However, if you don't do it, don't do these things, steel is right.

Q. Isn't it also true, and again I hate to say this, that aluminum is more easily damaged and dented than steel is, and the problems of handling aluminum may be a little more severe than they are in steel?

A. Well, it is softer. However, frankly, if you drop a 4-inch steel pipe from the top of this room to the floor, you are going to have the same effect as when you drop aluminum. Because you have three times the weight and it goes harder and so on. However, as far as laying on the floor and you drop something on it, naturally, being softer, it would be damaged.

Q. So each of them have certain advantages and certain disadvantages. I remember you mentioned the appearance of aluminum being one factor?

A. Yes.

[fol. 850] Q. Of course, a lot of conduit is enclosed in the wall and appearance doesn't matter?

A. That's right, or in concrete.

Q. Or in concrete. And steel has galvanized some of its conduit so the galvanized appearance is pretty much the same as the aluminum appearance?

A. Yes.

Q. So, all in all, there is pretty keen competition between aluminum and steel conduit, wouldn't you say, in the market place?

A. Yes. I like to think in time we are going to take most of it from steel. We have enough reasons to do it.

Q. Me, too. Now, in extruding and drawing your pipe, when you draw, you extrude from 6 inch billets?

A. Yes, sir.

Q. Do you get any of that, do you get any of your raw materials from sources other than domestic producers?

A. Well, I buy some metal from ALCAN, if you consider that other than domestic.

Q. Well, it is on the other side of the border.

A. Sometimes we think of Canada as being our blood cousins.

[fol. 851] Q. Do you buy any in foreign markets?

A. No.

Q. Do you use any secondary metal?

A. No. I tried a couple of loads, but I was not pleased with the finish and so on, and the price difference, especially in my part of the country, so it was not advantageous to me to buy secondary.

Q. I suppose largely due to your efforts in the aluminum conduit business that your sales have increased from 1950 to date?

A. Yes, yes. I won't say how much I had to do with it, but at least they have increased.

Q. And have they increased steadily each year?

A. Well, we have only made a little money the last couple of years.

Q. I ask on the volume of sales.

A. In volume, yes.

Q. I suppose everybody is up against the price situation?

A. Yes. No profit.

Q. But your volume has increased steadily in recent years?

A. Yes, sir.

Q. Would you say that the curve was——

A. The last two, especially, the last three years.

Q. The curve is uninterruptedly up?

[fol. 852] A. Yes.

Q. I think I have only one more question. When you report to the Census of Manufacturers do you recall what form you report on?

A. I sure don't. We report, but in what way, I couldn't answer.

Q. Do you know whether you report conduit on Form MA36-K; would you know?

A. Since I don't make the forms out, my office manager does, I could not honestly answer. I know we fill out a form, I sign it, but in what form it is to go out, I am not positive.

Q. Would it be possible that you report it under the form requiring reports on structural shapes, rods, rather than on the form requiring the report of wiring devices and supplies?

Mr. Wertheimer: I object, your Honor. This witness said he doesn't know.

The Court: Yes, but he calls his attention to another form and asks if he knows. That is the substance of the question. There are apparently two forms on which he could report, if I understand the question.

Mr. Bergson: That is correct.

The Witness: As I recall, it doesn't look like that [fol. 853] form there. But, again, I repeat, I am not positive of the form number itself.

Q. This form MA36-K is for wiring devices and supplies, and this is the Census code for conduit among other things?

A. That is M36-K?

Q. MA36-K.

A. I really can't be positive about it. I know we fill out some forms.

Q. But that doesn't look like it?

A. That doesn't look like it.

Mr. Bergson: Thank you.

Redirect examination.

By Mr. Wertheimer:

Q. Mr. McNair, you are aware that the Census reports are required by law?

A. I am aware that some report is. The one that we are filling out, I assume. Whether this one I am filling out is violating the law or not, I can't answer. We do fill out a Census form.

Q. You do fill out a Census form?

A. Yes.

Q. And to the best of your knowledge, you are not failing to fill out any form?

A. That is not required, to the best of my knowledge.

[fol. 853a] Mr. Wertheimer. Thank you.

(Witness excused.)

The Court: Take a short recess.

The Clerk: Court will be in recess.

(At this point a short recess was taken after which the trial was resumed.)

[fol. 854] Lawrence A. Harvey, called as a witness on behalf of the Government, being first duly sworn, testified as follows:

Direct examination.

By Mr. Melchior:

Q. Would you state your name and place of employment?

A. Lawrence A. Harvey, Harvey Aluminum, Incorporated, Torrance, California.

Q. What position do you hold with Harvey Aluminum?

A. Chairman of the board of directors, and executive vice president of the corporation.

Q. How many years have you been in the aluminum business, Mr. Harvey?

A. Well, principally as an active participant since September, 1946.

Q. What general business is your company engaged in?

A. We are an integrated primary producer of aluminum, of raw products.

Q. Would you state your approximate annual sales?

A. 86 million dollars last year.

[fol. 855] Q. Where are your plants located?

A. The Dalles, Oregon; Salem, Oregon; Torrance, California; Milan, Tennessee; Adrian, Michigan and 14 other factory branch sales locations.

Q. Do you have aluminum reduction plants?

A. Yes.

Q. Where are they located?

A. Dalles, Oregon.

Q. Do you have a fabricating plant to fabricate aluminum products?

A. Yes.

Q. Where is it located?

A. Torrance, California and Adrian, Michigan.

Q. Would you state specifically what aluminum products you do manufacture and sell. You don't have to give us too much detail, because I understand you have a fairly broad line, so you can give it to us in a particular category.

A. We produce primary aluminum and all of the aluminum rod mill products, with the exception of sheet, plate, scrap, foil and cable.

Q. You do not produce aluminum wire and cable, is that correct?

A. We do not currently.

[fol. 856] Q. Are you an integrated producer of primary aluminum?

A. We are.

Q. Are you generally familiar with the processes involved in the production and sale of aluminum conduit?

A. I am.

Q. How long have you been producing and selling aluminum conduit?

A. Past two years.

Q. Since 1960?

A. Since 1960, yes.

Q. What type of aluminum conduit do you sell?

A. We sell what is known in the trade as rigid conduit.

Q. Is that the only type of aluminum conduit you sell?

A. Yes, sir.

Q. What raw material do you use in manufacturing aluminum conduit?

A. Our primary metal is the primary raw material.

Q. Where do you get that?

A. We produce it ourselves. We are our own pro-
[fol. 857] ducers.

Q. You produce the raw material yourselves?

A. Yes.

Q. Why did you decide to go into the aluminum conduit market in 1960?

A. Because of an economic study made of the market potential and possibilities in various product fields, we picked among others the aluminum conduit business after study for a number of years of its potential over the past and future.

Q. Would you state what these studies showed? I didn't hear your last remarks.

A. It showed there would be a growing application for aluminum rigid conduit in the electrical products field, due to the general acceptance, in our opinion, of aluminum, due to the general growth of the electrical industry as a whole, and the general prosperity, economic growth of this country.

Q. Did you hear the previous witness, Mr. McNair, testify generally as to a number of advantages possessed by aluminum conduit?

A. I did.

Q. Do you generally agree with his remarks along those
[fol. 858] lines?

A. In general. I do not agree with his negative remarks.

Q. Would you care to add to his remarks, with respect to the advantages of aluminum conduit?

A. Well, we think among the major advantages of aluminum that he did not mention is appearance, (1), neatness of the job; (2), ease of fabrication, which means a reduction of labor cost, of manpower in the larger diameter conduit is easier to install, less physical burden on the personnel. The people in the electrical industry prefer lighter weight products because of the ease on the back and stomach muscles in the handling and installation of the equipment.

Q. Now, Mr. Harvey, may I caution you it would be be better if you would speak a little more slowly because

we have to get the testimony into the record and the reporter may not be able to keep up with your testimony.

A. She seems to be doing very well.

Q. I didn't mean to insinuate—does your company publish a catalogue of aluminum rigid conduit?

[fol. 859] A. Yes; it does.

(Government's Exhibit 495 marked for identification.)

Q. Mr. Harvey, I hand you Government Exhibit 495 for identification and ask you if you can identify it?

A. Yes. This is a brochure on aluminum rigid conduit, which includes our general product catalogue describing the aluminum rigid conduit made by us, the advantages of rigid aluminum conduit, and a certain amount of comparative weight charts in relationship to aluminum versus steel, and certain other sales and code approval literature all affecting merchandise promotion of aluminum rigid conduit by us.

Q. Was this catalogue prepared under your general direct supervision?

A. Yes, it was.

Q. To the best of your knowledge and belief, are the facts set forth therein true?

A. They are.

Mr. Melchior: We offer Government Exhibit 495 for identification.

The Court: Received.

[fol. 860] Q. Does your company publish price lists for aluminum rigid conduit?

A. It does.

Q. When was the first price list issued?

A. The first price list was issued in—let me fresh my memory by looking at my notes—it was published first on March 1, 1960.

Q. Have there been any changes in your price list since that date?

A. Yes, there have been.

Q. Would you state what they have been?

A. Well, they have been a series of unfortunate price reductions, and they have been continuous, and the first price reduction was issued on April 1st, April Fool's day,

1960 and it amounted to two and a quarter percent reduction. And again on August 26, 1960 a five percent reduction. And then again on January 17th, 1961 the accessories or what we might call elbows and couplings were further reduced by five percent, and then on April 10th, shortly after Fool's day again 1961, prices were again reduced five percent, and then there is a subsequent catalogue price sheet September 14th, 1961.

Q. Now from a percentage standpoint can you estimate [fol. 861] what these reductions totalled from the original one back in 1960?

A. The published sheet shows reduction in excess of about 12½ percent.

Q. Now, have your competitors in aluminum conduit made the same or similar price reductions, to your knowledge?

A. To my knowledge they have.

Q. Have any of your competitors, to your knowledge, made any additional reductions by discounts or otherwise in these published price lists?

A. To the best of my information and belief, yes.

Q. To what extent have they done this? Can you elaborate on that a little bit, if you know?

A. Well, to the best of my knowledge there have been variable prices by various members of the trade. Among them were illustrated by the testimony before the court here earlier during this trial, and even today, in which variable prices have been quoted by various people, either through distributors or directly to electrical contractors, in order to either encourage the sale of material or to be competitive with prices of other competitors.

[fol. 862] Q. Do you know which of these competitors of yours made these price reductions? Can you identify them?

A. To the best of my knowledge and belief, all of them.

Q. And who does that include?

A. All of the primary producers—Kaiser, Reynolds, Alcoa, associated companies of Olin, and some of the larger independent companies such as Channel Master, Jasco, Hazelwood Engineering.

Q. Now, Mr. Harvey, what change has there been, if

any, in the market price of primary metal during this same period from 1960 to the present time?

A. Well, the price at the beginning of the time we started in the conduit business of the primary metals was 24.7. It subsequently went to 26 cents, and more recently it dropped to 24 cents; that is the current United States published price, but it does not necessarily mean it is the price at which some metal is sold in this country.

Q. Do you know what the market price is today? Is there a market price?

A. Yes, there is an official market price published by the [fol. 863] American Metal Market, a daily trade journal for the metal industry, and there is an official published price by the major primary producers which is 24 cents.

Q. Now, would you say the price trend since 1960 in the primary metal has been downward, remained the same, or——

A. I think I would better characterize it by saying it has attempted to raise or lift itself to cover increased operating costs and expenses, but because of competition within the industry both domestically and abroad, the tendency has been for it to lower itself.

Q. Can you give me an indication perhaps or a percentage basis of how much this is?

A. I would say the price drop amounts to about 8 percent.

Q. Now, Mr. Harvey, do you sell accessories along with aluminum conduit?

A. Well, if you refer to elbows and couplings, yes, we do.

[fol. 864] By Mr. Melchior:

Q. Do you sell any aluminum conductor wire and cable?

A. No, we do not.

Q. Do you sell any conductor wire and cable?

A. No, we do not.

Q. That is one of the products I believe you stated earlier that you do not make?

A. That's right, sir.

Q. Do any of your competitors in aluminum conduit sell those three items?

A. Yes, they do.

Q. Would you identify each of your competitors who do this?

A. Yes. They are Kaiser, Reynolds, Alcoa, Olin, and a number of—no, I don't know of the independents, I don't think any of the independents do in the conduit business. Just the primary producers that sell the wire and conduit, the four I mentioned.

Q. And accessories. Now, when your competitors, your integrated competitors sell these products, do they on occasion sell them as a package, as the term might be used in the trade?

Mr. Bergson: If he knows.

Q. If you know.

A. To the best of my information during the course and [fol. 865] conduct of my business, it is my understanding in the trade that it is generally sold as a complete distributor line and not necessarily as an individual item, to be sold as a distributorship item. For example, if I may illustrate, I don't know of any particular occasion as such per se in which they have gone out and sold conduit with the offer of full line, where they have not either asked, insisted upon or tried to sell the balance of their production line.

Q. How does this practice affect you, if it does?

A. Well, in those areas where is it possible, and it has happened to us, there is what we call in the trade, technically, a package arrangement with the distribution of products and sale by a distributor of a group of items of the general electrical category, it is possible to put a price as a group as distinguished from quoting a price on individual products which may or may not include a discount; which may or may not encourage the sale of the package. We have a case in point. It is not against the defendant here, but against another integrated producer in which the price that we quoted for conduit was substantially less than the cost price quoted by the distributors.

[fol. 866] He advised us it was higher from this other integrated producer, yet he bought from the other integrated producer because the other integrated producer had a cable business and so forth, and if he didn't do that, he would lose his distributorship and his cable business, and therefore, it was sold as a package.

Mr. Bergson: I move to strike that.

The Court: Yes, it has got to be stricken out, unless you lay a foundation for it. How can anybody meet it.

Q. Do you recall this particular incident?

A. Yes, I do.

Q. Can you identify the companies or parties involved?

A. I don't recall the distributor's name offhand, but I do recall the town in which it was, and I do recall the name of the integrated producer.

Q. Would you identify the time when it happened?

Mr. Bergson: I object, your Honor.

The Court: Sustained. He must fix the time and place and who was present.

Mr. Melchior: I am trying to get that.

The Court: He tells you to start off with that he don't know the name of the distributor involved.

[fol. 867] The Witness: I don't recall it at this time.

Q. Do you recall the time when this incident happened?

A. Yes, I do.

Q. Do you recall the integrated company that was involved?

A. I do.

Mr. Bergson: How would ~~you know the integrated~~ company involved?

The Witness: The information came to me in the normal course of our business.

The Court: Someone told you.

Mr. Bergson: Hearsay.

Q. Who told you?

A. Our sales man contacting the distributor.

Q. Is this the way you get information in your normal business?

Mr. Bergson: This is hearsay twice over. I underscore my objection.

The Court: I will let it in if there is enough foundation so anybody can meet it. I want to know the time, place, the distributor involved and what the distributor said and what anybody else said in connection with this transaction.

Q. Can you give us the time, place?

A. Yes.

[fol. 868] Q. Will you state the time it took place?

A. This took place in Texas, El Paso, Texas.

Q. Can you state the time?

A. Towards the latter end of last week.

Q. Last week?

A. Yes.

The Court: Who was present?

The Witness: Present was our distributor representative, our direct factory man who works directly under me, and the distributor himself.

The Court: How do you know?

The Witness: It was reported to me by our representative.

The Court: Aren't we getting into hearsay?

Mr. Melchior: Yes, we are, and we are trying to show that it is an exception to the hearsay rule and it comes through to him in the normal course of business. May I examine further?

The Court: Yes. Go ahead, but you have got to find out before you get anywhere and nobody can meet it, the name of the distributor involved, because he wasn't there. Haven't you got to get those things for your [fol. 869] foundation?

Mr. Melchior: Yes.

Q. Do you know the name of the distributor that was involved?

A. I don't recall it.

Q. How many distributors are in that town; do you know that?

A. No, I don't recall the exact number. There are several.

Q. There are several?

A. Yes, there are.

Q. Is this distributor the distributor that you normally deal with?

A. This is the one that we wanted to normally deal with.

Q. What does this mean?

A. It means that we were soliciting the business and had quoted a price and were told we would receive the order,

and we were subsequently told that we would not receive the order.

Q. Do you normally attempt to deal with other distributors in this town?

A. In this particular case we did not.

Q. This is the only distributor that you deal with in this town?

A. Yes.

Q. So it can be determined who the distributor is?

[fol. 870] A. Yes.

Mr. Bergson: He just said he didn't deal with him.

Q. Is there any other distributor that you normally attempted to deal with in this town? Have you ever attempted to deal with any other distributor in this town other than the one you refer to?

The Court: You mean attempted to sell?

Mr. Melchior: Yes, attempted to sell. Apparently he has been unsuccessful in his attempts to sell.

Q. Is that correct?

A. Yes, that is correct.

Q. And that is the only one you have attempted to sell to?

A. Since that time your man has attempted to sell to others as well.

Q. Now, how long after the incident did the report come to you?

The Court: How does he know, if he wasn't there?

Q. How did the information come to you, Mr. Harvey?

A. By telephone.

Q. And from whom did the information come?

A. From our representative.

[fol. 871] The Court: Who was he?

The Witness: Who was he?

The Court: Yes.

The Witness: Bryan L. Harvey; my son.

Q. Did your son inform you how long after the incident took place that he notified you of the transaction?

A. If I recall the conversation it was the same day.

Q. The same day. Is this normal in your business operations to receive reports like this on the same day?

A. Yes, it is.

Q. You can identify the integrated producer that was involved?

A. I can.

Q. The only party you can't identify is the precise name of the distributor?

A. That's right, but we know that the distributor is the only distributor that your company has ever dealt with, or attempted to deal with, in that town.

The Court: Oh, no.

A. That is not what I testified to.

Q. I misunderstood your testimony, then.

A. We had contracted other distributors on electrical products in the town.

Q. Oh, I see.

[fol. 872] Mr. Melchoir: Well, we submit that sufficient fact basis has been obtained.

The Court: No. Sustained. Why don't you produce the evidence. It is in existence, instead of having to guess. Here is what happens. This man's son calls him up and tells him something of what happened. Where the son got the information from is still hearsay, so you have hearsay based on hearsay. One hearsay is bad enough, but what you are doing is piling hearsay on hearsay. The direct evidence must be available.

What is the name of the producer?

The Witness: Kaiser.

By Mr. Melchior:

Q. Now, earlier, Mr. Harvey, we were discussing, I believe the products of competitors, or some of them. I believe you referred to it as conductor wire and cable, conduit and accessories. Do you believe that offering a related line of goods such as this would be an asset in your business?

A. In my business judgment it would be.

Q. Now, have you ever considered going into the production of aluminum wire and cable?

[fol. 873] A. We have.

Q. Have you ever made any studies as to the price of entry into this field?

A. We have.

Q. And what have you concluded, if you have?

A. There are opportunities in the business.

Q. Do you feel that aluminum wire and cable would be a valuable addition to your aluminum product line?

A. We do.

Q. Why?

A. Because it is a profitable source of manufacturing and distribution and we think it would be an aid to other aluminum products that fit the general type and general product line and that it is a good addition productivitywise to our facilities.

Q. Have you produced ingot and rods suitable for the manufacture of aluminum wire and cable?

A. We produce what others in the trade might term ingot cable.

Q. Have you ever considered the possibility of acquiring an existing wire and cable producer?

A. Yes.

Mr. Bergson: I——

The Court: No, overruled.

Q. Why have you considered this?

[fol. 874] A. As a means of entering the business.

Q. Have you considered this as a possibility of entering the business by building it yourself, by building the facilities yourself?

A. Yes, we have compared it.

Q. Have you drawn a conclusion as to which might be more suitable from your standpoint?

A. I can give you both a business opinion and a personal opinion.

Q. We would like the business opinion.

A. A business opinion would be it depends on the cost of the acquisition. In other words, an analysis of the cost of establishing our own facility or the cost of acquiring an existing facility and the cost of making our own facility which we may acquire and bringing it up to the sales and distribution of an existing business.

Q. Have you found an estimate of how long it would take to build such an organization?

A. Yes.

Q. And to secure the necessary know how?

A. Yes.

Q. What is your opinion on that?

A. It would take us not less than two, and I believe it would take us five or six years to make a substantial im-
[fol. 875] pression upon the market.

Q. Would it require the expenditure of substantial funds?

A. Yes, it would.

Q. Have you formed an estimate as to how much it would cost to go into the business in the manner you have considered?

A. Yes, we have.

Q. Can you tell us your findings on that?

A. The order of magnitude we had under discussion was about five million.

The Court: But, you see, unless I have some idea of the order of magnitude it don't help me a bit. You can go out and buy this business for some five million dollars or a one million dollar basis.

The Witness: You could, your Honor, but I don't think it would be competitive enough unless it was a large enough scale.

The Court: What I am pointing out to counsel is that it doesn't help me a bit, this kind of testimony. Your question is have you thought about going into the business and how long it will take you to get into the business that you
[fol. 876] desire to be in, and of course, I assume anybody can go out and if they want to get into a business, the steel business, they can buy——

The Witness: Some people don't want to sell the business.

The Court: That's right. That's right.

By Mr. Melchior:

Q. Were you generally familiar with the operations of the Rome Cable Company prior to its acquisition by ALCOA?

A. Not with the details of the operations, no, sir. Only a general knowledge of the trade.

Q. Would this be a type of operation you would feel necessary for you to go into in order to be competitive?

A. In some phases of the work, yes, but not in all.

Q. You wouldn't have to go into all the constructions they were in?

A. I don't believe so.

Q. You could go in on a substantially smaller basis and be competitive, you feel?

A. On some of their products and some of their production line.

Q. But not their broad line.

A. What I mean, we are in the aluminum business and they are in the copper and aluminum business, and our interest lies in the aluminum business and not in the [fol. 877] copper business.

Q. What is the minimum expenditure funds you would feel would be necessary to put you in the aluminum wire and cable business and to become competitive.

A. I would appreciate it if you would rephrase the question because it is so broad that unless I set forth the basic postulates behind it and how broad we intend to set up a competition, it would be almost impossible to answer it.

Q. You are a producer of aluminum ingot?

A. Yes, sir.

Q. You have facilities for producing ingot and billet?

A. Yes.

Q. You have facilities for producing aluminum wire bar?

A. Yes, we do.

Q. And you have facilities for producing aluminum rod suitable for manufacturing aluminum wire and cable, is that correct?

A. We do have, but we do not think they are of such a nature in character as to currently be competitive.

Q. In other words, if you were going into the aluminum wire and cable business you would have to improve your existing facilities with respect to aluminum rod?

A. We would plan to build new facilities.

Q. Can you form an estimate as to what you think the [fol. 878] minimum estimate would be to improve your rod making facilities to make you competitive in the aluminum wire and cable business?

A. I have previously stated that our estimate, with the

size of plant we contemplate, what we thought was our reasonable share of the market development, would be in the neighborhood of five million dollars.

Q. This would include the rod making facilities as well as the wire drawing?

A. This would include rod making facilities, wire drawing, wire stranding, what we call the birds and the flowers, which means both, which means uninsulated wire, whether it be carried on a steel wire conductor or core wire and multiple strand and including the insulation.

Q. Do you think there would be any problem involved in know how in acquiring the know how in this field?

A. Yes, I do.

Q. Have you presently, or do you presently have within your organization, sufficient know how to do this?

A. I will answer you, and I don't want to be facetious, as you know, yes, and no. Yes, we have the management and technical know how, but no, we don't have the engineering personnel of sufficient size and number to carry [fol. 879] on the production.

Q. This would be another factor you would have to consider in going into this business?

A. Yes, sir.

Q. Now, Mr. Harvey, do you consign aluminum conduit to your customers?

A. Yes, we do.

Q. Now, do you consider this consignment practice to be something in the nature of a credit advancement to your customers?

A. Yes, we do.

Q. Why do you do it?

A. We do it in order to meet competition.

Q. Your competitors do it?

A. They do.

Q. Which of your competitors do it?

A. To the best of my knowledge and information, all of them.

Q. Now, what share of your aluminum conduit sales are on consignment? You can do this perhaps several ways. Let me put it this way. How many distributors do you have throughout the nation?

A. Well, if I might refer to my notes in order to help

me along, in the States of Arizona, Washington, Oregon and Southern California, we have a total of 27 distributors [fol. 880] of Harvey Aluminum Rigid Conduit.

Q. Now to how many of those 27 do you consign rigid aluminum conduit?

A. We consign to 16 of them.

Q. And the remainder?

A. Outright purchases.

Q. Now, on a percentage basis, considered from the standpoint of monetary return, could you form an estimate as to what percentage is consigned?

A. You are talking from a dollar point of view?

Q. Dollar standpoint.

A. I don't recall offhand, but the bulk of the sales made by us on our merchandising program has been outright sales. When I say the bulk I am saying more than 50 per cent, according to the best of my memory and recollection.

Q. Do you find this consignment practice that you engage in an expensive sales practice?

A. I do consider it an expensive sales practice and consider it a price discount.

Q. Do you consider it a price discount?

A. Yes.

[fol. 881] Q. If you know, I believe you stated your competitors also engage in this consignment practice. If you know, do any of your competitors use other forms or systems of financial credit to their customers in selling aluminum conduit?

A. To the best of my knowledge, information and belief, they do.

Q. What other forms do they use, if you know?

The Court: Hadn't we better find out who does it and in what different forms who does it? How can anyone meet —how do I appraise any such thing—unless we get down to something specific.

Q. Would you state who your competitors are that use some or all of these other forms of credit advancement?

A. Kaiser, Alcoa, Reynolds.

The Court: Tell us what Kaiser uses.

The Witness: I will answer you for Kaiser, your Honor, and Alcoa and Reynolds, the answer is the same. They all follow the same practices.

The Court: All right.

A. (Continuing) They have what we call general con-
[fol. 882] signment, which is a common term, and secondly extension of credit. The normal credit in the aluminum business is thirty days, the normal payment is sixty days. In a number of instances goods have been manufactured and kept on order under what we call "make and hold" by the manufacturers and then subsequently delivered to the various distributors or the distributor's customers at a later date because of the time of placement of the order. It is a method of financing inventory or incidentally of the type or nature of product in quantity. Which means, instead of accepting payment when due, in lieu thereof treating the account as current and so reporting it in the trade when it is not in fact current, by taking notes for past due accounts the maturity date of which is even further removed than the original maturity date of the original obligation. We feel this is a very substantial and very material competitive disadvantage, and only a large concern with large financial resources can afford to engage in this sort of competitive selling.

We fortunately have the financial means in order to meet this particular competition, but if we were not
[fol. 883] otherwise so financed and because of large capital required this is followed universally in the trade, it becomes a very severe restriction on competition. It means the larger more substantial accounts can go to those with larger and more substantial resources. I don't think there is any question about it.

I am talking about my judgment of what will and can happen in the future.

The Court: All I was trying to get was the names of the parties that did it and what they did. I guess you have covered it.

The Witness: I have, sir.

By Mr. Melchior:

Q. Mr. Harvey, what are your approximate annual sales of aluminum conduit currently?

A. Well, let me look at my notes and refresh my—you are asking dollar sales?

Q. Dollar sales will be satisfactory. Just approximately. We don't want you to disclose any precise figures unless you want to.

A. Well, I don't know that there are very many secrets in [fol. 884] the trade. The sales volume is about $900,000.

Q. How much was that?

A. Currently running at the rate of approximately $900,000. I might say it is a poor job.

The Court: This would be a good place to stop. You gentlemen are excused until two o'clock.

(Whereupon, at 12:40 p.m., a recess was taken until 2:00 p.m.)

[fol. 885] AFTERNOON SESSION

2:15 p.m.

APPEARANCES:—As before.

The Court: All right, Mr. Melchior.

LAWRENCE A. HARVEY, resumed the stand and testified further as follows:

Direct Examination. (Continuing)

By Mr. Melchior:

Q. Mr. Harvey, before we recessed I want to set the record straight on one thing. I believe I asked you which of your competitors utilized the practice of consignment. Would you state your answer to that question?

A. As I recall, my answer was that our principal competitors were Kaiser, Alcoa and Reynolds who followed the practice of consignment.

Q. I see. Mr. Harvey, where do you sell aluminum conduit?

A. This past year we sold it principally on the West Coast, but this current period we are attempting to establish nationwide distribution for the commodity.

Q. How do you sell it?

A. What do you mean by that?

[fol. 886] Q. What pricing system do you use? Do you use the zone pricing system that we heard something about in this proceeding?

A. Yes, we do.

Q. Is this the zone pricing system——

A. Yes, it is.

Q. —that has been testified to by earlier witnesses?

A. To the best of my memory and recollection it is similar to what was testified to by the previous witness.

Q. I believe you said you were trying to develop a nationwide distribution.

A. Yes, sir.

Q. What success are you having in this respect?

A. Not too much at the present time.

Q. What steps are you taking to develop this?

A. We have personnel under our marketing program working directly under the commodity division handling this particular commodity who have gone around to various major distributors throughout the United States and have attempted to solicit their representation for our particular items.

[fol. 887] Q. Do you intend to use manufacturer's agents?

A. No. Our basic policy of distribution is to use legitimately established and recognized in the trade electrical wholesale distributors. We had to supplement our sales staff which in effect is the alter ego of the salesman, and use others in the area where the cost would warrant that program.

Q. Have you ever built a distribution in your other fields?

A. Yes, we have.

Q. How long do you think it would take you to build a nationwide distribution in this field?

A. I can best characterize it by saying it may take several years, two, three, four or five years to establish a full distribution program.

[fol. 888] Q. Are there any problems involved in building such an organization?

A. Yes, there are.

Q. Would you want to elaborate on some of the major ones?

A. Well, among the—characterizing the general prob-

lem, one of them, of course, is meeting competition in different areas. Competition in one area may be different than another. It may not be nationwide; it may be regional, which has to do with price structure. You have the problem of getting public acceptance of the product, which means both by the consumer and the appropriate public authorities that have supervision over the construction industry.

We also have the problem of whether or not the proper representatives that we have and the salesmen we use are properly trained and educated, and we have the problem of the proper distributor, whether or not they are now precluded by virtue of existing arrangements with other distributors of like products, so we won't have a conflict of interest between the two. Whether or not they are capable of carrying on and paying their bills. Whether in cer-
[fol. 889] tain other areas the credit practices are such as to affect prices. Things of that general character.

Q. Are you generally familiar with the type of sales and distribution organization that Rome Cable had prior to its acquisition by Alcoa?

A. Just what is commonly known within the trade. I don't have specific and detailed knowledge of the specific distribution system.

Q. Do you know what sort of reputation its distribution organization enjoyed in the trade?

A. According to my best information and belief, a very excellent reputation. Considered one of the outstanding insulated cable and wire firms in the business.

Q. Now, from your experience in building a nationwide sales organization, could you venture an opinion as to how long it might take to build such an organization should you have the purpose to do it?

Mr. Bergson: Your Honor, I have refrained from objecting because of relevancy, but it is going awfully far afield.

[fol. 890] The Court: Hasn't he already told us that it would take two, three, four or five years?

Mr. Melchior: I was trying to tie it in to Rome's——

Mr. Bergson: He said he has no knowledge of Rome.

The Court: He has no intimate knowledge of Rome, just generally. I don't see how you can——

Q. Are you able to form an opinion, based on your knowledge of building a national sales organization and based on your knowledge of Rome's setup?

A. I believe so.

Mr. Bergson: Wait a minute. I don't even know what the question was.

(The pending question was read by the reporter.)

Mr. Bergson: What is the question? Opinion of what?

The Court: The question isn't complete.

Mr. Melchior: No. I want to ask him if he can form [fol. 891] an opinion as to how long it would take to build one of the size and caliber of Rome, if he has formed an opinion.

Mr. Bergson: He says he doesn't know.

The Court: Sustained.

Mr. Melchior: Have you formed an opinion.

The Court: First get some idea of Rome's.

Mr. Melchior: I think he stated he had a general idea.

The Court: Yes, a general idea; it is a very excellent company. Very excellent sales practice; something of that kind.

By Mr. Melchior:

Q. When you mentioned the type of sales organization that you desired to build in connection with conduit, aluminum conduit, did you have in mind that that sales organization would be the equivalent of what you understood Rome's to be?

Mr. Bergson: I object, your Honor.

The Court: Sustained. He hasn't told you what he [fol. 892] understood Rome's to be.

Q. How familiar were you with Rome's organization as it existed prior to its merger with Alcoa?

A. Only that which was common knowledge in the trade. General information about the company and its product and general conduct of business.

Q. Are you generally familiar with the location of its sales offices?

A. Not with all of the sales offices, no, sir.

Q. Are you generally familiar with the location of its warehouses?

A. Not all of them, sir. Those in our area, I know of.

Q. Have you ever placed an offer to supply aluminum conduit to any major construction project?

A. Yes, we have.

Q. Would you identify any of these projects?

A. Well, we have offered to supply aluminum on a major airport job in the United States. The only one of recent consequence we have offered and tried to promote.

The Court: The question is bids; have you submitted [fol. 893] bids. I don't know whether you are drawing a distinction between offering and bids. The question is, have you submitted bids on some major construction contract.

The Witness: In some cases, yes, sir.

The Court: Go ahead.

Q. Would you identify any of these major projects upon which you bid aluminum conduit?

Mr. Bergson: Your Honor, I don't see the relevancy of all this.

The Court: Well, I actually don't either, but tell us.

Mr. Bergson: Job by job?

The Court: Tell us when this happened.

Mr. Melchior: I will do that, if he can identify——

The Court: What is the purpose of it?

Mr. Melchior: I want to show what obstacles are faced even by an integrated aluminum producer who is selling conduit, what he will have to face in meeting competition.

The Court: Well, all right.

[fol. 894] Mr. Bergson: What has that got to do with the merger?

The Court: I don't know. When was this bid you are about to give us?

The Witness: The bid I have in mind—if we are referring to a bid as an offering, actual offering, the one I have in mind took place about two years ago. If you talk about an attempt to negotiate business, and the refusal of the customer to accept even a bid from us, it is very recent.

The Court: Let's keep to the one thing. The question is bids. Have you submitted a definite bid for some large con-

struction contract is the question, and I assume the answer is yes.

The Witness: Yes.

The Court: When did that take place?

The Witness: Well, we don't do it directly, we do it indirectly through our distributor. If you ask again, it is third-hand knowledge.

[fol. 895] Q. Can you identify the major project that you either bid upon or made an offer to supply conduit on?

A. Yes, I can.

The Court: I think you ought to separate it, because an offer doesn't mean a thing, Mr. Melchior.

Q. Did you bid or offer to sell conduit to this project?

A. Yes.

Q. Which did you do?

A. We offered to sell it.

Q. Would you identify this project?

A. The project I have in mind is known as Century City, which is a development of the Twentieth Century Fox movie studio in Beverly Hills, in the City of Los Angeles.

Q. And when did this offer which you made take place?

A. Two weeks ago.

Q. I didn't hear your answer.

A. I believe it is two weeks ago.

Q. Can you give me an idea as to the size of this project?

[fol. 896] Mr. Bergson: I object, your Honor. I don't know what we are trying here.

Mr. Melchior: If the Court please, I can explain what I think the relevancy is as I have explained the relevancy of these other factors.

The Court: Yes, a good many of which I don't agree with you but I have taken. Now, if I let this man go on and tell me about offers, he probably makes offers every day and they are not accepted. I assume there isn't an aluminum company or any manufacturing company that don't have that experience, for one reason or another. It seems to me we are going awfully far afield in taking up something that happened out in California where some offer was made and not accepted. Isn't that a common thing in every trade?

Mr. Melchior: No, I think the important thing is the circumstances under which this company failed to get the particular contract because we think this is indicative of [fol. 897] business conditions as they presently exist in the aluminum conduit field, and it is these business conditions that we must consider in evaluating the probable effect of this merger. We cannot look at a particular merger in a glass house. We have to look at this merger in the context of business conditions, and the only way we can show to the Court——

The Court: That's right. Now, suppose that the defendant, and I don't assume they will and I am warning them I won't let them, but they will go on and I suppose they can get a lot of companies who made offers and have them accepted. You know that must be true, because an industry goes on and on. So that the trouble here is that I can't see how I evaluate it.

Mr. Melchior: I don't think the important thing is whether they were successful or not. I think the important thing is if they were not successful the reasons why they [fol. 898] were not, which is what we are attempting to bring out.

The Court: Then if you bring out the reasons why they were not successful, then I suppose they can bring out the reasons why they were successful and so on infinitum. I wonder where the end of a lawsuit of this kind is when we once get started telling about the individual experiences on where a man failed or was successful. I don't see how it proves anything.

Mr. Melchior: Well, we feel that we can cite particular instances as examples, and we have had an array of witnesses so far who are citing a number of conditions which sound similar throughout the country.

The Court: Yes, that is why I am so hesitant about it. We have had a lot of them. They had told us the problems that they meet in everyday business.

Mr. Melchior: And we think it is highly relevant, your Honor.

[fol. 899] The Court: Yes, but this, of course, is going on a little different phase. He is telling us something about a bid or offer that was not accepted. The thing that bothers

me is if I once take it, where do I draw the line as to the defendant.

Mr. Melchoir: I think perhaps in this situation we can tie this particular transaction to the merger of Rome and Alcoa.

The Court: Well, I am going to take it. Let's see what it is. Overruled.

By Mr. Melchior:

Q. Did you state where this project was located, Mr. Harvey?

A. Yes, I did.

Q. Where was it located?

A. Los Angeles. In Beverly Hills.

Q. And did you give an indication as to what the size of this project was?

A. No, I did not.

Q. Would you do that?

A. To the best of my information and belief, it is——

[fol. 900] Mr. Bergson: I object, your Honor. He is again speculating.

The Court: If you don't know this, witness, please say so.

The Witness: I am only trying to be more explicit. If you want me to be more explicit I shall be.

The Court: Yes, because I got to be explicit and if all I get are these generalities I don't know where to go to. I have got to be explicit when I decide this case somewhere.

Q. Do you know, would you indicate, from a dollar standpoint, what the size of this project was?

A. Yes. It is over two hundred million dollars.

Q. I take it you consider this a pretty substantial project?

A. I do.

Q. Do you know or can you give me an indication as to what the approximate value of the aluminum conduit contract may be on this job?

A. If the project is fully developed as was reported and told to me personally, the value of the conduit wire job [fol. 901] should run around a million dollars.

Q. Now, did you talk to the electrical contractor concerning your bid on the contract involved in this job?

A. I did.

Q. With what purpose in mind did you talk to him?

A. I talked, I say "I talked"—my firm talked to the electrical contractor at the first phase of the first building on the job.

Q. Who was the electrical contractor?

A. Newbury Electrical Corporation.

Q. To whom did you or your representatives talk?

A. Jeffrey Langton.

Q. And you attempted to bid or offered to supply the aluminum contract on this job?

A. We did.

Q. And what success did you have?

A. None.

Q. Did you discuss your lack of success with the contractor?

A. We did.

[fol. 902] Q. And what did you tell him?

Mr. Bergson: When you say "we", who do you mean?

The Witness: My firm.

Mr. Bergson: You didn't?

The Witness: Not I.

Q. Would you state the results of your conversation with him?

A. We were told that——

Mr. Bergson: I object, that is not the result.

The Court: Yes. Again this is hearsay on hearsay. Did you submit something in writing to this electrical contractor that some of us can look at and see what it is about?

The Witness: No, sir, we did not.

The Court: What did you do? Somebody else in your concern told you about it?

The Witness: We instructed our man to go out and make an inquiry concerning the job, which is what we would do under normal course of business.

[fol. 903] The Court: Sure. I find no fault with you, Mr. Harvey. Don't get that idea. Apparently what you did, and I don't have any foundation for it at all, you sent a salesman or some representative to this general electrical contractor; is that right?

The Witness: To a general electric—not the General Electric, but a general electric contractor.

The Court: And I suppose they were ready to do some phase of that job?

The Witness: Yes, sir.

The Court: This two hundred million dollar job wasn't to be done all at once?

The Witness: No.

The Court: Didn't call for a single contract?

The Witness: No.

The Court: It was split into phases.

The Witness: Yes.

The Court: All right, what is the first phase?

[fol. 904] The Witness: Construction of the so-called Gateway West building.

The Court: That was an individual building, I suppose, a business building of some kind?

The Witness: Yes.

The Court: Did you have some basis for the determination of the amount of the conduit needed in that building?

The Witness: Yes, sir. A general knowledge of what goes into a high rise building.

The Court: What I mean, did you have any specifications or anything that anybody can check or do anything with, or did you just——

The Witness: Just our business judgment estimate, and that is all.

The Court: And your representative talked to Jeffrey Langton?

The Witness: Yes, sir.

The Court: Langton is some officer of the electric company?

The Witness: He is one of the managers.

[fol. 905] The Court: He is one of the managers. And after your representative got through talking with Langton he came back and told you something about that talk, I suppose.

The Witness: Yes, sir.

The Court: Now there is your background of your testimony. Now Mr. Bergson objects to it as hearsay. Why couldn't we have the man here, if it is of any importance here. We all know when you pass the results of a conversa-

tion from one to another very often their import is lost, the essentials are lost. We have so many things.

Mr. Melchior: I will try by one question.

The Court: All right.

By Mr. Melchior:

Q. Do you know of your own knowledge whether there were any restrictions which prevented you from being the successful bidder on the conduit?

A. Yes, sir.

Q. What were they?

[fol. 906] Mr. Bergson: I object, your Honor.

The Court: Yes. Let's find out who placed the restrictions. Maybe somebody said the mayor of the town, if this is a town proposition, that they won't buy anything from anybody outside the town of California.

Q. Do you know who placed these restrictions upon this contract?

A. Yes, sir.

The Court: Who was it?

The Witness: Aluminum Company of America.

Q. Would you state what those restrictions were?

The Court: Just tell us how the Aluminum Company placed the restrictions.

The Witness: I was told that by the chairman of the board of the corporation——

The Court: Oh, God bless us. Strike it out.

Mr. Melchior: I might explain, your Honor, why we didn't have a chance to investigate this matter, as this just [fol. 907] came to our attention since the trial commenced.

The Court: Well, you can get him here next week if there is anything of importance that somebody has done. Let's have it directly. If we go ahead and try this case on what somebody else told somebody, why we just get into a rather fine mess.

Mr. Melchior: Well, we submit that in cases of this type sometimes we will have to relax the ordinary rules of evidence.

The Court: You know, counsel, I have relaxed it in this case time and time again.

Mr. Melchior: Yes, you have.

The Court: But when you get down to something like this, when there is an insinuation of wrongdoing and the direct testimony is available, you got to produce it. In this court anyway. I am not going to let you wholesale it in the way we have let a lot of it in, and I find no fault in that. But when you get down to and are charging Kaiser, for instance, with [fol. 908] some improper trade practice, there is no excuse for not having the direct evidence that I know of.

Mr. Melchior: We don't mean to insinuate that what the company was doing here was improper. We are just showing that it was the practice in the trade.

The Court: You have a perfect right to show it, but you can't do it if it is hearsay in that way. That Alcoa placed a restriction upon some particular building out somewhere in California. If they did, let's find out who did it and how it was done.

By Mr. Melchior:

Q. Do you know of your own knowledge who the successful bidder on this contract was?

A. Are you talking about the electrical contractor?

Q. The aluminum conduit contractor.

A. Following the judge's instructions, all I know is what our staff reported to me.

The Court: I will let you tell who the successful bidder [fol. 909] was.

The Witness: The successful bidder was Newbury Electric Corporation.

Q. And who is Newbury Electric Corporation?

A. What was the original question you asked me?

Q. The successful bidder on the aluminum conduit contract.

A. I do not know who the successful bidder is. I only know who was specified.

The Court: What was the last?

The Witness: I only know who was specified.

Q. Do you know of your own knowledge who was specified?

The Court: What do you mean by "who was specified"?

The Witness: Well, your Honor, normally in an architectural venture of this character I am referring to, either the architect or the owner specifies the raw material. He says "I want this kind of raw material produced by so-and-so—Standard Sanitary or equal, Jim Jones wallpaper or equal," but in this particular the contractor told us that in [fol. 910] the drawings he specified a specific brand and none else.

The Court: Who drew the drawings?

The Witness: The architects, Rolfe and Beckett.

The Court: They were hired by the municipality, I suppose.

The Witness: No, by the owners of the property, to make the drawing. That would probably be the best evidence of what was specified.

The Court: Certainly.

Q. Mr. Harvey, from your knowledge of the aluminum industry, do you know whether there currently exists any shortages in the supply of primary aluminum for the domestic market?

A. No, sir, there are no shortages currently.

Q. To your knowledge have there ever been any periods of shortage of primary aluminum since Korea?

A. Yes, there have been.

Q. Would you indicate the periods when aluminum has been in short supply domestically?

[fol. 911] A. Aluminum has been in short supply domestically since sometime in 1947, continuously and periodically. Definite shortages in the country in the supply of primary material. And I think since 1958 there has been a reasonably adequate productive supply in this country plus some imports to satisfy current market requirements.

Q. Do you have a general knowledge of existing and planned capacity for the production of primary aluminum?

A. Yes, sir.

Q. Now, in the light of your knowledge or opinion as to the potential use of aluminum in the future, have you formed

an opinion as to whether or not shortages may exist sometime in the future?

A. I have.

Q. Would you state what your opinion is?

Mr. Bergson: I object, your Honor. His opinion as to whether shortages may exist is awfully speculative.

The Court: Well, I know it is.

Mr. Melchior: Well, it's the only thing we can do about the future, counsel.

The Court: That's right. All we can do is guess, and if [fol. 912] history repeats itself I suppose we will have shortages and overages. I guess in most every industry that has occurred, and I assume it is a fair statement it will occur in the future.

The Witness: I concur.

The Court: We have them in farming, and most any manufacturing business. Probably Mr. Harvey's guess is not any better than mine, and I will tell you I will guess we will have them. So we don't need to worry about it.

The Witness: I concur with the judge's opinion.

Mr. Melchior: No further questions.

Cross-examination.

By Mr. Bergson:

Q. Mr. Harvey, who are your principal competitors in the conduit business?

A. Our principal competitors?

Q. In the conduit business.

A. I think I have recited them before. They are all of the [fol. 913] integrated—not all of them—I'm sorry. If I might be more specific in answer to your question. The principal competitors are Channel Master—the naming of them is not in the order of importance or position; I don't want to put anybody's nose out of joint socially. Channel Master, Alcoa, Kaiser, Reynolds, Hazelwood Engineering, Jasco. Triangle and General Cable.

Q. Triangle?

A. And General Cable.

Q. General Cable. How about Youngstown?

A. You are asking me about the aluminum business.

Q. No, I said conduit.

A. Oh. Well, all the steel conduit competitors are, in our opinion, more serious competitors than those in the aluminum business.

Q. Whose competition do you meet in the conduit business?

A. The competition we meet is not only that of the other aluminum competitors, but price changes have occurred by announcement of price changes by Youngstown Sheet and Tube Company.

Q. That is a steel company?

[fol. 914] A. Yes.

Q. Do any other steel companies sell conduit on the West Coast?

A. I believe they do, sir.

Q. Whose competition do you meet in the steel?

A. Anybody that manufactures steel conduit. It is a direct competitor to aluminum.

Q. Do you know where the plants of the steel manufacturers are located?

A. I don't know where they are all located.

Q. Other than Rome Cable's plant at Torrance, do you know where any steel conduit plant west of the Mississippi is?

A. Yes, I do, sir.

Q. Who?

A. Youngstown, located at Youngstown.

Q. Youngstown where?

A. Ohio.

Q. Is that west of the Mississippi?

A. No, I'm sorry. I got confused being back east.

Q. Do you know of anybody whose plant is located west of the Mississippi?

A. I don't know anybody in the steel business.

[fol. 915] Q. Now, you talked about the price of aluminum conduit going down.

A. Yes, sir.

Q. I suppose competition forced that price down?

A. Competition from the steel industry, sir.

Q. Mr. Harvey, do you have a supply contract with General Services Administration?

A. Yes, sir.

Q. Would you explain to the Court what a supply contract is?

A. Well——

Q. Let's cut it down a little bit. What is the capacity, the pig or ingot capacity of your aluminum smelting works?

A. I will answer that by making a statement. Our current rate of production is 80,000 tons per annum approximately.

Q. Are you, under your contract with the General Services Administration, required to set aside any part of that product for sale to non-integrated users of aluminum?

A. We are, sir.

Q. Will you tell us how much of that product you are [fol. 916] required to set aside for non-integrated users?

A. For the first five years of our operation, which will expire I believe at the end of 1963, we were required to set aside 35 percent of our total production, and thereafter for 25 years we were required to set aside approximately 30 percent of our production. 15 after the first five years. To non-integrated small business.

Q. In terms of pounds, how many pounds a year would that be?

A. Well, that would be, say, one third of 54,000 tons, so——

Q. 18 times 2,000 about.

A. It is about 18 or 19,000 tons a year.

Q. And you are required to set that aside through 1978?

A. That's right.

Q. Now, in selling to non-integrated producers do you sell a grade of pig which you call EC pig?

A. We sell a commodity which we call EC pig.

Q. What is that commodity?

A. Well, the word EC means electrical conductivity, and [fol. 917] the standard within the trade is that the aluminum itself, pure metal itself, shall be 99.45. It gives no other general specifications for it, which leaves it up to the individual suppliers to fix a criterion between he and his customer that would be satisfactory for the EC grade used within that particular customer's plant.

Q. How much pig could you have supplied for electrical supply conductor use if you had demand for it?

A. It varies from month to month according to the grade

produced, but I would say offhand last month we could have supplied 80 percent or about 5500 tons, about 4,000.

Q. 80 percent of your capacity would qualify as EC grade?

A. I think so, yes, sir.

Q. Now, do you sell this pig to non-integrated producers of electrical conductor products?

A. Yes, we have.

Q. And to whom do you sell?

A. Well, we have sold to South Wire. I will have to look at my list in case you would ask me the question I had some [fol. 918] notes. I will refresh my—South Wire. No conductor pig to Alabama Wire. No conductor pig to Nichols. And some to GE Company. We sold Scoville—I don't know whether they used it for wire conductor or not; it doesn't tell us. Some experimental shipments to General Cable Company.

Q. This material you shipped to Nichols—was this of a quality capable of being used as EC?

A. It could be, but I don't think it was used for that purpose.

Q. Did you sell any pig or ingot to Rome Cable prior to its acquisition by Alcoa?

A. No, sir.

Q. Do you feel that Alcoa's acquisition of Rome Cable foreclosed you from a substantial market for pig or ingot?

A. No, sir.

Mr. Bergson: No further questions.

Redirect examination.

By Mr. Melchior:

Q. Mr. Harvey, on these government set-asides you spoke of, who did you say they were set aside for the benefit of? [fol. 919] A. They were set aside for the benefit of non-integrated small business.

Q. Now, is that who they are set aside for or is it for non-integrated companies and small business?

A. Non-integrated companies and small business. I think your application is correct.

Q. Right. In other words, if you are a non-integrated com-

pany as far as the aluminum industry is concerned, even though you are not small business, are you eligible to purchase this from you?

A. Yes.

Mr. Melchior: That's all.

The Court: Is that General Service?

Mr. Melchior: G.S.A.

Mr. Bergson: General Services Administration.

Mr. Melchior: A government agency.

The Court: Of the United States Government?

The Witness: Yes, it is.

Mr. Melchior: No further questions.

[fol. 920] William Louis Hendrix, called as a witness on behalf of the Government, being first duly sworn, testified as follows:

Direct examination.

By Mr. Mahaffie:

Q. Mr. Hendrix, what is your occupation?

A. I am the treasurer of the Hendrix Wire and Cable Corporation.

Q. Where is the Hendrix Wire and Cable Corporation located, sir?

A. Milford, New Hampshire.

Q. Mr. Hendrix, will you briefly describe your educational background?

A. Yes. I have graduated from Purdue University with a bachelor of science degree in electrical engineering.

Q. And what has your business experience been, sir?

A. Principally in the wire and cable business. I was three years with Anaconda Wire and Cable Company at Marion, Indiana, and I was fourteen years with the Okonite Company.

Q. Have you ever worked for a public utility?

A. Yes, in between, for a period of five months between [fol. 921] my employment with Anaconda Wire and Cable

and the Okonite Company, the Indiana General Services Company, in Marion, Indiana. An electrical public utility.

Q. Approximately how long have you been engaged in one aspect or another of the wire and cable business?

A. About twenty-seven years.

Q. All right, sir. How long have you been associated with the Hendrix Wire and Cable Corporation?

A. We are in our eleventh year.

Q. All right, sir. You have described yourself as treasurer of the Hendrix Wire and Cable Corporation. Do you own stock in the company, sir?

A. Yes, sir.

Q. Are you the principal stockholder?

A. Yes.

Q. You were with the Okonite Company until when, Mr. Hendrix?

A. May of 1950.

Q. What did you do in May of 1950?

A. Started a company on my own ideas of covering line wire.

[fol. 922] Q. What is the name of that company?

A. That was called the Hesco Electric Products Company.

Q. Located where?

A. Norwich, Connecticut.

Q. That company you stated was started on the basis of one of your ideas?

A. Yes.

Q. In the nature of an invention?

A. A machine to apply concentric covering to electric conductors for overhead use.

Q. What type of conductors were you covering?

A. Aluminum.

Q. What became of that business?

A. The business was closed down because of lack of raw material which was due to the Korean war. They went on priority and we had no priority. Just couldn't buy it.

Q. What was your next step?

A. My next step was in June of 1961 when we formed the corporation, the present corporation.

Q. Did you mean 1951 or 1961?

A. 1961. 1951. Yes, the following year.

Q. You formed the present corporation?

[fol. 923] A. Yes.

Q. All right, sir. Are you associated as an officer or director with any other corporations?

A. Yes, we have a sales corporation, that is, a sales distributor called Hendrix Engineering Sales, Incorporated.

Q. Any others?

A. Yes, there is another corporation that has to do with manufacturing of installation tool for our particular type of cable, called the Hendrix Wade Corporation.

A. Any others?

A. That's all.

Q. Is there also a real estate holding corporation with which you are associated?

A. Yes, the Hendrix Real Estate Trust, which owns the real estate property for the factory and the land.

Q. Which of these corporations are manufacturing corporations?

A. Hendrix Wire and Cable Corporation.

Q. Are all these corporations located at Milford, New Hampshire?

A. Yes.

[fol. 924] Q. And you are associated with all of them?

A. Yes.

Q. Is the stock ownership in all of these corporations the same?

A. No, sir.

Q. Why do you have separate corporations for these operations, Mr. Hendrix?

A. The sales corporation was formed so that we might sign sales agreements with Reynolds Metals Company as distributor for their conductors. Since that time we have taken on other manufacturers' lines, such as Standard Transformer Company and Electrical Products Materials.

Q. Why do you have a separate—what is the name of the Wade Corporation? Why is that separate?

A. Mr. Wade was instrumental in developing a tool. His own business is overhead line contractor.

Q. How much—what is your ownership in that corporation?

A. 50 percent.

Q. What type of financing was used to start the Hendrix Wire and Cable Corporation?

A. In the way of a loan of $15,000.

[fol. 925] Q. Where did you get the loan?

A. From Mr. William Howe.

Q. Did you use any, in starting the wire and cable corporation, financing from Small Business Administration?

A. Not until we expanded into our present facilities.

Q. That is the facility at Milford, New Hampshire?

A. Yes.

Q. Did you at that time obtain financing from the Small Business Administration?

A. Yes.

Q. Are you still financed by the Small Business Administration to some extent?

A. Yes, we are.

Q. Do you render reports to the Small Business Administration?

A. Yes.

Q. Mr. Hendrix, what is the approximate volume of sales of the Hendrix Wire and Cable Corporation during the last fiscal year?

A. Well, our fiscal year ends May 31st and we had total sales volume of $807,000.

[fol. 926] Q. What products are manufactured by the Hendrix Wire and Cable Corporation?

A. We manufacture the spacers for our Hendrix aerial cable, space cable. We insulate conductors for that space cable. We do a limited amount of insulating for line wire and tree wire and service drop cable.

Q. What products are sold by the sales company?

A. All of the Hendrix Wire and Cable products are sold by the sales company in that area where they have sales representation.

Q. What is that area?

A. New York State, Pennsylvania, New Jersey, all of the six New England states and part of Maryland.

[fol. 927] Q. And does the Hendrix Wire and Cable Corporation sell its products in other areas?

A. Yes. We have sales agents in the outlying areas such as Ohio, Indiana, Michigan.

Q. These are sales agents not associated with the Hendrix Engineering Sales Corporation?

A. They are sales agents that have kindred products that they sell to the electric utility.

Q. Did you list the type of product sold by the sales corporation other than the products manufactured by the Hendrix Wire?

Q. No, I did not. We sell the standard products, switches and connections. We have a line of poles and crossarms, the Lincoln Pole and Wood Coating Company. And we have small accessories line for linemen, leather buckets and gloves and things of that nature.

Q. Does the sales corporation sell electrical conductor products other than the products manufactured by the wire corporation?

A. Yes. We sell the Reynolds conductors.

Q. These are aluminum conductors?

A. Aluminum conductors. Both bare and covered.

Q. Mr. Hendrix, what is the principal product that you manufacture in terms of sales volume?

[fol. 928] A. Our specialty is the spacer cable.

Q. Would you state what a spacer cable is?

A. Spacer cable is an aerial cable which is supported by a strong member such as a copperweld steel messenger and three insulated conductors which are held attached to the messenger and are held separate from each other.

Q. How far apart are the insulated conductors in a spacer type aerial conductor?

A. The most spacing is six inches, and the spacers, I might add, are located 30 feet apart.

Q. So in simple terms these are three insulated conductors held approximately six inches apart by spacers which occur approximately at 30 foot intervals in the assembly?

A. Yes, sir.

Q. What is this product used for?

A. It is used for power distribution in the circuits.

Q. What type of customer buys it?

A. Electrical utilities.

Q. Is it used for transmission of electrical energy?

A. Transmission indicates a very high voltage, and it is not used for that.

Q. Then all space aerial cable must have insulated conductors?

[fol. 929] A. Yes, sir.

Q. Now, what conductor metals do you use in your spacer aerial cable?

A. We use both copper and aluminum.

Q. About what percentage of each is used in your total volume?

A. About 95 per cent aluminum, 5 per cent copper.

Q. Why is it that the proportion of aluminum is so much greater than that of copper?

A. Economy is a big reason. It is less expensive and has less weight.

Q. If it is less expensive why is it that 5 per cent of your business is still accounted for by copper?

A. There are some areas where corrosion is a problem, such as salt spray on the seashore, where the utility people prefer a copper conductor.

Q. Now, Mr. Hendrix, in the wire and cable business as a whole, are there today separate fields or areas in which aluminum and copper conductors are used?

A. Yes, I would say that aluminum is properly used in overhead circuits.

Q. And where is copper used?

A. And copper is used in inside wiring and underground circuits.

Q. Now, with respect to the spacer aerial cable, which [fol. 930] is your principal product, who are your competitors today in the sale of that product?

A. We have a number of them.

Q. Could you state them?

A. Yes. Rome and ALCOA, Kaiser, Anaconda, General Electric, General Cable, Olin Conductors and more recently, Reynolds, are into it now. They are taking over the same position that Roebling did have. Roebling was a competitor before they sold it.

Q. You said Rome and ALCOA. You mean——

A. (Interrupting) The combination, yes.

Q. The combination. Now, which of these companies, if any, manufacture the entire assembly for space aerial cable?

A. Rome, Kaiser and Anaconda, I believe manufacture their own design of spacer.

Q. And Hendrix also manufactures its own design?

A. Yes.

Q. Now, will the Reynolds Company manufacture the entire assembly?

A. I believe they plan to. I am not sure of that.

Q. What about the other companies, General Electric, General Cable and Olin?

A. They use spacers that are manufactured and sold to [fol. 931] them by outside concerns.

Q. Mr. Hendrix, are there today any independent companies which manufacture the entire cable assembly by themselves?

A. None other than ourselves.

Q. None other than Hendrix?

A. Yes.

Q. And is this product usually sold as a composite union?

A. Very often, yes. There are scattered sales where different parts are purchased from different companies.

Q. Have there ever been other independent manufacturers of this product who have manufactured the entire product?

A. Yes, Roebling.

Q. Any others?

A. Rome.

Q. Are they the only ones?

A. They are the only independents.

Q. When did Roebling enter the business?

A. Early '58 or late '57. I believe December, 1957 was the first time it was offered.

Q. When you say Roebling, Mr. Hendrix, you are referring to the John A. Roebling Sons division of the Colorado Steel and Iron Company?

A. Yes.

[fol. 932] Q. And when did Rome enter this business, approximately?

A. Approximately? I believe, it was late '58 or early '59.

Q. Now, was ALCOA a manufacturer of this product prior to its acquisition of Rome?

A. No, sir.

Q. And was Reynolds a manufacturer of this product prior to its acquisition of Roebling?

A. No, sir.

Q. Mr. Hendrix, has the entry of integrated aluminum

companies in the field of spacer type aerial cable had any effect on your business?

A. Yes, sir. Pricewise.

Q. Now, specifically, has the acquisition of Rome by ALCOA had any effect?

A. I have noticed that the price is considerably less now than it was before the acquisition.

Q. Could you give an example of the way this effect has worked out?

A. In April, 1959, Rome quoted a price of $1,111 per thousand circuit feet for 18,600 circuit feet of 4015 K.B. aluminum cable. This was in Wallingford, Connecticut.

Q. This was on a particular job in Wallingford, Connecticut?

[fol. 933] A. Yes. In which we were involved. In March——

Q. Excuse me, Mr. Hendrix, you bid on that job?

A. We bid on that job and lost it.

Q. All right, proceed.

A. In 1961, March, the City of Norton, Kansas, there was an item of 22,000 feet of the identical construction. ALCOA's price was $869.59 for 1,000 circuit feet.

Q. $869?

A. Yes.

Q. Now, what is the—excuse me. Did Hendrix also bid on this 1961 job?

A. Yes, sir.

Q. What was your price?

A. Our price was $1,007 per thousand circuit feet.

Q. What was the relation of the price you bid on that 1961 job to the cost of the product?

A. We had been asked to give the very best price we could by our agent in Kansas City, and this price we quoted him was actually under our cost figure, figuring in the fair overhead, manufacturer's cost.

Q. That is overhead and all including profit?

A. Not including profit. There was no profit at all.

Q. And what was the relation of the price bid by the [fol. 934] Rome division of ALCOA to the cost for that product?

Mr. Bergson: I object, your Honor. I don't see where that has any relation.

The Court: I don't know if I understand it.

Mr. Mahaffie: The question is what was the relation of the price bid by ALCOA-Rome to Mr. Hendrix' cost for the product. He says his cost was $1,007, which would leave no profit.

The Court: Yes.

Mr. Mahaffie: I think the question is probably superfluous, your Honor, and I withdraw it. I simply wanted to show if it was above or below. I will withdraw the question. It is unnecessary.

Q. Mr. Hendrix, is this example that you gave typical of the trend in prices of spacer type aerial cable during the past four years?

A. Yes, sir. I might add that there were two other producers bid on that same job in Kansas City, Norton, Kansas, and they were both underneath the ALCOA price.

Q. And this was the 1961 job?

A. Yes.

Q. And who were those producers?

[fol. 935] A. Kaiser and Anaconda.

Q. Mr. Hendrix, in what form do you buy aluminum for use as a conductor?

A. We buy a stranded conductor.

Q. That is stranded aluminum wire?

A. Yes.

Q. Who are your suppliers?

A. Suppliers are Reynolds, Alcoa and Olin Conductors.

Q. Have you ever bought aluminum from Canadian sources?

A. No, sir.

Q. Have you ever bought aluminum on the foreign market?

A. No, sir.

Q. Why not?

A. Just haven't considered it. Not having been approached by any of them on a price basis and not having gone after them to see if I could better the price.

Q. Has the price of aluminum strand, that is the stranded aluminum wire to you changed proportionately with the price of your finished products during the past four years?

A. No, sir.

Q. It has not?

A. It has not.

Q. What has been the general trend in price of aluminum [fol. 936] strand?

A. In the past four years I believe the price has been down, as a general trend. There has been about a 2 cent drop in the base price of aluminum and the strand has come down pretty much in accordance with that drop.

Q. The strand has come down, too, from what you said, but I believe it has not come down as sharply or as drastically with the finished product.

A. Yes. In connection with our spacer aerial, that is correct.

Q. Has the diminished spread between the cost of strand to you and the cost that you get for finished cable had any effect on your utilization of your manufacturing facilities?

A. Yes. Of course, in fear of considerable business producers lower prices and then we were practically alone in the field, because we were the only ones manufacturing them those years. We would have certainly enjoyed a greater volume, had a profitable business, were it not for this competition.

Q. Has it meant that at times you have had to take machinery out of production?

A. Oh, yes, our machinery has been idle now, well, I would say perhaps two-thirds of the time.

[fol. 937] Q. Has the diminishing spread had any effect on your profits?

A. Yes, our profits have gone down.

Q. Can you state what your profits have been during the past three years?

A. Yes.

Q. Let's say since 1958, your fiscal year 1958.

A. 1958 our total sales was $471,951. Our net profit before taxes was $20,038.

Q. How about 1959?

A. '59 we had $10,000 worth of business. Our net profit was $1,076.

Q. How about 1960?

A. 1960 our sales volume was $708,000, and we had a net profit before taxes of $17,558.

Q. And in '61?

A. 1961 we had $807,000 worth of sales, and we had a net loss of $31,856.

Q. Now, are there any, well, in the 1961 figure, Mr. Hendrix, were there any non-recurring expenses?

A. Yes. There were legal fees in there of approximately $25,000, which will be non-recurring.

Q. So if the non-recurring expense figures were not included——

A. Our loss would be approximately $6,000.

[fol. 938] Q. Now, Mr. Hendrix, with respect to products other than spacer type cable, incidentally, sir, the profit figure you stated were the profits for the Hendrix Wire and Cable Corporation?

A. Right.

Q. And that includes any other products manufactured by that corporation?

A. Right.

Q. I believe you stated earlier the principal product manufactured by the corporation was the spacer type aerial cable?

A. Yes.

Q. With respect to products other than spacer type aerial cable you stated that you had manufactured aluminum line wire and aluminum service drop cable, is that correct?

A. Yes.

Q. Very much of those products?

A. Very little.

Q. Do you make as much of those products as you could make with the facilities that you have?

A. No, we could make much more.

Q. Why don't you?

A. Well, we can buy the finished product at less than we can produce it.

[fol. 939] Q. Do you buy it?

A. We buy it and resell service drop and line wire, from Reynolds Metal Company.

Q. And you resell it as a distributor from the Reynolds Metal Company?

A. Yes.

Q. Have you considered integrating your operation farther back into the fabrication of metal?

A. No. We have not, other than just to think about it.

Q. Why not? Would this not improve your position?

A. Perhaps it would, if we could work with the pig and have a little spread between the pig and the stranded conductor.

Q. Do you know what it cost to integrate back to a point where you could produce aluminum rod?

A. Just for our small volume that we have there, I would roughly indicate that factory facilities, with your space and machinery installed, would roughly be three-quarters of a million dollars.

Mr. Mahaffie: That is all.

Cross-examination

By Mr. Bergson:

Q. Mr. Hendrix, as I gather your testimony, your business is primarily in applying the insulation?

A. Yes.

[fol. 940] Q. To wire and cable products?

A. Yes.

Q. And you have no equipment for drawing, stranding, cabling?

A. No, sir.

Q. And your principal product was this spacer type cable?

A. Yes, sir.

Q. And when did you start making that cable?

A. In 1951.

Q. In 1951. And how long were you the sole manufacturer of that cable?

A. Until Roebling came into the picture in late '57 or early '58.

Q. So for seven years you were the sole supplier of that type of cable?

A. Yes, sir.

Q. Now, how did you establish your prices in that time? How did you go about making your list price?

A. Our first price was roughly established at about half of what aerial cable was selling for in other designs. That is how we started out.

Q. Was there any relation between cost or production,

overhead and so forth, or did you just—you were the sole supplier?

[fol. 941] A. Sole supplier.

Q. So you had no competition to help you fix the price or establish the price?

A. No, sir. And had very little business either.

Q. And then you said that you went along from '51 to '57, and then competition came in; right?

A. Yes.

Q. And when came in who was the competitor?

A. Roebling. The first one.

Q. Now, by Roebling's entry into the field, did that have any effect upon the price?

A. Yes.

Q. What happened?

A. They began to steal business away on the price basis. Or win business away.

Q. Well, I don't represent Roebling and you can say what you want. So that the position in which you find yourself today is because the field that you formerly occupied yourself is now occupied by competitors and you are having to compete for business?

A. That is true.

Q. And you would like to have it the other way around?

A. It was much more profitable, of course.

Q. Now, does anybody else manufacture these spacers [fol. 942] that you talk about, other than wire and cable manufacturers?

A. Yes.

Q. Who manufactures them?

A. There is an outfit in Cleveland called the PLM Company. Fargo Division of Line Material, manufactures spacer, porcelain spacers. I believe there is a moulding concern called the Park Plastic in New Jersey that manufacturers a spacer. Those are the only three that I know of.

Q. Isn't it a fact that most utility companies instead of buying your pre-assembled cable, buy regular line wire plus spacers and assemble their own spacer cable?

A. Regular wire, they buy conductors to their own specifications.

Q. A covered line wire?

A. Yes.

Q. And assemble it themselves?

A. Yes. As a matter of fact, it is all assembled in the field. It always has been.

Q. So that the difference is that you offer a full package and the other spacer manufacturers are unable to offer a full package that offers the spacer and the utility company [fol. 943] buys the spacer from him and the wire from the cable company?

A. Yes. However, their merchandising procedure in the early days was to sell a spacer to the wire and cable company and let him again resell it to the utilities.

Q. Were these wire and cable companies included in the list of competitors that you mentioned?

A. Yes, sir.

Q. Were there any others?

A. There could have been. I believe that Okonite got into it. I don't know of any others offhand that we have actually been in competition with.

Q. Now, can you use your covering or insulating machine to cover either copper or aluminum?

A. Yes.

Q. Interchangeably?

A. Interchangeably.

Q. And do you do so?

A. We do.

Q. And if you were to integrate backwards, as Mr. Mahaffie suggested, the first step would be to get your own stranding equipment?

A. Well, I wouldn't go into stranding unless I went into wire drawing, too.

[fol. 944] Q. And wire drawing. Now, how much would it cost you to buy enough equipment to put in a single strander and a single drawer?

A. There again one drawer would certainly take care of more than a single strander in volume.

Q. I am just asking you one strander and one drawer.

A. I am not familiar with it.

Q. And would it be anything like the $750,000?

A. That including building facilities and so forth, which we wouldn't have to build. Actually the machinery installed, I would estimate, and this is a very rough estimate and I have not solicited specifically prices with anybody, I think

the cost would be in the neighborhood of a quarter of a million dollars for the installed machinery.

Q. Now, in your direct examination you referred to two projects in which you cited a figure bid by Rome Cable in 1959 and the figure bid by Rome Cable in 1961. Were the insulating materials on these two projects comparable?

A. They were named exactly the same high molecular weight polyethylene outdoor group.

Q. Both polyethylene?

A. Yes.

Q. What did you bid in 1959?

[fol. 945] A. We had a bid and a different construction. It was 135 mills thickness of the same polyethylene plus 15 mills of a heated irrathene which we were recommending in furnishing for $15,000, and the other was 14,000, which was a different construction, so it can't be compared to the Rome price.

Q. What were you offering in 1961?

A. We bid on the identical construction with the Rome Construction. That was specified.

Q. I see. Now, when you buy your wire and cable products, which you subsequently insulate in your factory, do you get a special insulator's price?

A. Yes, sir.

Q. And is that special insulator's price lower than the list price for the wire and cable?

A. Yes.

Q. Have you bought any from Rome Cable?

A. Alcoa.

Q. Alcoa-Rome?

A. Yes.

Q. Did you get that special insulator's price from them?

A. 5 per cent.

Q. Thank you.

[fol. 946] Redirect examination.

By Mr. Mahaffie:

Q. Mr. Hendrix, in cross-examination you stated that you had this spacer aerial cable field all by yourself until approximately 1957 or 1958. Now, you told me on direct examination that in 1957 and 1958, both the Roebling Company

and the Rome Company entered into this business, is that correct, sir?

A. Yes.

Q. Now, during the period just after the entry of Rome and Roebling, that is period roughly the year 1958, you competed with these two companies?

A. Yes, sir.

Q. On sales of these products?

A. Yes, sir.

Q. Did your competition with Rome and Roebling at that time, at any time, force you to enter a bid below your cost?

A. No, sir.

Q. Were you able to obtain a reasonable share of the business even competing with these two corporations?

A. I believe so.

Q. Now, one further question, sir. When a utility buys insulated wire and then buys a spacer from—I believe you [fol. 947] mentioned three manufacturers of spacers, to put it together—is the insulated wire the same product as the utility would buy to use as line wire?

A. No, sir, not to my knowledge.

Q. What would this be?

A. Usually a better grade of insulating material and heavier wall thickness, depending on voltage use.

Q. I see. Thank you, sir.

Recross-examination.

By Mr. Bergson:

Q. I have just one further question. When did Anaconda and Kaiser come into this business?

A. I believe Kaiser was next with their own spacer, and Anaconda last, and I think Anaconda got into it early 1960. If I remember right, it was in 1959 when Kaiser got their spacer on the market.

Q. Anaconda and Kaiser were both lower than ALCOA-Rome in this business you cited in 1961?

A. Yes, sir.

Q. Thank you.

Mr. Mahaffie: No further questions.

The Court: We will take a short recess.

(Whereupon, at 3:35 p. m. a short recess was taken after which the trial was resumed.)

[fol. 948] HARRY RESNICK, called as a witness in behalf of the Government, being first duly sworn, testified as follows:

Direct examination.

By Mr. Melchior:

Q. Would you state your full name and place of employment?

A. Harry Resnick, President and General Manager of the Channel Master Corporation, Ellenville, New York.

Q. How long have you held this position as president, Mr. Resnick?

A. About twelve years.

Q. When was Channel Master Corporation founded?

A. About twelve and a half years ago.

Q. And what line of products does it produce?

A. We have three major avenues, aluminum, TV antennas, and importation of radios.

Q. What do you mean by "aluminum"?

A. Well, we are in the aluminum business. We buy aluminum on the world market, and we make billets, sell billets. We have two extrusion presses, one which has just gone into operation. We extrude rigid conduit. We extrude tubing which is known as broom, and then we draw that for finished tubing, and we sell that to manufacturers, such as people [fol. 949] who make gliders, summer furniture, anyone that has an application for what we would call drawn aluminum tubing.

Q. Can you state approximately what percentage of your total investment is in the aluminum and aluminum product field?

A. I would say roughly 75 per cent, but capital equipment-wise, that would be more, because it might be more floor space given up to the antenna division than to the aluminum division. But machinerywise it is in the aluminum division's favor.

Q. You stated you manufacture or fabricated aluminum conduit?

A. Yes.

Q. Do you manufacture rigid aluminum conduit?

A. Yes.

Q. In what sizes?

A. We make everything except six inch..

Q. What does "everything" include?

A. Half inch through five inches. We do not manufacture accessories such as couplings and elbows.

Q. Do you manufacture EMT aluminum conduit?

A. Yes, we do.

Q. Now, are you generally familiar with the manufacture and sale of rigid and EMT aluminum conduit?

[fol. 950] A. Yes.

Q. What is the raw material that you use in the production of aluminum conduit?

A. The raw material is aluminum.

Q. In what form?

A. Well, ours comes in the form of pig, or ingot, as it is known.

Q. You convert the pig or ingot into what form?

A. Into billets, and we convert it into extruded pipe and then we thread it, coat it, inside coating, and mark it.

Q. When did you first begin to extrude aluminum pipe?

A. About two years, 1960.

Q. Do you have an extrusion press?

A. Yes.

Q. Can you give me an idea of what the investment was required in order to gather these facilities together in order to extrude aluminum pipe?

A. Well, we installed our first extrusion press in 1953, and we were only in the drawn tubing, and like other growth industries, we couldn't take up the capacity. We were looking for capacity. So we looked around to see what would be suitable for our facilities and this item we came up with was aluminum conduit. We feel it has a vast potential in [fol. 950a] this area. We know of all the pioneering work Kaiser has done in this area, and we went into it, and in investigating we found our equipment was not sufficient to be an economical producer, so we had to invest about three-quarters of a million dollars to buy a new 3,000 ton extru-

sion press, which we installed—oh, about, I would say, it is in operation two months now.

[fol. 951] Q. I see.

A. And during this investigation we also looked at the threading equipment, and we bought a machine such as the other witnesses spoke about, this double end threader, but we were offered a machine that cost maybe three hundred thousand that this company was making for Alcoa prototype, the automatic putting on of couplings and the end caps would be just about untouched by human hands, but the three hundred thousand was too rich for us.

Q. Can you give me an approximation of your company's annual sales?

A. About thirty-three million dollars.

Q. And can you indicate what share of this is in aluminum conduit?

A. Well we in aluminum conduit, we did a million three.

Q. In which year?

A. 1961.

Q. How about in EMT?

A. Very minor. It is a very little market for us. Maybe fifty, sixty thousand.

Q. How about the year 1960, do you recall what your approximate sales were in aluminum rigid conduit in that year?

A. No. But I think we have a letter—I don't recall the numbers off hand.

Q. You don't recall?

[fol. 952] A. It was just starting off. Very minor.

Q. You began production in that year?

A. Yes.

Q. I believe you stated that you did not manufacture accessories for aluminum conduit?

A. That's right.

Q. You purchase them?

A. That is correct.

Q. Do you purchase them for resale?

A. Yes. We also re-sell.

Q. When you sell this do you sell this in conjunction with aluminum conduit?

A. Well it is more of a—well we tried to stay out of the marketing of the couplings and elbows but some of our distributors—well we don't have distributors—we have dis-

tributors—I have to clarify this—we sell through manufacturers' reps. We call these stocking manufacturers' reps and they insisted that we supply these products also.

Q. I take it this is not a very high profit line?

A. No, it is not a high profit line.

Q. This is a convenience item that you carry?

A. Yes.

Q. For the benefit of your customers?

A. Yes.

[fol. 953] Q. Now who are your most significant competitors in the field of rigid aluminum conduit?

A. Well I break the industry down as the three majors and the three minors. The three majors being Alcoa, Kaiser and Reynolds. The three minors being—no offense—Harvey, Anaconda and Ormet or Olin. There is a joint venture known as Ormet. I don't know what name is actually under the primary production. I think Ormet is the primary producer.

Q. O-r-m-e-t?

A. Yes.

Q. Now do you compete with Alcoa in this line?

A. Yes. We have a general production line. Our other aluminum is in competition to Alcoa also. Our tubing. Our mill production end of the business is also in competition with Alcoa, and the maintenance.

Q. I was directing my attention to the aluminum conduit line that you have—you are in competition with Alcoa?

A. Yes. We have other competitors now—independents. We had more but a few dropped out. We have Jasco down on Long Island. We have——

Q. Is Triangle a competitor of your's?

A. Not in aluminum as such.

Q. Not in aluminum as such?

A. Not that I know now. If they are competitors they are a secondary, where they buy their pipe from somebody. [fol. 954] They don't have their own extrusion facilities and without extrusion facilities I don't believe you can be in the rigid conduit business.

Q. Is Hazelwood a competitor of your's?

A. Yes, Hazelwood is. He has his facilities.

Q. Now you mentioned EMT. You said you manufactured that, I believe.

A. Yes. This was manufactured during the steel strike of

I believe two years ago, and we sold quite a considerable amount of pounds, and this was when we couldn't get steel. They used aluminum. And we sell some for export now.

Q. Who was your significant competitors in this field?

A. I think we only had one, and that was Alcoa.

Q. Alcoa?

A. Yes.

Q. Now to what extent do you meet competition of steel conduit manufacturers?

A. As far—it is a mixed picture out in the market place. Take a city like New York City. I would say steel has become less and less of a factor and I would say 70 percent of the volume has gone to aluminum. So we don't even take steel into consideration. Take a market such as Miami, which is also one of fifty to sixty percent aluminum. So I think as far as our company outlook the battle has been [fol. 955] won for aluminum's rightful place in the marketplace. Kaiser did a very good job in exposing this material and went ahead and most of the distributors are the electrical user who is the electrical contractor. In the New York area I would say 70 percent of them require it.

Q. I don't understand your last statement, Mr. Resnick.

A. In New York City where there is a lot of construction going on at the moment—in other words, as far as I know we are competing and bidding against other aluminum companies not as against steel as such. Although aluminum is two percent less than steel is now anyway.

Q. You mean in price?

A. Pricewise.

Q. Would you have a way of knowing what is going into the New York market at the present time on various construction jobs, whether it is steel going in or aluminum? Would you have any way of knowing?

A. This is by the jobs that we do get and the jobs that we do not get. We think it is by—and it is being in business and you get to know these things, and by your man reporting back, we would estimate it is about 65 to 70 percent aluminum.

Q. Aluminum conduit?

A. Conduit.

[fol. 956] Q. As opposed to——

A. (Interrupting) Other materials. We lost a very in-

teresting job the other day to concrete underground work. Aluminum lost it to concrete. So there is other conduits other than steel. There is plastic conduit—a special application. But this is not a big share of the market.

Q. What type of conduit is generally used above ground and in buildings?

A. Aluminum or steel.

Q. Aluminum or steel. Where is concrete generally used?

A. Underground.

Q. Underground. Where is plastic generally used?

A. Sometimes—I am not too familiar with the plastic. I know this particular instance we lost a nice job to concrete.

Q. But this is underground?

A. Underground.

The Court: When you say you lost it to concrete, is that the name of a company?

The Witness: No. That is the type of conduit, it is made up of. Like our gas lines in the city that go underground. Pre-cast concrete pipe.

Q. What sort of distribution set up do you have, Mr. Resnick, for aluminum conduit?

A. Well this is our second go around. We tried the approach of having our mill salesmen sell to the distributors [fol. 957] directly. But we found we didn't have enough weight and couldn't travel this man. No, we didn't have enough weight. By that I mean other production lines such as wire and cable and so on and soforth. Then we had to go to what I call stocking reps or agents, as they are sometimes called. These are independent business man who own a warehouse and will charge a certain percentage for selling and a certain percentage for stocking the material in these warehouses. And they sell to distributors. We are financially responsible for this material. And we have 19 such stocking warehouses. And this is—looking at our competition, the most successful ones have done this. Kaiser, Rome, they have. They own their own such set up. We said we can't own our own and we will do the next best thing. We will go out and get representatives.

[fol. 958] Q. And you have these manufacturers' representatives—is that the proper term?

A. Yes. Well, stocking "reps" is the——

Q. Stocking reps?

A. Yes.

Q. You have 19 of these?

A. Yes.

Q. Where are they located generally?

A. I'd say throughout the country.

Q. Now, have there been many difficulties involved in setting up this distribution organization?

A. Yes, we have been working on it for a full year. We should have 50 locations to serve the nation and we have only come up with 19, and unfortunately one of these went bankrupt in Pittsburgh the other day. It is a very competitive sort of thing.

Q. I take it you are still trying to build it up then, is that it?

A. Yes.

Q. Now, you mentioned TV antennas. Do you distribute these on a nationwide basis?

A. Yes.

[fol. 959] Q. Do you have a national distribution organization for the distribution of TV antennas?

A. No. We have our own salesmen that report directly to a sales manager—that is, direct factory men.

Q. You have your own salesmen doing this?

A. About twenty-five of them, traveling and living in the territory. They are on our payroll as opposed to the stocking reps, who are not on our payroll.

Q. I see. Now, you also make other mill products, don't you?

A. Yes.

Q. Do you distribute these nationally also?

A. Well, yes. Yes.

Q. Well, now, do you have a sales organization distributing these?

A. Well, we have direct factory men selling these products. We have exactly two of them traveling the country selling mill products.

Q. Couldn't you use these already established sales organizations to sell aluminum conduit?

A. We tried it with the mill salesmen and we failed. And the advantage we get of stocking rep—he might have other [fol. 960] gear or other materials that a distributor might

want on the spot for immediate service, so he ties in a little of our conduit into it, or cable, or all the hundreds of items that go into the selling of an electrical distributor.

Q. Now, did you say that Alcoa-Rome was one of your competitors in the aluminum conduit field?

A. Well, I would think that Rome would be a bigger threat to me than Alcoa.

Mr. Bergson: That wasn't what he asked. He asked if it was a competitor.

The Witness: What was that?

Mr. Bergson: The question was whether Alcoa-Rome was a competitor.

The Witness: Yes.

Q. It is a competitor of yours?

A. Yes.

Q. Throughout your entire organization?

A. No, not in radios or antennas, just the aluminum division.

Q. Aluminum conduit. That's the only field I am asking you about. Aluminum conduit.

A. Well, yes.

[fol. 961] Q. Are you generally familiar with Alcoa's or Rome's marketing organization?

A. Yes.

Q. To what extent are you familiar with it? Do you know the location of their warehouses and sales offices, if they have them?

A. Well, I don't know the exact locations of the warehouses, but they have warehouses in strategic locations, which we are trying to do. I know the exact number of some of the others. I know Triangle has 22.

Q. I am asking you about Alcoa-Rome.

A. No, I don't know specifically the number of locations, no.

Q. Do you know that Alcoa-Rome in the aluminum conduit field does have warehouses?

A. Yes, they sell, through the Rome division. I know they sell the material through the Rome division.

Q. Do you know whether they have warehouses?

A. Yes, they have stocking warehouses.

Q. Do they sell through stocking reps as you call them?

A. I don't think so.

[fol. 962] Q. How do they sell?

A. As we sell our antennas, they sell. Their own men. Factory men.

Q. You prefer going to stocking reps to meet the competition of Rome-Alcoa through Rome's sales organization?

A. Yes, but they have an overhead in doing this also. It costs me a percentage to do this and I assume it costs Rome and Alcoa the same overhead.

Q. Well, I was really trying to find out if you are familiar with Rome's sales organization, and I'm not sure whether you say you are or are not.

A. Yes.

Q. You are?

A. Yes.

Q. Is your sales organization of the same caliber as theirs?

A. No.

Q. How long have you been building one?

A. Well, a year.

Q. How long will it be before yours is of their caliber?

A. Well, it is hard to say. We work very hard, and—[fol. 963] maybe two or three years we will—we can never be in that caliber because we don't have the cable to go with it. We have to take second choice in the marketplace.

Q. Do they sell more than aluminum conduit through their sales organization?

A. What was that?

Q. Do they sell, products other than aluminum conduit through their sales organization?

A. Cables, conductors, the general makeup of the factory output.

Q. Now, how long have you been in the aluminum business, Mr. Resnick?

A. 1953 as a producer.

Q. As a producer. And how long have you been in the aluminum conduit field?

A. Two years.

Q. From your own knowledge of the aluminum conduit industry, where do you think or could you estimate for me where you think the market for aluminum conduit may be in the future?

A. Well, we just made a substantial investment, based on our opinion that this is a growing market, and it is my own [fol. 964] personal opinion that 90 percent of this material is going to be aluminum within five years. Now there has been too much investment by major manufacturers to go any other way.

Q. Mr. Resnick, do you consign aluminum conduit to any of your customers?

A. No, we don't have the financing to consign.

Q. What do you mean by that?

A. Well, we don't consign to the distributors. We stock in the warehouse but we do not consign any merchandise. I think it is a bad business policy, first of all. It's a costly one at that.

Q. Do any of your competitors in aluminum conduit consign their stock?

A. Yes. The ones that are the primary producers consign, and all the product that I know that are sold, this aluminum conduit seems to be the only one that consignment came in. Whether this is a carry-over from the steel people, I don't know.

Q. Well, how do you compete with these competitors of yours who do consign?

A. Three and a half percent discount will take care of [fol. 965] the consignment.

Q. You give a three and a half percent discount?

A. Yes. In lieu of.

Q. In lieu of consigning the goods?

A. Yes. That has been the practice and it has worked into the price list somehow now.

Q. Do you have a published price list for aluminum conduit?

A. We have a published starting price list. It happens to be true.

Q. Will you explain what you mean by published starting price list?

A. Basically, we sell from the published price list. And then, on these bigger jobs it seems—I don't know, the word "bid" was used before—it isn't bid—I guess the term is "put your best price on the table and we will see." Stuff like that. Negotiate from the price list. And finally you do bid, or tender an offer for these jobs, and this gets very

involved, and an independent company such as ours has not one such of these bids.

Q. What has been the general trend of the market price of aluminum conduit since you came into the business in [fol. 966] 1960, if you know?

A. Well, I don't think there is any dispute that this price went down substantially. I don't have the exact percentages, but I know it has gone down 15 to 20 percent. In that area.

Q. Have your prices generally declined that amount?

A. Yes.

Q. Now, are you familiar with the market price of ingot?

A. Yes.

Q. Do you know what, if any, change has taken place in the price of ingot over the last several years?

A. Well, as was pointed out here this afternoon, there was a tendency for it to go up there for a while, but basically it went down and fluctuated from 26 to 24. That is now, I would say.

Q. What is the price today, do you know?

A. 24. Once again, there has been a drop in the world price of aluminum, just as we rode up here yesterday, world prices went down three-quarters of a cent, and we don't know how it is going to affect——

[fol. 967] Q. Well, did domestic prices go down too?

A. Well, no, not to my knowledge. This might happen in a week or ten days and it might not even happen; I don't know.

Q. How do you know the world price went down?

A. It is published. There are two prices of aluminum. The domestic price, which is 24 cents a pound, and there is a world price at 22½ cents a pound today, so assuming that the American producer sold in Europe, he would sell that material at 22½ cents. If he could get 22½ cents. Or in this market he would sell it at 24 cents a pound. This happened yesterday.

Q. Well, now, from your knowledge of the price changes in the field of ingot since 1960, have the prices of ingot on a percentage basis gone down to a greater or lesser extent than in the case of aluminum rigid conduit?

A. I don't recall at any time that the price of rigid moved with pig. Basically, at the beginning when there was sharp

reduction, it moved with what steel did. In other words, our raw material and our selling price had no relationship to one another during these ups and downs.

[fol. 968] Q. I am not sure of what you are telling me. Are you telling me——

A. In other words, pig could have went up and rigid could have went down within ten days, or vice versa. One has nothing to do with the other.

Q. Well, which way did pig go since 1960?

A. The final result is that pig is 24 cents, which is about two cents off the highest price it has ever been, and rigid conduit is about 20 percent off the highest price it has been.

Q. I see. Now, are you aware that Rome was acquired by Alcoa in 1959?

A. Yes.

Q. Now, has this merger had any effect on your business, to your knowledge?

A. Yes.

Q. Would you state what effect it has had?

A. Well, it tends to look at Rome in a different perspective. Now they have two selling organizations rather than one. Alcoa, who we had been competing with since 1953, is one organization. Now Rome, who basically could not be in this business without their own extrusion facilities and compete, they've got this free. And there is two—I got a free [fol. 969] competitor, actually, and this tends to press prices.

Q. I'm not sure what you mean by "free competitor."

A. They got in it by virtue of Alcoa having this material. They just transferred it over to Rome to do the selling. Got two selling organizations.

Q. Are you telling me that as a result of this merger they have an added competitive advantage?

A. Yes.

[fol. 970] Q. And they have a competitive advantage over you by virtue of the merger?

A. Yes.

The Court: Sustained. Don't use the word "advantage". Let him describe what it is. You put it in your question and that doesn't establish any proof whatever.

The Witness: Just to explain myself, we sell against

Alcoa and it has a fine reputation and is a big company. And every company likes to sell all their products possible. When they get into a big building program and they sell elbows and couplings and so on and they are selling rigid, and that is what they are selling. One instance, the Pan American Building, Alcoa's reciprocity cost me half a million dollars in fees——

Q. Reciprocity with whom?

Mr. Bergson: I object, Your Honor.

A. Alcoa and the landlords.

The Court: Just a minute. Let's see if we can't get down to something. I don't mind you going on but what the question is, and I think it needs some clearing up, is that by this merger you felt that you were—if I understand you right, and correct me if I am wrong—you felt that you were met [fol. 971] by two sales forces instead of one. Is that what you mean?

The Witness: Yes. Yes.

The Court: So that you felt that by the Alcoa, by the merger, you had an additional competitor?

The Witness: Yes. O.K. Now let me——

The Court: Now, Mr. Resnick, just take it a slower.

The Witness: All right. Let me see if I could explain it.

The Court: Just listen to me a minute. Rome had a sales force before the merger?

The Witness: Yes.

The Court: And Alcoa had its sales force before the merger?

The Witness: Yes.

The Court: So that I suppose there were two sales forces?

The Witness: Yes.

The Court: Now I think it requires some explanation. You say that the merger gave you two sales forces. Still you had those two before the merger.

[fol. 972] The Witness: Yes. But Rome could never be a factor in the aluminum business, in aluminum conduit as Rome is today unless they were acquired by Alcoa, because they had to have the facilities to compete. And I would like to know, and I don't know if it is feasible for me,—I don't know of any rigid aluminum that Rome sold, any aluminum,

before the merger. They were not in this business. Alcoa was always in it. Now there are two groups of men selling. Alcoa is selling its quantities and Rome has its boys out.

The Court: This is what confuses me. I don't understand it either. I didn't understand that Rome sold aluminum before the merger.

The Witness: That's right. But as a company grows in stature and growth they acquire friends and have done favors in the past, on shortages. So Rome can say "Remember during Korea I gave you copper that was so hard to come by and do me a favor and b-y from me", and all that stuff.

The Court: Oh yes. I understand that.

The Witness: So I have two sets of people out in this fashion.

Mr. Bergson: I don't think this is testimony. This is [fol. 973] fantasy.

The Court: I think that you better get on. Frankly I don't quite understand—maybe the witness could explain it—I don't quite understand his explanation of the effect. Let's get it to this, Mr. Resnick, I think the question was, in substance, what was the effect of this merger between Alcoa and Rome upon your business? I think that is the question.

The Witness: O.K. Point blank they had a five year jump on me. They got a completely thoroughly trained organization in selling electrical distributors. Point blank. No ifs, ands or buts about it.

The Court: The question is how did it affect you?

The Witness: I can't get the best distributors. They are tied in with Rome. Rome has advantages. Rome has fifty years of name. Rome is a fine company and through the years it has treated its customers very good. I don't think you can hear anybody say a bad word against them. I don't know. I have not heard any. Then they get themselves immediately behind their selling of Alcoa—of aluminum [fol. 974] wires. Whereas I have to start from scratch. Run to the city. Find a stocking rep and then start digging. This I would say is a definite advantage. If I could afford to buy a company such as this, this is the thing to do. This is what you call buying a market, or buying a business.

Mr. Melchior: No further questions.

The Court: Is that the answer? All right.

Cross-examination.

By Mr. Bergson:

Q. Mr. Resnick do you know when the Rome-Alcoa merger took place?

A. Roughly.

Q. When?

A. Couple of years.

Q. It was April 1st, 1959.

A. All right.

Q. Were you in the aluminum conduit business at that time?

A. Well if we didn't——

The Court: No. Were you?

Q. Were you in the aluminum conduit business——

A. Yes.

Q. (Continuing)—at that time?

[fol. 975] A. Yes.

Q. So you testified incorrectly when you told Mr. Melchior that you went into the aluminum conduit business in 1960?

A. We started producing. It takes a year to find equipment and get it set up. I certainly don't want to mix any words or mislead anybody but it takes time in preparing.

The Court: Yes. We all understand those things. Just take it slow, Mr. Resnick.

The Witness: All right.

The Court: And get the question before you answer it.

The Witness: Right. All right.

The Court: So we won't get these dates confused.

By Mr. Bergson:

Q. Let me put it simply: Were you selling conduit——

A. (Interrupting) No.

Q. (Continuing)—prior to the Rome-Alcoa merger?

A. I don't believe so.

Q. So that when you did get into the market the merger had already taken place?

A. Yes.

[fol. 976] Q. Now you mentioned that the price of conduit has gone down 15 to 20 percent in the last couple of

years. And also you stated that you think that aluminum in certain areas anyway is taking over from steel. Do you think that that price decline in aluminum conduit has anything to do with the fact that aluminum is taking over from steel?

A. Yes.

Q. And you predict that in the next five years or so that aluminum will take over from steel?

A. I would. This is my firm opinion.

Q. What do you think the steel conduit manufacturers are going to do in the meantime? Do you think that they are going to sit back and take this?

A. Why did they leave New York and take 70 percent of the market now.

Q. They are competing, aren't they?

A. I can't answer the question.

Q. You talked about the promotional efforts of Kaiser in getting aluminum into the market. Wasn't the greatest promotional tool that they used the consignment method?

A. I don't know if this was a good tool. I think it hindered in the early days. I think people who have no money in something tend to feel, well if it will sell it will sell. But when he gets hurt in cash then is when he will undertake to sell.

[fol. 977] Q. In order to compete with steel and get wide distribution, didn't Kaiser have to place its conduit on a consignment basis?

A. I would say "no". Otherwise we could have sold Point 1. Because we didn't consign Point 1.

Q. But we are talking about the growth and existence of aluminum.

A. This only happened in the last two years.

Q. And when did Kaiser go on consignment basis?

A. In that period of time.

Q. And Kaiser was the first to go on this consignment basis?

A. I think this is correct.

Q. And while you have not had the financial ability to place your conduit on consignment, haven't you reaped some of the benefit of the popularity which has been given to aluminum conduit by Kaiser and Alcoa and Reynolds going into consignment, putting aluminum on consignment?

A. Just as I reaped benefit from my aluminum operation. I started very small in aluminum operation and I feel our share of the aluminum business did not grow, of the rigid conduit in what the market is out there. I would say "no, I did not share as much."

[fol. 978] Q. You didn't share as much?

A. Yes.

Q. Because you didn't join in doing it.

A. I joined., I had to save 3½ percent in lieu of consignment.

Q. Have you made any money on your conduit operations?

A. In the broad sense, yes.

Q. You said you market your conduit all over the country. Now do you sell on the West coast?

A. Yes.

Q. How do you ship your conduit to the West coast?

A. Railroad car. Carload.

Q. Carload?

A. Yes.

Q. Are you able to sell any on the West Coast?

A. Yes.

Q. Were you able to sell any in the—strike that. Do you know whether the manufacturers of steel conduit are making any efforts to reduce the gauge of steel?

A. I don't think it would make any difference because of the code. It makes no difference—it doesn't make any sense because we could reduce the gauge of aluminum. It is still the same ratio.

Q. You could reduce the range of aluminum and still be [fol. 979] safe?

A. As safe as steel.

Q. Is aluminum as hard a metal as steel?

A. I had a funny experience. We made the first three sizes in a drawing method which was as hard as steel and our stocking reps are crying the blues. They say if we are buying aluminum we want it to act as aluminum. Now we are down to only drawing two sizes and I have to tool up to extrude like the rest of the industry.

Q. Do you sell a substantial portion of your conduit in the New York market?

A. Percentage wise, no.

Q. When you sell on the New York market do you sell direct to the contractor?

A. No. But our man is always there. There seems to be always a huddle. The architect, the contractor, the landlord and God knows who else.

Q. Do you sell through a distributor?

A. Yes. All our sales are made through our agents who sell through our distributors.

Q. Just one question, Mr. Resnick. You spoke of competing against two sales organizations—Alcoa and Rome. Do you know that for a fact?

A. Yes.

[fol. 980] Q. How do you know?

A. Well take the Pan American building.

Q. No.

A. Well you asked me the question. I have to answer it.

Q. All right.

A. I know Alcoa wasn't there and I know reciprocity talks with the power companies who are some of the bigger users of power in this country——

Mr. Bergson: I think the answer is entirely unresponsive. I ask it be stricken.

The Court: We are talking about the sales organizations of Alcoa and Rome.

The Witness: But I must answer this question.

The Court: No you mustn't. You won't do any such thing.

The Witness: All right. First I know——

The Court: Now wait a minute please, Mr. Resnick.

The Witness: O.K.

The Court: I think that you left the impression and all they are trying to do is clear it up, that since the merger there are two separate distinct sales organizations. I don't know whether you intended to mean that or not.

[fol. 981] The Witness: No, this is not.

The Court: Well if you pay attention, that is what counsel is trying to clear up.

The Witness: O.K. There is not that as such.

Mr. Bergson: Thank you. That is all.

The Witness: All right.

The Court: That is what you said, Mr. Resnick.

Mr. Bergson: Thank you, Your Honor.

The Court: All right. Anything else?
Mr. Melchior: I would like to ask one question if I may.
The Court: Yes.

Redirect examination.

By Mr. Melchior:

Q. Mr. Resnick in discussing the sales organization of Alcoa and Rome do you recognize a distinction in the market between what Rome sells and Alcoa sells?

Mr. Bergson: Of what?

Q. Of any of their products? Are you familiar with the products manufactured by the Rome Division or the Rome part of the Alcoa corporation?

A. Not as thoroughly as the Alcoa aluminum works.

Q. Do you know in a general way what the Rome Division——

A. (Interrupting) Yes.

[fol. 982] Q. What raw products the Rome Division markets?

A. The high tension cables; aluminum cables that are supplied to the power companies and through distribution. Now there are two ways of selling this material.

The Court: Now wait just a second. We know that there are lots of ways of selling. We heard it for a week. Just pay attention to what counsel asks you.

Q. Are you familiar generally with the array of products sold by the Alcoa Company other than the Rome Division of it?

Mr. Bergson: What do you mean by "array"?
Mr. Melchior: I beg pardon?
Mr. Bergson: What do you mean by "array"?
Mr. Melchior: I am talking about the products sold by the Alcoa Company.

Q. Are you generally familiar with the type of products Alcoa sells now?

A. Yes.

Q. Have you noted any distinctions in marketing between

the products normally sold by Alcoa prior to the merger in the general aluminum field and the products——

A. You lost me.

Q. Were you familiar with the products sold by Alcoa prior to the merger?

A. Yes.

[fol. 983] Q. And what generally did this comprehend?

A. Everything but the kitchen sink in aluminum. In fact they sold pots and pans.

Q. Did it include aluminum rigid conduit?

A. Yes.

Q. Did it include steel conduit?

A. No, aluminum. We are talking about aluminum.

Q. It did not include steel conduit?

A. Not to my knowledge.

Q. Did it include copper wire and cable?

A. Not to my knowledge.

Q. Now I ask you are you generally familiar with the products sold by Rome before it was acquired?

A. Not to the degree of Alcoa, but in a general sense.

Q. In a general sense what were these products that Rome sold?

A. Its copper wire, the copper cable, its covered copper. They were basically a copper house. Rome was a copper house.

Q. And to what line of business activity generally were Rome's products sold?

A. Through the electrical distributors.

Q. Through electrical distributors?

A. That is correct.

Q. Those were electrical products?

A. Electrical products, and to major power companies, I think, through distributors.

[fol. 984] Q. Now to what general class of customers or for what general class of uses did Alcoa sell products?

A. To mill operators such as myself, and to mill people and I think they had the Ever-right—"Wear-ever" the old offshoot. But basically they are a mill selling—mill products is what they classify themselves as, I would say. They sell sheet to manufacturers. They sell to automotive factories. You name it and they take it and sell it.

Q. You met Rome-Alcoa as a competitor in the field of aluminum conduit?

A. Yes.

Q. Do you still recognize in their selling policies this distinction between the sales policies of Alcoa and the products they sell historically and the sales policy of Rome and their products?

A. Counsel isn't going to let me answer it.

The Court: Can we get an answer to that? I don't understand it. What policies are we talking about? You are asking for the conclusion first before you lay the foundation. You asked him if he recognizes the difference between the sales policies of Rome and the sales policies of Alcoa historically since the merger but you have not asked what the sales policies were.

[fol. 985] Q. What are those sales policies?

The Court: No. Not what are the sales policies. Apparently that is not what you want.

Mr. Melchior: I want the sales policies of Alcoa and then of Rome so we can contrast them.

The Court: But first you want the sales policies before the merger; isn't that what you are getting at?

Mr. Melchior: No. I am getting at *at* the present time.

Q. Is there a distinction between the policy, the sales policy of the Rome Cable products today? Do they go to different avenues? Are they sold to different types of customers than in the case of the other Alcoa products?

A. Yes.

Mr. Bergson: I can't understand the relevancy of this, Your Honor. Wire and cable products goes to one class of people and sheet goes to another class of people. We will admit that.

[fol. 986] Mr. Melchior: We are trying to clarify what the witness' direct testimony was. The witness testified there were two sales organizations, and there seems to be a failure on the part of counsel to understand what that means, and we are trying to clarify it.

The Court: Well, ask him. That's the way to clarify it.

The Witness: I am trying——

The Court: It is a very simple proposition. I mistrust

what the witness—now just a minute, please. I think the witness reasonably cleared it up once except we are back in the maze again. Have two separate sales organizations—this is the way I understand it, and if I am wrong please correct me.

The Witness: Okay.

The Court: Two sales organizations before the merger. Rome and Alcoa. I think he first started to say he had two after the merger, then he cleared it up I think by saying [fol. 987] in substance that the sales organizations of the two had combined, so that there is really one sales organization handling both products. That's my understanding.

By Mr. Melchior:

Q. Is this your testimony, Mr. Resnick?

A. Yes, but I think I can clear the point up with one word which is known as reciprocity.

The Court: Well, all right. The one word is in the record.

Mr. Melchior: No further questions.

The Court: Anything else?

Mr. Bergson: Nothing further.

The Court: That's all. We will recess until tomorrow morning.

(Whereupon, at 4:55 p.m. an adjournment was taken until Thursday, February 15th, 1962 at 10:00 a.m.)

[fols. 988-989] [Title omitted]

Transcript of hearing—February 15, 1962

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[fol. 990] The Court: All right, gentlemen. I am sorry to have held you up.

Mr. Mahaffie: Mr. Morley.

WILLIAM H. MORLEY, called as a witness in behalf of the Government, having been first duly sworn, testified as follows:

Direct examination.

By Mr. Mahaffie:

Q. Mr. Morley, what is your occupation?

The Court: Give me your name again.

Mr. Mahaffie: I am sorry, Your Honor.

Q. Will you state your name?

A. William H. Morley, Your Honor.

The Court: l-e-y?

The Witness: M-o-r-l-e-y.

Q. What is your occupation, Mr. Morley?

A. President of the Narragansett Wire Company, Pawtucket, Rhode Island.

Q. Mr. Morley, how long have you been engaged in the wire and cable business?

A. A little over 32 years.

Q. How long has the Narragansett Wire Company been in business?

[fol. 991] A. Sixteen years.

Q. Who founded the Narragansett Wire Company?

A. Four of us from Rhode Island; three business men including myself and a lawyer.

Q. Mr. Morley, what are the approximate annual sales of the Narragansett Wire Company today?

A. They were twelve million dollars in 1961.

Q. What products of the Narragansett Wire Company produce as of today?

A. A full and complete line of building wire products.

Q. Do you produce any products other than building wire?

A. Some control cable and some service drop and service entrance using aluminum conductors.

Q. Approximately what percentage of your total business is made up of the building wire line?

A. Approximately 95 per cent.

Q. What is the principal raw material used by Narragansett?

A. Copper.

Q. In what forr , sir?

A. In copper rod form.

Q. Does Narragansett produce aluminum conductor wire and cable products at the present time other than the service cable that you mentioned?

[fol. 992] A. Only service drop and service entrance.

Q. And does the company also produce copper service drop and copper service entrance?

A. We do.

Q. Mr. Morley, about what percentage of the total production line of the company is made up of products in which aluminum conductors are used?

A. Not over 2 per cent.

Q. Has Narragansett ever made a serious attempt to enter the aluminum wire and cable business?

A. Yes. In 1956 through our subsidiary, Texas Wire & Cable Company, in Plano, Texas, right outside of Dallas, at that time we contemplated getting into the manufacture of line wire and triplex using aluminum conductors. And late in the summer of 1956 we ordered gross wire drawing equipment and Edmonds Twisting Equipment for the drawing aluminum from aluminum rod and the insulator in the bare conductors into a three conductor triplex.

Q. That was to produce——

A. (Interrupting) [illegible]e wire.

Q. Aluminum line wire?

A. And we would draw the aluminum rod into solid wire and insulate for line wire and also insulate two conductors,

[fol. 993] using a bare as the third member of the three-conductor cable.

Q. Approximately what amount of money did you put into this operation in Texas?

A. Our initial investment amounted to $145,000.

Q. And this was, I believe you stated, with the purpose of producing service drop and line wire?

A. Yes.

Q. With aluminum conductors?

A. Right.

Q. Did you actually produce these products in Texas?

A. No. Subsequently, about seven or eight months later when the equipment arrived and was installed, the prices had deteriorated in the meantime to such an extent that it was inadvisable for us to go through with our contemplated pilot project.

Q. The prices of finished goods?

A. We would have incurred losses, not being too well integrated from the standpoint of the aluminum conductor itself.

Q. What did you do?

A. We continued to pursue our regular production program and continued with our present line with copper.

[fol. 994] Q. Did you have any additional plans in connection with that Texas operation that involved aluminum?

A. Yes. At that time we were contemplating and ordered the equipment for the line wire and the triplex, and we knew that if we entered the field of the transmission cable with so-called ACSR, that with the prices prevailing at that time it would necessitate a further investment into a Properzi rod casting unit. We were going to take one step at a time.

Q. Did you have plans with respect to production of ACSR?

A. We had planned it as the second step, yes.

Q. And what became of those plans?

A. After we found ourselves sort of blocked, due to the pricing situation from getting into line wire and triplex, and I believe at that time the price structure on ACSR was probably more competitive than the two I just named, we abandoned the entire project.

Q. What did you do with the machinery that you had ordered?

A. Well, the coarse wire drawing machine eventually ended up in Orange, California. We had a plant out there. The twisting equipment is still in Texas and is being used [fol. 995] for twisting conductors with copper.

Q. Mr. Morley, in connection with that Texas operation why was it necessary that you purchase equipment specifically for manufacture of aluminum?

A. Well, we had coarse wire drawing equipment available for copper——

Q. (Interrupting) In the Texas Plant?

A. Yes.

Q. Yes, sir.

A. And we considered it necessary at that time to buy additional equipment for drawing the copper rod.

Q. Excuse me. Did you mean for drawing the aluminum rod?

A. Correction. I should say the aluminum rod.

Q. Why did you consider it necessary to buy additional equipment, was it a matter of volume?

A. No, it is not practical—it is not considered good manufacturing practice, to draw copper one day and aluminum the next day on the same equipment.

Q. Is the same thing true of the stranding equipment—I am sorry, the twisting equipment that you purchased?

A. No, not necessarily so.

Q. But you did in fact purchase twisting equipment for the aluminum operation?

[fol. 996] A. We did.

Q. Now, did you in connection with this purchase of this wire drawing machine have any consultation with one or more manufacturers of that machinery?

A. We did at the time we converted it back for drawing copper.

Q. And what did they tell you about that conversion?

A. The engineers at Waterbury Farrell——

Mr. Bergson: This is hearsay, Your Honor.

The Court: I will take it. Of course, the question is pretty indefinite, what did they tell you about that transaction?

By Mr. Mahaffie:

Q. Let me make it more specific. Did you receive any advice from the manufacturer of this wire drawing equipment with respect to its conversion from aluminum to copper or vice versa?

A. In contemplating the utilization of that equipment for drawing copper instead of aluminum, we took the initiative and contacted Waterbury Farrell to ask them for their engineering recommendations.

[fol. 997] Q. And what was their recommendation?

A. They advised us to purchase an additional set of gears to be used or to be installed on the machine to draw copper.

Q. Mr. Morley, based upon your experience as a manufacturer of both aluminum and copper wire and cable products, is there in your opinion today an area or a field in which aluminum conductor products have their principal use?

A. With my limited experience in aluminum I know that the aluminum cables are used primarily for overhead transmission, for aluminum line wire, service entrance and service drop.

Q. And is there also a field or area in which copper conductor wire and cable products have their principal use?

A. Well, that happens to be the building wire that we are engaged in manufacturing and trying to sell at the right price, principally for inside wiring of homes and buildings.

Q. Mr. Morley, what has been the profit history of the Narragansett Wire Company during the 16 years that you have been in business?

A. The first twelve years of our operations were very [fol. 998] satisfactory from a profit standpoint.

Q. You made money?

A. Did I say the first 12 years?

Q. Yes sir.

A. The last four years have been highly unsatisfactory and we sustained huge operating losses.

Q. This is during the past four years?

A. The past four years; '58 through '61.

Q. Approximately how much have those losses amounted to?

A. I hesitate to tell you but I will. They are in excess of two million dollars over that period.

Q. Now, what has caused this change from consistent profits to consistent losses in your business operation?

A. A highly intense cost price squeeze.

Q. What do you mean by cost price squeeze?

A. It is that diminishing margin between the cost of the raw materials and the selling price of the wire and cable, the building wire and cable.

Q. What has caused this cost price squeeze with respect to the products that you manufacture?

A. My experience indicates that the loss constantly staring us in the face month after month, we really tried to find out why, and it seems to me that the dominance of the pri- [fol. 999] mary producers who control the price of the rod metal which we buy on a basis of price prevailing at the time of delivery and their penetration into the fabrication industry, and I am qualifying that to the products or the product group that we manufacture.

Q. Yes, sir.

A. Namely, building wire. And through the use of other fabricating facilities and their subsidiaries in using them as means of promoting the sale of copper. Because at the present time with current competitive conditions as intense as they are, all of the profits is coming out of the metal or from the production and sale of metal, and not from the end products, the building wire and cable.

Q. This—excuse me, sir, are you finished?

A. Yes.

Q. I believe you said primary copper producers or integrated copper producers; are they your suppliers of copper rod?

A. They are not only our suppliers for the raw material, copper, but they are also our competitors in the copper bearing finished wire and cable.

Q. Mr. Morley, with respect to the cost price squeeze [fol. 1000] that you have described, has there been any change during the period of the last ten years in your costs?

A. There has been a rather drastic change in the cost of our copper metal. For instance, using a dollar as a, a sales dollar, as a yardstick, going back to 1951 as a base, in 1951 our copper cost represented 21 per cent of our sales dollar. In 1961 that percentage of cost had risen to 47 per cent. An increase of 26 per cent.

Q. Now——

A. (Continuing) In 1961 the materials used in the production of building wire declined from a percentage of 36 in '51 to 25 per cent in '61.

Q. If I could break in, by other materials, you mean all raw materials?

A. Plastic, yarns, glass, finishing compound and so forth, and what have you.

Q. Other raw materials other than copper?

A. Other than copper.

Q. You say that declined from 36——

A. To 25 per cent.

Q. Of the final dollar of sales of the company?

A. That's right, that portion of the dollar of sales.

[fol. 1001] Q. What about your other costs?

A. We were able to hold our selling expense in line. We had a reduction from 12 per cent to 11, over that span of years.

Q. What does the selling expense consist of?

A. This was distribution expense of freight and commissions, your salaried salesmen, if you have any, and customer discounts.

Q. Do you have any other cost items, Mr. Morley?

A. Yes. In spite of the increase in taxes and other cost increases our operating cost at 1951 represented 15 per cent of our cost dollar. In 1961 our operating overhead was down one per cent, to 14 per cent.

Q. Now, your operating cost includes roughly what type of expense? Overhead, I believe you mentioned.

A. Non-productive labor and power and heat and steam and light and some non-productive people as well, taxes, auditors, lawyers; all expense of a general nature.

Q. Mr. Morley, what about your labor expense since 1951?

A. During that 11-year period our hourly wage rates increased 82.4 per cent and yet in 1951 there was only a change [fol. 1002] of one per cent between 6 per cent of labor costs in our sales dollar, which is now 5 per cent. It was 5 per cent in 1961.

Q. Let me take that back, Mr. Morley. Your labor cost in 1951 was what per cent?

A. 6 per cent of the cost dollar.

Q. Of the sales dollar?

A. Of the sales dollar.
Q. And what is it today?
A. 5 per cent.
Q. So your labor expense actually has declined?
A. That's right.
Q. By one per cent?

The Court: That is due to increased productivity?
The Witness: Yes, Your Honor, and better equipment, better flow, new materials and buildings.

Q. Mr. Morley, what effect, if any, has the acquisition of the Rome Cable Corporation by Alcoa had on your company?
A. The only effect as I see it would be our inability sometime in the future——

[fol. 1003] Mr. Bergson: I object, your Honor. The question is what effect has it had.
The Court: Yes.
The Witness: Sir?
The Court: Limit your first answer. The first question is limited to what it has affected, how it has affected.
The Witness: Will you repeat the question?

Q. My question was what effect, if any, has the acquisition of the Rome Cable Company by Alcoa had on your company?
A. None.
Q. Now, do you expect, Mr. Morley, that it may have an effect on your company?

Mr. Bergson: I think that is highly speculative.
The Court: It is very speculative, of course. Overruled.

By Mr. Mahaffie:

Q. Do you want the question read back, Mr. Morley?
A. Please.

(The reporter read back the last question as above recorded.)

[fol. 1004] A. It may at some future time, should we deem it advisable with, say, changing conditions and better prospects to make a profit using aluminum conductors or manufacturing building wire with aluminum conductors, we may at some future time want to try to get into that operation.

Q. That is, the aluminum wire and cable operation?
A. Aluminum wire and cable.
Q. And what do you expect the effect of this acquisition to be should you attempt to do that?
A. Sir?
Q. You stated the acquisition has had an effect.

The Court: No, he hasn't said it has an effect.

By Mr. Mahaffie:

Q. May have an effect should he attempt to enter the field.

The Court: Due to changing conditions and so forth.

By Mr. Mahaffie:

Q. What do you expect that effect to be?

Mr. Bergson: This is speculation piled upon speculation.
The Court: I know, but we will add another block to the [fol. 1005] pile. Overruled.

By Mr. Mahaffie:

Q. Do you want that question read back?
A. Yes.

(Reporter read back the last question as above recorded.)

A. I thought I answered that just the question preceding that.
Q. Well——

The Court: You can ask it again.

By Mr. Mahaffie:

Q. Let me ask it again. You stated, Mr. Morley, that in your opinion the acquisition might have an effect on your company should Narragansett due to changing circumstances wish to enter the aluminum wire and cable field.

Mr. Bergson: I beg to differ, he did not state that, Your Honor. He said if he wished to enter the building wire field with aluminum conductor cable. You can have the record read back to you.

By Mr. Mahaffie:

Q. Let's straighten that out. Mr. Morley, did you mean by that entry into the aluminum building wire field or the [fol. 1006] broader field of aluminum conductors in general?

A. When I answered the question I had in mind building wire.

Q. Well, would you also consider entry into the broader field?

A. That would depend on the circumstances at that time.

Q. All right, sir. Now, with respect to future entry into either the building wire field or broad aluminum conductor field, what would the effect of this acquisition be?

Mr. Bergson: This is the third block in the speculation. When does it topple?

The Court: We will go up one more.

The Witness: There again it is hard to say, because new products may be developed in the future and we would of necessity have to broaden our operation to include other types of wire and cable, or types other than building wire.

By Mr. Mahaffie:

Q. Well——

The Court: Gentlemen, isn't the answer obvious? If he went into the field some time in the future he would have one more competitor, is that the answer?

[fol. 1007] By Mr. Mahaffie:

Q. Well, is that the effect, Mr. Morley, or is it something beyond that?

A. I didn't get what the judge said.

(The reporter read back the last question by the Court.)

The Witness: Yes, we would have an integrated competitor.

By Mr. Mahaffie:

Q. And would that make a difference?

The Court: Difference in what?

Mr. Mahaffie: In his chances of entry into this field.

The Court: You don't need an expert for that, do you?

Don't we all know that in any crowded business, whether it is aluminum or anything else, it is one thing that a business man has to appraise when he goes to enter it.

Mr. Mahaffie: What I am trying to bring out, your Honor, is that the effect is not simply the addition of another competitor, it is the addition of the change from a non-integrated [fol. 1008] competitor to an integrated competitor.

The Court: That is exactly what you said, that you have an integrated competitor, and there can't be any dispute about that.

Mr. Mahaffie: All right.

By Mr. Mahaffie:

Q. Mr. Morley, in your judgment, would the profits of your business be improved if Narragansett were integrated further back into the fabrication of metal?

A. No question about that, yes. Our present plans call for the erection of a copper rod mill which we hope to have in operation by July 1st of this year.

Q. How much are you investing in that rod mill, Mr. Morley?

A. Approximately two million dollars.

Q. And why are you, can you explain why that would improve your profits?

A. To improve our competitive position and get our company back on a profitable basis of operation. With this cost-price squeeze, that most of the profit is in the metal, it is our long range plans, we have been working on this for the past three years, and this rod mill should be in operation July [fol. 1009] 1st of this year.

The Court: The answer to that is you would hope to make rod in your own mill cheaper than you can buy it from somebody else?

The Witness: Yes, sir.

The Court: That is a very simple answer and very obvious.

The Witness: And we also contemplate late this year the installation of a milling furnace and a wire bar casting unit to convert the scrap generated by our rod mill back into electrolytic copper wire bar, and at the same time buy some No. 1 electrolytic copper scrap and also convert that back into wire bar.

By Mr. Mahaffie:

Q. Are these plans for immediate execution or future plans?

A. The rod mill, yes; the milling and casting unit, yes; and then the long range planning also calls for the purchase and erection of a small electrolytic refinery which will permit us to buy copper-bearing scrap in the New England area and convert it into good electrolytic copper wire bars. Then [fol. 1010] we will be as basic as we can get, unless we found some copper-bearing ore in our backyard or acquired a small copper mine, but if we ever get to the point where we are integrated back into the metal with a little refinery to take care of our own needs and casting and rod bar, I would be very happy.

Q. Mr. Morley, in the wire and cable business today, what are the chances of a new entrant?

A. Currently with the price prevailing in our field, a man would be most fool-hardy to risk good American dollars in such a venture.

Q. And what in your opinion are the chances of success of an existing manufacturer of copper wire and cable products who attempts to get into the aluminum wire and cable field?

A. If I were to contemplate that, I'd deem it absolutely necessary to be basic.

Q. What do you mean by that?

A. Be not only able to fabricate aluminum, but a producer of the metal itself.

Mr. Mahaffie: That's all.

[fol. 1011] Cross-examination.

By Mr. Bergson:

Q. Mr. Morley, you testified about your plans to go into aluminum line wire and triplex back in 1956 and that you had made an intial investment for a wire drawing machine of $145,000; when did you drop those plans?

A. The following year.

Q. 1957?

A. Right.

Q. Did the Rome-Alcoa merger have anything to do with the dropping of those plans?

A. It did not.

Q. Now, you also said that it was not practical to draw copper one day on the same machine and aluminum another day or the next day on the same machine; would it be practical to draw aluminum one week or two weeks on a machine and then draw copper a week or two weeks on the same machine?

A. I am really not competent to answer that question one way or the other, not having had the necessary experience in the drawing of aluminum.

Q. You also stated that when you sent the machine that you planned to draw aluminum on to California, where it [fol. 1012] was used to draw copper, that you had to change the gears; wasn't that because the gear ratio or the power ratio needed for drawing copper is higher than it is for drawing aluminum?

A. I don't know that for a fact. I only know what Waterbury Farrell recommended. We spent $1800 in acquiring a new set of herringbone gears for copper drawing.

Q. If you had been converting a copper drawing machine to aluminum draw, which wouldn't require so much power, would such an expenditure have been necessary?

A. I don't know. I do know that when we converted the machine over for copper drawing with the new set of gears, the finishing speed was reduced from 5,000 to 4,000 feet per minute.

[fol. 1013] By Mr. Bergson:

Q. Isn't it a fact that on a drawing machine that you can draw more feet of aluminum per minute than you can copper with the same power?

A. I would assume so, because you are handling less weight.

Q. And a softer material?

A. And a softer material.

Q. So if you were converting from copper to aluminum the problem of power would not be the same as it is converting from aluminum to copper; isn't that simple logic?

A. Very simple. Yes, it is.

Q. When you were talking about this price squeeze you talked in terms of percentage of cost.

A. Yes.

Q. Let's talk in flat prices. What has happened to the price of copper rod?

A. During that period?

Q. During that period.

A. Three cents a pound from '51—three cents a pound higher today than it was eleven years ago.

Q. And how much higher per pound than it was two yeras ago?

[fol. 1014] A. Gee, I would have to trace that whole price structure back in '57. In April, 1957, copper was 46 cents a pound; by December that year it was down to 30. And the summer of the following year it was down to 25. Copper fluctuates up and down. I would have to kind of refresh my memory to get those cycles.

Q. Isn't the main reason for the difference in ratio on cost, cost of the rod and the price of your, that you sell your finished product for, due primarily to the price at which you sell your finished product rather than the fact——

A. Of course, all I can give you percentage——

The Court: Just take it a little slower. Let me see if I understand the answer. What is the answer?

The Witness: The answer, your Honor, is yes. But I can reconvert those figures to our cost dollar rather than our sales dollar and then the relative rise and fall of the market prices has no bearing.

Q. Mr. Morley——

[fol. 1015] A. I would like to explain that.

Q. When you have a squeeze in anything, whether it be in a product or anything else, there is something pressing up and there is something pressing down; right?

A. Of course.

Q. Let me ask you this: In your product, which is copper building wire as I understand it, has the pressure been more severe from the top, the sale of your building wire product, or has it been more severe from the bottom, the cost of your purchase of copper rod?

A. It has been much more severe from the top.

Q. Right. And expressing it in terms of percentages, as you did, has a little bit—well, strike that.

A. I would be glad to give you those percentages.

Q. No, you gave the percentage.

A. Yes, I gave the percentages on the sales dollar, but I can also give them to you on the cost dollar, which only fluctuates with metal, of course, and other costs. I only gave those figures to illustrate what has happened to us.

[fol. 1016] Q. I understand.

A. From the standpoint of the selling price of this cost price squeeze.

Q. Who are your principal competitors in your building wire products?

A. All the large integrated companies; all the large independent companies, and some of the smaller independent fabricating companies.

The Court: Are you talking about copper companies now?

The Witness: Copper companies.

Mr. Bergson: Copper companies.

The Witness: I am talking about the wire and cable manufacturers who use copper in the building wire.

The Court: All right.

Q. Now, isn't it a fact that in copper building wire your severest competition has come from the independents, price-wise, the non-integrated companies?

A. If you permit me to answer that question I would be very happy to do so.

Q. Well, I asked you, so I certainly will permit you to answer.

[fol. 1017] A. Now, my opinion is that that intense price squeeze manifested——

Q. I didn't ask you about the price squeeze. I asked you about the competition in prices between you and your competitors, not between you and your suppliers.

A. That competition develops through the marketing practice of the large integrated companies as well as the large independent manufacturers of building wire. Because they are three customer group classifications. Your sales manager of a large company, whether it be integrated or a large independent company, starts to work to get those customers. Now, the first group are the consignment stock

customers. The second group are the big wholesalers in the metropolitan and urban centers. And the thing that is causing so much intense competition in our particular field has been that desire on the part of the large companies to sell metal in the form of wire against a big tonnage of building wire construction contracts which they feel belongs to them and not to a small independent such as ourselves. And we recognize that fact because we don't quote or try to obtain [fol. 1018] that kind of business.

Q. Then they are not your competitors?

Mr. Mahaffie: Let him finish his answer.

The Court: No. It is perfectly proper. Because he is asking about competitors.

A. (Continuing) Our only means, our promotion of our sales of products is through an independent jobber and not on chains and big building projects. That is where all the abuses creep into this price war and causes them to sell their copper on the price at the time of the shipping and therefore through their subsidiaries they will sell building wire against a building project on a firm price that may be in the far future, two years later. So that establishes the price levels for everyday business, over the counter business we call it, through the regular jobbers. Electrical wholesalers.

Q. Do you know a company known as the Narragansett Wire Company?

A. Do I know it?

Q. Oh, you are Narragansett Wire. I am sorry.

[fol. 1019] The Court: I would like to have you clear up one thing.

The Witness: Yes, your Honor.

The Court: Which to me affected your answer a lot. You say that you don't compete with those, you don't try to take the business, that large business that you speak of, which you seem to think is pretty well controlled by the larger integrated companies and the large independents. Did I understand you to say that?

The Witness: That's right, your Honor.

The Court: Then they are not your competitors. The question was directed to your competitors.

The Witness: They are competitors in this sense, that they take that business with a guaranteed price over a long period of time and that creates the price level at which we have to compete with in the sale of our products to other competing independent wholesale distributors. There is a [fol. 1020] relationship there, your Honor.

The Court: Okay.

By Mr. Bergson:

Q. When I said Narragansett Wire Company, when I put my foot in my mouth, I meant Hatfield.

A. I certainly do.

Q. Is Hatfield an integrated wire and cable producer, copper wire and copper producer?

A. Well, they just put in——

Q. Is it?

A. Not at the moment.

Q. And it has not been?

A. No.

Q. Is Hatfield known—do you meet Hatfield's competition in the trade?

A. We try to.

Q. What do you mean, you try to?

A. If the business is attractive to us, we meet the competition. When it isn't, we don't.

Q. In other words, Hatfield is a price cutter?

A. I think so.

Q. And in competing with Hatfield you have to lower your price to meet its competition?

A. We do.

[fol. 1021] Q. Now, Hatfield is not an integrated producer. Does that have any bearing on your profits?

A. Definitely.

Q. Now, you said in your direct examination that you were in a position to make aluminum line wire and triplex; that you had the capability of making aluminum line wire and triplex.

A. Yes.

Q. And you do make copper line wire and triplex?

A. When I answered that question on direct I was referring to aluminum service drop and aluminum service entrance.

Q. Mr. Mahaffie asked you whether you had ever contemplated going into the manufacture of copper line wire and triplex and you said you had.

Mr. Mahaffie: I don't think I did.

Q. Aluminum. I got it right here in my notes.

A. In '56, in Texas.

Q. Yes, sir. Aluminum line wire and triplex; Texas Wire and Cable Company, Plano, Texas.

A. That's right.

Q. And you put in machinery that would have given you the capability of making it?

[fol. 1022] A. That's right.

Q. Would you need any special skills, technical skills, to make that?

A. No, sir.

Q. Now I know you dropped this product because you determined at that time that it was not going to be a profitable product. If it turned out in the future that it were profiable to make aluminum wire and triplex, could you enter the business?

A. Not without buying additional equipment.

Q. I understand that. You couldn't change, you couldn't use your present equipment? You couldn't convert some of your present equipment?

A. We don't have any idle capacity.

Q. That is capacity. But suppose you decided to change your production mix.

A. Then we could convert over.

Q. Then you could convert over and you could make aluminum line wire and triplex without any additional investment?

A. That's right.

Q. Now, if, and I am indulging in the same type of speculation that I objected to——

The Court: Well, go ahead.

[fol. 1023] Q. If it should prove profitable that you could make a dollar or two dollars on aluminum line wire and

triplex, would the fact that Alcoa had merged with Rome deter you from doing that?

A. Not if we could make money.

Mr. Bergson: That is all, thank you.

The Court: Redirect.

Redirect examination.

By Mr. Mahaffie:

Q. Mr. Morley, in your opinion does the fact that Alcoa has merged with Rome Cable Company have any bearing upon your ability to make a dollar or two dollars in the aluminum wire or service drop cable field?

A. Not any more so if other mergers took place of a similar nature. I think the results would be the same.

Q. Does the fact that an integrated aluminum producer has purchased an independent manufacturer in this field have any effect on your ability to make money in this aluminum wire and cable field?

A. I believe that it does limit the potential.

Q. It limits your potential. Now, Mr. Morley, in 1956 and [fol. 1023-a] 1957 when you attempted to get into the aluminum business in Texas, I believe you stated that at that time you had equipment in your Texas plant which was capable of drawing copper and was used to draw copper.

A. That is correct.

[fol. 1024] Q. Am I also correct, sir, that you testified at that time that you did buy this additional equipment specifically for the purpose of drawing aluminum?

A. We did.

Q. Mr. Morley, who owns the Hatfield Wire Company, Wire and Cable Company?

A. I believe it is owned by Continental Copper & Steel Corporation.

Q. Now, on cross-examination you offered to Mr. Bergson some figures relating to copper costs as a percentage of your cost dollar between 1951 and 1961. I wonder if you could give me that information, sir?

A. Our copper cost as a percentage of our sales dollar, getting back to that same yardstick?

The Court: I don't think he asked you that.

By Mr. Mahaffie:

Q. Mr. Morley, on direct examination you gave us the various cost items as a percentage of the sales dollar?

A. Yes.

Q. Now, I thought on cross-examination that you were about to give the copper cost as a percentage of your cost [fol. 1025] dollar in 1961 as compared to 1951?

A. Those figures all could be reduced by a factor of 20 per cent to arrive at the percentage of our cost dollar instead of our sales dollar.

Q. Well, I am not sure that I understand that, sir. You mean the percentages of the sales dollar if reduced by 20 per cent would represent the same cost factors as a percentage of the cost dollar?

A. I do.

Q. This is with respect to the copper?

A. And the other cost factors as well.

Q. Well, can you state those percentages, or do you have them in mind? In other words, what the percentage of copper cost is as the percentage of your cost dollar approximately?

A. Well, I said that the percentage of copper in the sales dollar was 47 per cent, so you would reduce the percentage in the cost dollar to 39 per cent.

Q. That is 1961?

A. That's right.

Q. How would that compare with 1951?

A. Well, that would be 16 in 1951 to 39 in 1961, copper.

Q. Sixteen to thirty-nine?

[fol. 1026] A. Yes.

Q. Copper as a percentage of cost?

A. That's right.

Q. 16 per cent in 1951, 39 per cent in 1961?

A. That's right.

Mr. Mahaffie: Thank you, sir. No further questions.

Mr. Bergson: No further questions.

The Court: Just one question, Mr. Morley. Maybe you could clear it up for me. If you can't, I wish you would say so.

The Witness: Yes.

The Court: I notice throughout this trial there seems to be emphasis upon a situation that existed, I think, in the

aluminum industry in 1956, '57 and maybe '58. Now, was there something unusual about the price situation—well, let me ask you, in the aluminum industry during those two or three years?

The Witness: I believe, your Honor, that this change represents or is a result of the primary producers of aluminum, say Kaiser, starting to get into the field of fabricated [fol. 1027] wire and cable.

The Court: No. My question is simply this, was there an unusual situation? I don't care how it happened, in 1956, '57 and '58 was there an unusual situation?

The Witness: No, your Honor.

The Court: Well, am I right, then, in this statement, that the price of aluminum pig, ingot or rod began to go down from 1958 and is lower now than it was back there in 1956 or '57?

The Witness: That is true because of productive capacity of primary aluminum.

The Court: I don't care how or why or anything, I am trying to get a fact.

The Witness: I don't know, your Honor.

The Court: Well, as I understand it, that period in there, 1956 or '57, possibly part of 1958, was a high-price period for aluminum, primary aluminum. That is my understanding, and I am wondering if I was right about it. If you don't know, that is all right.

The Witness: I don't.

[fol. 1028] The Court: All right. That's all.

(Witness excused.)

OFFERS IN EVIDENCE

Mr. Wertheimer: At this time, your Honor, the Government wishes to introduce some more of its documents.

The Court: All right, sir.

Mr. Wertheimer: Documents which have previously been marked Government Exhibits for Identification 203, 204, 205 and 206, are offered into evidence at this time.

Mr. Bergson: No objection.

The Court: All right. Received. You can tell me briefly what they are.

(Government Exhibits 203, 204, 205 and 206 for Identification were received in evidence.)

Mr. Wertheimer: All right, your Honor. These documents which date back to early 1957 relate to Alcoa's interest in magnet wire as possibly a field for aluminum, possibly a field for Alcoa.

The Court: All right.

Mr. Wertheimer: Next, the government wishes to offer [fol. 1029] Government Exhibits for Identification 208, 209, and 210 for admission into evidence.

Mr. Bergson: No objection.

The Court: I will receive them.

(Government Exhibits 208, 209, and 210 for Identification were received in evidence.)

Mr. Bergson: Wait a minute.

Mr. Wertheimer: I did not offer 207 at this time.

Mr. Bergson: All right. No objection.

Mr. Wertheimer: These documents relate again to magnet wire and to REA Magnet Wire Company. Mr. Cope writing to Mr. Coffin in Government Exhibit 208 refers to aluminum magnet wire, the possibilities of aluminum magnet wire market and Rea's sales organization as having better knowledge of it. He also speaks of REA as a "high quality magnet wire manufacturer who wishes to work with us in the development of the magnet wire market for aluminum."

Next, the Government wishes to offer Government Exhibit for Identification 221 into evidence.

[fol. 1030] Mr. Bergson: No objection.

The Court: Received.

(Government Exhibit 221 for Identification was received in evidence.)

Mr. Wertheimer: This is an announcement, Your Honor, of Alcoa's acquisition of the Rea Magnet Wire Company—I am sorry, not the acquisition, of the tolling arrangement with Rea Magnet Wire Company. It is dated October 1, 1958. By this arrangement the Rea Magnet Wire Company produced magnet wire on an arrangement much the same as the tolling arrangement Alcoa had with Rome prior to Rome's acquisition.

The Government offers Government Exhibit for Identification 223, 224 and 225 for admission into evidence.

Mr. Bergson: No objection, Your Honor.

The Court: Received.

(Government Exhibits 223, 224 and 225 for Identification were received in evidence.)

Mr. Wertheimer: Government Exhibit 223, Your Honor, [fol. 1031] is a memorandum from Philip T. Coffin, whom I believe is manager of electrical conductor sales for Alcoa to Mr. R. V. Davies, an officer of the company. He states the reasons why he believes there is what he calls an optimistic outlook for aluminum magnet wire. Some of these relate to the differences in price of aluminum and copper, different demand and supply characteristics of each metal. He refers on page 3 of this document to the complimentary nature of Rome's and Rea's product line. I quote: "Rome Cable Corporation enjoys a nice volume of business in square and rectangular magnet wire but does not go down to the smaller so-called round sizes in either copper or aluminum. I think our pushing the aluminum magnet wire operation would be a natural and valuable activity to supplement the Rome activities. Generally speaking, the same trade that the Rome salesmen call on for Rome's present magnet wire product would be the same as that for the finer wire sizes of magnet wire to which I refer."
[fol. 1032] He also speaks of "package deals," as he terms them, and I quote: "There will be many applications with package deals involving big and small wire for both aluminum and copper, which can or will be made to advantage."

Next, the Government wishes to offer Government Exhibit for Identification 227 for admission into evidence.

Mr. Bergson: No objection.

The Court: Received.

(Government Exhibit 227 for Identification received in evidence.)

Mr. Wertheimer: Your Honor, this is a letter written ten days after the Rea acquisition by Frank L. Magee, President of Alcoa. He refers at the outset of the letter to "Our interest in the Rome Cable Corporation and now

in the Rea Magnet Wire Company." Alcoa had acquired Rome in 1959 and had just acquired Rea.

The Court: Yes.

Mr. Wertheimer: He says that this interest, and I quote, "Stimulated by our long time confidence in the future of [fol. 1033] aluminum in the electrical industry—" and skipping down a bit in the letter, he says, "Our decision was made in the belief that we could progress faster by acquiring these two aggressive and highly reputable companies, as well as the fact that we have had friendly relations with these companies for a long time and were attracted by their keen interest in the potentialities of aluminum in their respective fields."

Next we wish to offer Government Exhibit for Identification 207 in evidence.

Mr. Bergson: 207?

Mr. Wertheimer: Correct.

The Court: That is the one you skipped.

Mr. Bergson: That is objected to, your Honor, on the ground that it relates to electrical foil and strip sheet windings and has no relevancy to a case in which the line of commerce charged is wire and cable.

Mr. Wertheimer: Your Honor, we do not argue that aluminum foil and strip are included within the lines of commerce. We do submit, however, that they are related to the elec- [fol. 1034] trical—they are electrical conductor products manufactured by Alcoa, part of the product line which we contend gives Alcoa certain competitive advantages and indeed in some ways a substitute product in the broad sense for certain wire. In addition, your Honor, this document written by Mr. Coffin to all conductor salesmen with copies to executives of Alcoa relates to the general distinctions we intend to draw between copper and aluminum, the different price situation prevailing for each metal and the unresponsive nature of these two.

The Court: A moment ago you said something about they might be interchangeable.

Mr. Wertheimer: I say in the broad sense, your Honor. We do not contend they are not interchangable.

Mr. Bergson: That is the beauty of being on the Government's side, you can expand like a bellows, you can be broad or narrow, whichever suits your purpose.

Mr. Wertheimer: The defendants have cited Judge Wein-
[fol. 1035] feld's opinion, in the Bethlehem case in which lines of commerce were found within other lines of commerce. The first paragraph of this letter it refers to the soaring copper prices—

The Court: What is the date of the letter?

Mr. Wertheimer: The date is December 1957.

The Court: I will take it. What it has to do with this merger in 1959 I don't know.

Mr. Wertheimer: It has to do with the line of commerce issue, your Honor.

The Court: It has to do with the line of commerce issue?

Mr. Wertheimer: Yes, sir.

The Court: I will take it.

Mr. Bergson: He just said it didn't.

The Court: He says now it does. I will take it.

(Government Exhibit 207 for Identification was received in evidence.)

Mr. Wertheimer: Next the Government wishes to offer
[fol. 1036] Government's Exhibit for Identification 217 into evidence.

Mr. Bergson: This is objected to, your Honor, on the ground it has no relevance or materiality to the case at issue. This is a press release announcing the purchase by Alcoa of the transformer division of Automation Instruments Company which former division had been experimenting with aluminum foil and sheet strip windings. Again I see no relevance to this case.

The Court: I actually don't, I don't know that they do any harm but I really don't see any relevance to it, do you?

Mr. Wertheimer: We think this is illustrative of Alcoa's attempt to push aluminum——

The Court: There is no question about it, don't waste your time on that, any business man if he is making aluminum, he is pushing it, if he isn't, he isn't worth his salt, and I don't think the Anti-Trust laws were ever intended to stop him pushing it. So all of this stuff, I think, is just
[fol. 1037] appendages that attach themselves to anti-trust litigation which frankly I can't see any benefit to it at all.

Mr. Bergson: Your Honor, besides that they had witness after witness sitting in this chair saying that aluminum is

not feasible for magnet wire, that it won't work in magnet wire. Now, they stand on one foot and they stand on the other foot. Now, they are standing on no feet at all, it seems to me.

Mr. Wertheimer: We quite agree with our witnesses that aluminum wire is not suitable because of its physical and electrical characteristics; however, this doesn't relate to aluminum wire as a substitute for copper magnet wire, it relates to strip and sheet. This is precisely our point, that you have to go to a different type of product for it.

Mr. Bergson: May I ask you if you included the statistics of this product in your line of commerce statistics?

Mr. Wertheimer: No, we didn't.

Mr. Bergson: Why? If this is the line of commerce, [fol. 1038] why not?

Mr. Wertheimer: We have referred to aluminum——

The Court: Sustained, I am just not going to take it. I am going to draw the line, see if we can get moving. I don't think it is competent, Mr. Wertheimer, I don't think it does any harm but I think I would reject it. I really don't think it does you any good at all.

Mr. Wertheimer: We contend that acquisitions by an integrated company, your Honor, in related fields, are relative to the consideration of this acquisition.

The Court: Yes.

Mr. Wertheimer: This document refers to such an acquisition.

The Court: What does it do? Tell me.

Mr. Wertheimer: I quote: "Alcoa has purchased the transformer division of Automation Instruments, Inc. at Boulder, Colorado, along with all technical data and research and development equipment in possession of that [fol. 1039] unit.

"Alcoa's market objective is the application of aluminum foil and sheet strip windings for transformers and miscellaneous electrical equipment."

The Court: If you do that, you could go back and show how they bought mines and so forth. That is the way all companies are made up.

Mr. Bergson: We have a peach orchard, your Honor.

The Court: Sustained. I just am going to keep some of this stuff out.

Do you have quite a few more, Mr. Wertheimer?

Mr. Wertheimer: Yes, we do, your Honor.

The Court: All right, take a short recess at this time.

(At this point a short recess was taken after which the trial was resumed.)

[fol. 1040] The Court: All right.

Mr. Wertheimer: The next document that the Government offers in evidence is Government's exhibit for identification 361.

Mr. Bergson: Your Honor, the defendant objects to Government's Exhibit 361 on the grounds that it is composed of four papers written by people who have no connection with Alcoa and are incompetent on the ground that they are hearsay, so far as Alcoa is concerned.

The Court: What are they, Mr. Wertheimer?

Mr. Wertheimer: Your Honor, these are four technical papers, as Mr. Bergson described them, illustrating differences in physical and electrical characteristics of working aluminum and working copper. We contend, however, that they were adopted by Alcoa as a corporate admission and that they were distributed along with some notes explaining and qualifying certain terms in the papers from the Pittsburgh office.

[fol. 1041] The first page is a cover memorandum from Mr. Dallye, of the Pittsburgh office, to all electrical conductor salesmen commending these technical papers to the attention of the salesmen. Each report is preceded by a couple of pages of criticism which were accepted as corrections made by Alcoa. We contend that it is just as if the person in the head office of Alcoa wrote the technical papers themselves.

The Court: Tell me when were they written.

Mr. Wertheimer: These were written in June, 1956.

The Court: All right, Mr. Bergson, what is your explanation?

Mr. Bergson: Your Honor, the covering memorandum says this: "We think that after reading this memorandum a number of questions may occur to you. We shall indeed be glad to receive your comments and discuss any questions to your satisfaction."

[fol. 1042] This was merely a circulation of this docu-

ment to provoke thought or ideas from the persons to whom the documents were circulated, and there is no probative value in this case to any of the documents attached.

The Court: What would be the probative value of them?

Mr. Wertheimer: Your Honor, this would indicate, for example, the basis in the technology of using and selling aluminum conductors and copper conductors. We contend that aluminum wire and cable can be separated for copper wire and cable for among other reasons from different characteristics and the way these characteristics affect the trade. We think these articles bring out the technical side of the characteristics quite effectively.

Mr. Bergson: It is our position if they wanted to prove this they should have brought witnesses in to prove them and let us cross-examine them.

[fol. 1043] Mr. Wertheimer: I understood your objection to be hearsay.

Mr. Bergson: Well, isn't that it?

The Court: Well, I think so. Of course, gentlemen, again I don't think you are going to do much harm. You have had the practical men in the industry who handle aluminum and handle copper and have had them here for days, and they described their functions. Now I suppose some learned man, probably he isn't learned, can go ahead and give us characteristics or something or other. Maybe they agree with what we already got, but I don't think they carry much probative weight to them at all as proof of the facts therein. I am not disturbed about them. I don't think the case is going to turn on them by any means.

Mr. Wertheimer: We don't either, your Honor. If you feel you have enough evidence of the definite physical electrical characteristics, all right.

The Court: I think we have. I suppose you can get text-[fol. 1044] books written even ten years ago that don't correspond with the practicalities of the day. That is what progress is I assume in the aluminum industry the same as in any other industry.

If we ever started to take this as facts, can you imagine what we would run into in articles written by scientists in regard to our space rockets. I think you could find anything that you wanted to written about them.

I think I will sustain the objection. Simply because in my

opinion without looking at them very much they don't carry any probative value.

If there is something that you have not brought out from these men who handle these problems, work with them for years, experiment with them, had research departments, and if you wish to contradict something that they have said, I think you ought to produce the man who contradicts them. I will sustain it.

[fol. 1045] Mr. Wertheimer: The next group of documents which the Government wishes to introduce at this time are Government exhibits for identification 473 through 491. I can explain these documents.

Mr. Bergson: The defendant objects to these documents, your Honor, on the ground that they are completely irrelevant and immaterial to this case.

The Court: All right. What are they, Mr. Wertheimer?

Mr. Wertheimer: These documents relate, your Honor, to the real estate and development construction projects of Alcoa, including the Century City project to which reference was made yesterday.

To explain briefly, I believe Alcoa participated in a financial sense and administrative and managerial sense in certain real estate projects, using its aluminum products for construction thereof. Specific reference to using products of Rome Cable are made in Government exhibits for identification 477, 484, 488 and 489. In addition references to [fol. 1046] aluminum conduit to be used in these projects is made in Government exhibits for identification 482 and 488. We believe therefore that these are quite relevant.

Mr. Bergson: Your Honor, these are projects in which Alcoa, particularly the one that Mr. Wertheimer referred to, is the majority owner, they are projects which Alcoa has engaged in among other things for the purpose of promoting the use of aluminum, putting the aluminum products on display to show what they can do. Their relevance to this case has about as much relevance as Alcoa promotion on sheet or tube or storm windows or siding, which is involved in these things. If we are going this far afield, we have got to try the entire Alcoa operation, because if these documents go in I am going to have to put on proof to show what the purpose of the projects were, why they were engaged in,

what the circumstances are, and we are going to be here a [fol. 1047] long time.

Mr. Wertheimer: Your Honor, we want to show that these real estate projects, these construction projects were a market for Alcoa's products, the products relevant to this case from which other suppliers were excluded.

The Court: Excluded by who?

Mr. Wertheimer: By Alcoa.

Mr. Bergson: And if we didn't put them up they would be completely excluded, because there wouldn't be any place for their products to go. I think it is entirely ridiculous to say when a company puts up a project of its own that they can't use its own materials.

Mr. Wertheimer: We are not contending they couldn't use their own materials, we are not questioning the legality of these projects.

Mr. Bergson: What are you putting them in for?

Mr. Wertheimer: To show the market that Alcoa has for [fol. 1048] its products, the market that is denied to other competitors.

Mr. Bergson: I don't know what else to say to your Honor.

Mr. Melchior: May I make a few remarks?

The Court: Sure.

Mr. Melchior: I think maybe we ought to explain these a little more. These are documents we have recently secured by discovery of Alcoa, and they are memorandums prepared by highly placed officials of the defendant. Certain of these officials are to be witnesses for the defense in this case. These documents relate to the matter that Mr. Harvey spoke of yesterday. They relate in part to that, and these were the matters that were requested of Mr. Harvey in writing. We feel these documents will supply to you in writing the facts that Mr. Harvey could have testified to only by hearsay.

Now, they tie into the merger very closely in that it shows the way Alcoa is using the assets it acquired in the Rome [fol. 1049] merger and the Cupples merger and I believe the Rea merger. It shows how they tie in their sales of their ordinary aluminum building products to the electrical products produced by Rome, and it involves aluminum wire and cable, and it involves aluminum conduit, and specifically

Rome, because the company is mentioned in here and we think they are very highly relevant to this proceeding.

Mr. Bergson: Your Honor, these are documents that the government obtained under the motion to produce in the Cupples case. If you will recall when we had our discovery proceedings in this case the government asked for Cupples documents and you ruled that anything other than the mere fact of acquisition by Cupples was irrelevant to this case and denied the government's motion for production on those grounds. Now, all that apart, that is history, and the government is now using these documents obtained in another case in this case.

[fol. 1050] But the thing that I can't understand is how it helps to show that the acquisition by Alcoa of Rome substantially lessened competition when Alcoa desires to use the products of Rome, be it in a building that it decides to put up and which it owns. If it had not decided to build the building there wouldn't be any place for any products to go, but by building these buildings and by showing what aluminum can do in these buildings they increase the opportunity for sales of all competitors in other buildings which Alcoa doesn't own.

It has no bearing on this case at all.

The Court: I don't see that it would have any bearing if the background is what you indicate. Certainly I would think that you might sustain another lawsuit if Alcoa builds a building on behalf of the stockholders, builds a building and uses somebody else's materials to build it with. I would [fol. 1051] be a little suspicious that somebody might well claim a mismanagement.

I see nothing sinister at all in this, the building of a building, if I understand this thing right.

For instance, some of these are buildings built by Alcoa and owned by Alcoa.

Mr. Melchior: That is not completely the case.

The Court: I can only take one thing at a time. Now, how in the world is that of any importance to me here?

Mr. Melchior: Well, one of the problems your Honor seems to have faced throughout this case, because you have asked questions in this direction, is how do we tie this question of squeeze, how do we tie market power into the Alcoa-Rome merger. In some cases it is difficult to do other than

show the market conditions and how the market conditions and how the merger aggravate market conditions for a non-integrated company.

[fol. 1052] Now, we think this is the most relevant type of information that we can give to you. Here we have a specific case where Alcoa is using its power in the marketplace and is using the facilities it acquired from Rome and from Cupples for the very purpose of broadening its own opportunity to supply these products in a multi-million dollar project in California.

The Court: Wouldn't any company, whether it be Kaiser, Channel Master, Hatfield, wouldn't they be remiss in their duty to their own stockholders and to business as a whole not to try to increase their own output, and wouldn't they be remiss if they didn't at least try to do it in their own buildings?

Mr. Melchior: These are not their own buildings, your Honor.

The Court: That is something else again.

Mr. Bergson: We don't own these buildings a hundred percent, we are in a joint venture with Webb and Knapp. We own the majority. We have control.

[fol. 1053] Mr. Melchior: And we wish to show by the writings of Alcoa officials that it is impossible for aluminum conductor wire and cable and aluminum conduit to be put on that project unless the aluminum is made by Alcoa.

The Court: Everyday occurrence.

Mr. Bergson: They would be crazy if they didn't.

Mr. Melchior: But you have that against the backdrop of the power of Alcoa in the marketplace.

The Court: Certainly, and we have the statistics to show the power of Alcoa.

Mr. Melchior: And this shows it further. These, incidentally, since Mr. Bergson raised the point that these are documents from the Cupples case, these are documents which are dated in 1951, and these are documents which they apparently didn't have available when we made discovery in this case.

Mr. Bergson: You wouldn't have gotten them anyway, [fol. 1054] because his Honor ruled you were not entitled to it.

Mr. Melchior: These related to the merger because they involved the facilities of Rome.

Mr. Bergson: Your Honor, do you ever watch Maverick on television?

The Court: No.

Mr. Bergson: Well, that is a television program that is sponsored by the Kaiser Company, and they show their Kaiser office building and they say "Every single bit of material in this building was supplied by Kaiser Company. The cement was supplied by Kaiser Cement; the steel was supplied by Kaiser steel; the aluminum was supplied by Kaiser Aluminum." And they would be crazy if they didn't.

Mr. Melchior: This is the very thing that we insist makes life difficult for the men who testified here this week.

The Court: My dear gentleman, does the United States, does the anti-trust division claim that because life is made [fol. 1055] difficult in the competing in business that it is unlawful?

Mr. Melchior: No.

The Court: Isn't life made difficult in the electrical business?

Mr. Melchior: In the context of a merger.

The Court: It is a simple question. I don't understand that the anti-trust division or the United States Government or the statute in any way intends to cut out competition. Does it in any way intend, until you get to the force of a monopoly, does it in any way—doesn't it encourage rather than discourage the broadening of commerce and the increase of their business. Isn't it in the interest of any business, whether it is the shoemaker on the corner or the steel companies in Pennsylvania? They are trying to increase their business. So when the shoemaker makes his own shoes and uses his own material, is there anything sinister about [fol. 1056] it?

Mr. Melchior: We don't insinuate there is anything sinister, but we have to consider this in terms of merger. Congress has said that the merger trend shall not continue and that these mergers shall not take place if it has the following principal effects.

The Court: Your first, premise I am not so sure about your statement that the merger trend shall not continue. I am not certain that that is the basis at all.

Mr. Melchoir: I think the legislative history is replete with statements to the effect of concentration——

The Court: That is something different. Don't switch back all the time.

Mr. Melchior: I am not switching back.

The Court: You said that Congress said that mergers shouldn't continue.

Mr. Melchior: I think I said both.

[fol. 1057] The Court: Then you switched to concentration. You have two different propositions entirely.

Mr. Melchior: But they are related.

The Court: Well, they may be related if you show they are related. They are not related prima facie.

Mr. Melchior: We feel that one follows the other, however.

The Court: One follows it if you prove it.

Mr. Melchior: That is what we are attempting to do.

The Court: I understand that, but we are talking about the congressional meaning. Well, gentlemen, again you got a situation there where I don't know just what effect this has. These generalities we have in the context of the act and so on and so forth is always very hard for me to understand. What I want and am going to try to get is something cold, something hard that I can put my finger on rather than the generalities that generally find themselves in this sort [fol. 1058] of case. If it substantially lessens competition, why that is what we got.

And the fact that an aluminum company requires some products to be used in a business enterprise over which they have control——

Mr. Kergeon: About a 75 percent interest, your Honor.

The Court: I don't think it has much probative force. I think it is common. I think, just as I said, I think they might well be subjected to litigation if they didn't.

Mr. Melchior: We think this directly shows one of the ways in which this merger would substantially lessen competition in the aluminum wire and cable field and in the aluminum conduit field.

The Court: There is no question about this, that if every builder, and there are a substantial number of them, go into the building field and prescribe their own product, certainly part of the market is foreclosed to anyone else.

[fol. 1059] Mr. Melchior: That's right.

The Court: Do you have any case that indicates in any way that such an operation is any evidence of undue concentration?

Mr. Melchior: I believe we did have some testimony of that——

The Court: I am asking about a case. About a decision. I just can't consider it. It happens every day.

Mr. Bergson: I can show you a decision, your Honor, where the Supreme Court said that a subsidiary is expected to buy from its parent.

Mr. Melchior: We don't have this situation here. Rome is not buying from Alcoa.

Mr. Bergson: All right then, a parent buy from a subsidiary. What difference does it make?

Mr. Melchior: That is not here. This is a construction project in which independents are barred by virtue of Alcoa's investment in this.

[fol. 1060] Mr. Bergson: And may be barred even further back if they didn't intend to go ahead with it.

Mr. Melchior: May I finish my statement. We have already had some testimony to the effect that this is not only being done by Alcoa but by the other integrated producers in the industry.

The Court: Then you get to the proposition where you have a monopoly.

Mr. Melchior: I don't think we have to show monopoly in a Section 7 proceeding.

The Court: That's right, you don't. I don't understand that there is any claim of a monopoly here.

Mr. Melchior: There is a claim, we allege not only is there a substantial lessening of competition, but it tends to a monopoly. That is our claim. To this extent it is highly relevant.

The Court: Well, again I don't think there is anything that is soul-shaking about this that the case is going to turn [fol. 1061] on. I will defer on that and see what it is all about.

Mr. Melchior: All right, sir. Your Honor, I have just a few more documents here which I will explain very briefly. This hasn't been marked. It is GX-496 for identification.

Mr. Bergson: GX-496? May I see a copy of it?

Mr. Melchior: You have a copy of it, Mr. Bergson. It is the Census letter.

(Letter dated January 30, 1962 from the Director of Bureau of Census marked as Government's Exhibit 496 for identification.)

Mr. Melchior: That is a letter from the Director of the Bureau of Census, United States Department of Commerce, in response to a letter we wrote to them on January 30 requesting that they give to us any changes which may have been made in certain published totals.

The Court: January 30, 1962?

[fol. 1062] Mr. Melchior: Yes, sir. January 30. We just received it the other day.

The Court: 1962?

Mr. Melchior: Yes, sir, 1962. It has to do with certain tabulations that we introduced and changes have already been made in your copy and defendant's copy.

The Court: All right.

Mr. Bergson: I have no objection, your Honor, but I think it points up the inaccuracy of the census figures because they have to be rattling around while the case is going on.

Mr. Melchior: Well, as a matter of fact——

The Court: All right, gentlemen, go ahead.

(Government's Exhibit 496 for identification received in evidence.)

Mr. Melchior: I offer GX 411—strike that, please. Government Exhibit 409 and Government's Exhibit 410 for identification. I offer them at this time. These are BDSA [fol. 1063] forms 122 and 84, the forms used by that agency in quoting statistics.

Mr. Bergson: No objection.

The Court: Received.

(Government's Exhibits 409 and 410 for identification received in evidence.)

Mr. Melchior: GX 411 for identification is an article from American Metal Market dated February 21, 1961 which relates to Roebling's acquisition. Do you wish to comment on that?

Mr. Bergson: No, I will wait until you finish. You can tell what it relates to.

Mr. Melchior: I offer it at this time.

Mr. Bergson: I object, your Honor, on the ground it is a newspaper story and hearsay.

Mr. Melchior: Now, we will be glad to——

Mr. Bergson: It is a far cry where we put newspaper articles into a record in a trial of a case, even an anti-trust case.

[fol. 1064] Mr. Melchior: We are offering this merely to prove that the Reynolds Metal Company in 1961 acquired the wire and cable facilities of John A. Roebling and Son, and if counsel will stipulate that on the record we won't offer it.

The Court: I think it is already in the record several times.

Mr. Bergson: It is on the charts, your Honor.

The Court: It is already in the record.

Mr. Melchior: GX-412 for identification, which is an extract from Moody's Industrial Manual in regard to the Aluminum Company of America. It relates to certain facts.

The Court: What is the number?

Mr. Melchior: GX-412 for identification.

Mr. Bergson: No objection.

The Court: Received.

(Government's Exhibit 412 for identification received in evidence.)

[fol. 1065] Mr. Melchior: I next offer GX-413 which is an extract from Standard and Poors publication industry services dealing with aluminum, copper and fabricating metals. This document contains a great deal of industrial information in condensed form. I do not believe there is much in here that would be contradicted by defendant. We attempted to get these papers into the record by stipulation immediately prior to trial, but defendant in its letter to us indicated that they would not enter into that stipulation because the facts were drawn out of context. So in order to assist the Court we thought we would offer the full context merely for what the information is worth.

Standard and Poors, as your Honor undoubtedly knows,

is a reliable publication and business concerns and individual investors rely on it to make their investments.

I offer 413 for identification.

[fol. 1066] Mr. Bergson. I object on the ground it is hearsay. This is a Standard and Poors, as he says, industry survey. In the first caption is "Selective holdings warranted." They are advising investors what to invest in.

The Court: Maybe I could get some good stock.

Mr. Bergson: I am perfectly happy for you to look at it, but I don't think it should be part of the record in this case.

Mr. Melchior: We don't think the document is really that important. We merely think it would provide some industry information which I am sure the defendant and plaintiff would very willingly agree on if they had the time to sit down and go over it.

Mr. Bergson: But there is so much editorial material in here.

Mr. Melchior: We admit it is hearsay.

The Court: I think I better sustain it.

[fol. 1067] Mr. Melchior: A group of documents GX-416 to GX-420 for identification. These are articles copies from Modern Metals, which is an industry magazine in the metal field.

Mr. Bergson: Your Honor, I——

Mr. Melchior: I have not finished, Mr. Bergson.

Mr. Bergson: Oh, excuse me.

Mr. Melchior: From American Metal Market. We are not offering them for the truth of the facts contained therein. We are merely offering them to show that the periodicals in the trade treat aluminum and copper separately. These are four brief announcements.

I offer them at this time.

Mr. Bergson: Your Honor, I object. These are hearsay. They are newspaper stories. Let me read one of them to you just so you can see what they are like. This is 416, I take it, because it is the first one: "Heavy aluminum cable [fol. 1068] users—particularly some public utilities in the south—are getting cable at bargain basement prices these days. Stuff that normally markets for 30 to 33 cents a pound, which beats the hell out of copper or any other material, is currently selling for 26.3 to 27.7 cents. No freight charges either. One 22 million pound order recently went at 26.28

cents a pound, just a fraction of a cent above the price of primary ingot. The Justice Department will have to look hard to find price fixers in the aluminum cable business."

This shows the difference between copper and aluminum.

Take another one which says, "Copper wire mills' price war rages."

I submit that is not the type of material that should be received in a lawsuit.

The Court: I think I will sustain it.

Mr. Melchior: We now offer Government's Exhibit 414 for identification and Government's Exhibit 255 for identi-
[fol. 1069] fication.

Government's Exhibit 414 is an article drawn from the magazine, trade magazine Modern Metals. It is entitled "Alcoa 1960."

Government's Exhibit 255 is an inter-corporate memorandum of the Aluminum Company of America which refers to this particular magazine article and it indicates that the statements made or attributed to Alcoa officials contained in this article have been adopted by the company.

In other words, we are offering the article, we only offer so much of that article as contains statements by Alcoa officials. And we offer Government's Exhibit 255 for identification in support of the fact that these quoted statements have been adopted by the company.

I will offer them at this time. Incidentally, this is an article which extolls the virtues of Alcoa.

The Court: Well, I just don't want to hear their virtues
[fol. 1070] at all. I want nothing but the facts.

Mr. Melchior: We think the article contains facts. We could reduce the size of this exhibit by offering two pages of it, pages 62 and 64. The intervening page being an advertisement which we have deleted.

Mr. Bergson: 62 and 64?

Mr. Melchior: Page 62 and 64.

Mr. Bergson: My copy of the article only has 24 pages.

Mr. Melchior: We are going by the number that appeared in the magazine. Page 62. That is the next page, and that section of the article is entitled "Alcoa and copper."

[fol. 1071] Mr. Bergson: Well, your Honor, may I be heard for a moment on this?

The Court: Yes.

Mr. Bergson: There are quotes in here, but the memorandum referring to this document has this statement: "I took into consideration all the comments of those who reviewed the initial draft, made the changes that were suggested and turned the corrected copy over to Bill Griffin on Friday, June 5. How many of these proposed changes he will accept is anybody's guess. He will, I believe, take most of the changes in which quotes are involved. However, he is quite independent and will probably do what he pleases with his own editorial comment."

Now, I again submit this is not the type of evidence for a lawsuit of this kind.

Mr. Melchior: Now, the final page of that memorandum states this: "All quotes may be edited. In many cases words have been artificially put into the mouths of different people, so don't be surprised if you can't remember making certain [fol. 1072] statements. We are at liberty to shift quotations from one person to the other—" These people being Alcoa officials mentioned in the article—"and if we don't want to be quoted on some point we can suggest Modern Metals say it themselves."

Therefore we can understand from this statement that all the quotations in the article attributed to Alcoa officials were made by Alcoa officials.

Mr. Bergson: Now, your Honor, again I want to say, I don't want to belabor this, but what Mr. Melchior was reading from was not the second page of the memorandum.

Mr. Melchior: Last page.

Mr. Bergson: From which I read. You read from a memorandum dated May 25, 1959, and I read from a memorandum dated June 8, 1959, either of which is on one page.

Mr. Melchior: This is a series of about four memoranda all related one to the other, and we have marked them as one document.

The Court: Well, doesn't the last memorandum indicate [fol. 1073] that this article that you referred to is going to be edited by somebody and he is going to do as he likes in regard to some quotes?

Mr. Melchior: Not with respect to the quotes. He could edit the article but not the quotes.

The Court: Wait a minute, I think he does say something about the quotes.

Mr. Bergson: He does, your Honor.

The Court: That's what I thought. What does he say the quotes—let me see the memorandum. (Document handed to Court.)

Well, this is a document of June 8, 1959, which is later than the document that you referred to.

Mr. Melchior: Well——

The Court: Which would indicate to me that the document that you are referring to is subject to some later correction.

Mr. Melchior: Well, I don't think it changes it, though. You notice he says he is quite independent and will probably do what he pleases with his own editorial comments, mean-[fol. 1074] ing the writer of the article.

The Court: What has he done?

Mr. Melchior: He hasn't had authority to change a quote.

The Court: What has he done?

Mr. Melchior: Has the writer done?

The Court: Yes.

Mr. Melchior: We don't know what the discussion was about, but we know the quotes are accurate and that is all we are offering it for.

The Court: I don't know about that.

Mr. Melchior: Well, your Honor, this document is not that important.

The Court: I will sustain it.

Mr. Melchior: Now, the final three documents are the Government's Exhibit for Identification 421-A, 421-B and 421-C. These are chapters drawn—they are reprints drawn from Mineral Facts and Problems, 1960 Edition of the Department of Interior, Bureau of Mines, that relate specifically to copper, aluminum, alumina and bauxite, and they are [fol. 1075] in the nature of background information. They are Government publications.

Mr. Bergson: I have a little problem with these documents, your Honor, because they are government documents and I think government documents should be given considerable weight, but there is a chapter which does some crystal-ball-looking in these memoranda, called "Outlook and Problems," and this is the editorial guesswork of the author and I don't think it is proper evidence.

Mr. Melchior: If Mr. Bergson's only objection to this

document is that, we could strike that part of it and let the rest in for background. Do you have any objection?

Mr. Bergson: No. Let's find out what parts we are striking out.

Mr. Melchior: The part entitled "Outlook."

Mr. Bergson: "Outlook and Problems."

Mr. Melchior: Whatever the conjecture is. We don't want conjecture in the record unless it is necessary.

Mr. Bergson: Well, let's outline it so there won't be any [fol. 1076] question about it. Government Exhibit 421A, the part that is to be disregarded is on the bottom of page 10 and all of page 11, right?

Mr. Melchior: Agreed.

Mr. Bergson: And on 421B, practically all of page 14 and page 15.

Mr. Melchior: Agreed.

Mr. Bergson: And 421C, the bottom of page 23 and all of page 24.

Mr. Melchior: Agreed.

The Court: All right. I will receive it with those limitations.

(Government Exhibits 421A, 421B, and 421C for Identification received in evidence.)

Mr. Melchior: Your Honor, the Government has nothing further on its case in chief.

The Court: Why don't I recess. You can check your exhibits so you will be certain you have them in. If you haven't got them in, let's wait until after lunch to formally close it. You can check your records in the meantime.

Mr. Melchior: All right.

The Court: We will recess until 2:15.

(Whereupon, at 12:50 p. m. a luncheon recess was taken to 2:15 p. m.)

[fol. 1077] AFTERNOON SESSION

APPEARANCES: (Same as at Morning Session.)

The Court: All right, Mr. Melchior. Do I understand the Government's principal case is in?

Mr. Melchior: Yes, we think so. The only question we

have is these documents which were introduced with respect to Century City and others this morning.

The Court: I said I would take a look at them.

Mr. Melchior: Yes, you said you would look at them.

The Court: All right, I will still reserve, and if in the course of the argument either one of you want to refer to them, why, go ahead and refer to them.

Mr. Melchior: Shall we make them available to you?

The Court: Yes. I will look these over tonight when I have a little time.

THE GOVERNMENT RESTS

All right, the Government rests. All right, Mr. Bergson, [fol. 1078] any motions here?

DEFENDANT'S MOTION TO DISMISS COMPLAINT

Mr. Bergson: May it please the Court, at this time the Defendants move to dismiss the Government's complaint in this case on the ground that the Plaintiff has failed to establish by a preponderance of the credible evidence that there has been, that the acquisition of Rome Cable by Alcoa may probably or probably will lessen competition or tend to create a monopoly in any line of commerce in any section of the country.

THE COURT'S STATEMENT

The Court: Well, gentlemen, as long as we have the afternoon free, I think I would like to hear you. There is no secret about the fact that I don't feel that I have this case in my hands. I was going to say that I have control, but that isn't the right word. But it is perhaps an understanding, and I would welcome argument on it which may be helpful to me in going on further in the case if I decide to deny this motion. Now, perhaps, a little word from me might help you in your argument.

[fol. 1079] As I see these cases or this type of case, it is not a price-fixing case. It is not a monopoly case. It is not a case of unfair business practices. It is a case—the ultimate finding which a Court must make is whether or not this acquisition substantially reduces competition. That in substance. Or tends to create a monopoly.

No. 1, I am not impressed at all with the last part of the language of the statute as tending to create a monopoly. So I really think that the crux of the case is "a substantial lessing of competition."

Now, in order to arrive at that decision I have got substantially three things to determine. Or, putting it another way, the Government has three things to establish.

Number one, to designate the lines of commerce, which are involved.

The market, because I have to have something in determining the competition with which to equate the lines of commerce. They have got to establish the market.

And number three, the conclusion to be drawn from the, [fol. 1080] or the ultimate finding to be drawn from the consideration of those first two—that is the line of commerce and the relevant market.

Now, if I read you gentlemen's briefs right, there is an agreement—strike that out.

I think the Government urges that there are ten applicable lines of commerce. And perhaps we could shorten this argument and get it down to something closer if we find out before the argument starts whether or not the Government stands on each of the ten lines of commerce that they have outlined in their brief. On the other hand it is my recollection that the Defendant at least agrees that there are some three lines of commerce, three or four, that may be of value, perhaps may be the way to put it, and correspondingly we may find from them before the argument starts, whether at this stage of the case it has changed as to the addition or subtraction of other lines of commerce.

[fol. 1081] Now, beyond that, I guess, my mind is pretty much a blank. I realize that the Government's burden is one that is difficult to prove in a factual way, in the way you would prove a negligence lawsuit. That these are ultimate facts have got to be the result of inferences drawn from proven facts. Of course, on the other hand, even though that is true, which I recognize as true, their burden is not relieved. It is still their burden by a preponderance of the evidence. But they probably have to rely on an inference to be drawn from some established fact rather than a clear exposition of an unreasonable restraint of competition. I guess that about sums up my understanding of the case.

Maybe I could make a few other general statements that might help you or confuse you, one or the other.

Number one, I don't understand that the Government seeks to interfere in business beyond that which reasonably, clearly shows competition. Another one is that you can't overlook, just because we are trying an anti-trust case, the [fol. 1082] everyday action of business, that it is perhaps the obligation of any business concern, all business concerns, to increase their acceptance of their product in the market. Everyone engaged in business is, as I understand it, forever seeking a larger acceptance of its goods, a pricing policy that will promote public consumption.

Another thing that requires no particular proof, as I see it, which is a fact of life, that a large manufacturer has by reason of the very nature of its size, its resources, its capabilities, may have an advantage over a small manufacturer. And I am not alarmed at all by the fact that a person or firm entering into a new field, whether it is aluminum cable or conduit or copper or most anything else, ordinarily finds under our business climate that he doesn't fairly often start off with the same margin of profit that those engaged in that business may enjoy. So that I am not shocked at all by the fact that any business where it is reasonably competitive, [fol. 1083] has some difficulties for the man seeking to enter it.

I am not disturbed either by the fact that one may have, by reason of size and financial resources and experience and so on, has the ability to advertise where the other man perhaps does not. But I don't understand that the Anti-Trust Law is intended as a cure-all for those inequalities that seem to have been historically a part of the business itself.

In connection with these very exhibits that I have not ruled upon, we every day see the lumber company go out, buy a tract of land, build their house, and of course they use their own material. They would be remiss probably if they didn't.

And, very frankly, up to this date I have not seen any particular thing that has disturbed me in connection with this acquisition in so far as the competitor's business of making aluminum conduit, wire, or what have you.

And, I guess, with that statement I better let you talk,

[fol. 1084] and maybe I could do better by keeping still and listening for a while.

One more think that I have in mind—I have forgotten it now. Oh. Does it clearly appear in the evidence that there has been an increase in the number of aluminum fabricators, if that is the right word, in the past few years? I got the impression that there has been.

But, in thinking it over, I am not so certain that the increase in the number does appear actually in the evidence or not.

I guess that was the thing I had in my mind. I got the impression, and I am not so certain whether it is simply my own thought about it or whether there is something positive in the evidence that shows perhaps the number of manufacturers of wire and cable and conduit have increased over a period of years.

COLLOQUY BETWEEN COURT AND COUNSEL

All right. Now, Mr. Bergson, why shouldn't I immediately grant a summary judgment against you.

[fol. 1085] Mr. Bergson: Against who?

The Court: Against you, even without a motion.

Mr. Bergson: I can think of a lot of reasons, which I am sure Your Honor won't want to hear.

The Court: Well, I heard a lot of them.

Mr. Bergson: The easiest one in this circuit is that there are material issues of fact between us.

The Court: Yes. I have been told that a couple of times.

Mr. Bergson: I suppose the other reason is that they haven't proven a case.

The Court: All right.

Mr. Bergson: I think your Honor's suggestion that we see if any lines of commerce can be eliminated or not before the argument commences is an awfully good one, and I suppose you might want to ask Mr. Melchior that first.

The Court: I assume that that is true. You have ten, or at least in your briefs you outline ten.

[fol. 1086] Mr. Melchior: Yes, your Honor, ten. If I may make one statement, I am not sure what you expect of the Government this afternoon, but if you would expect a full scale argument, why, we would have to marshal our evidence and we would urge we be given a little more time to do this. I would be glad to discuss anything you want, however.

The Court: I don't know whether I do it right or not. What I would like is a give and take argument here, where I can find out the exact points of difference. That problem is a hard one for you, because it is just natural that you will fall back upon an answer which is generally like this, well, we think in the context of the whole business conditions as shown here that there is a restraint.

Now, I can't find any fault with that answer, but, of course, it doesn't satisfy me. After all, it doesn't mean anything. It simply means you think you ought to win, you think you have made out a cause of action. What I would [fol. 1087] like to do is get right down, if I can, to the factual points upon which you draw your conclusions, but don't let me get away from it now. Are you in a position to say that your attitude in regard to the number of commerce claims is still the same ten, do they embrace the same ten that you indicate in your brief?

Mr. Melchior: Yes, we think they do, the same ten lines of commerce.

The Court: All right. Now, Mr. Bergson, I think you——

Mr. Bergson: We agreed with some of them.

The Court: You have agreed with some of them substantially in substance, that if they prove it, you are probably not going to get away from it. What are the three?

Mr. Bergson: There are more than three we agreed on. We agreed that ACSR and all aluminum cable, bare, that is, the transmission and bare distribution cable which you heard some of the witnesses testify to and which Mr. Fosdick stated had been taken over, aluminum has taken over 95 per cent in overhead uses and so forth, we agree that that [fol. 1088] is a line of commerce.

The Court: All right.

Mr. Bergson: We, of course, violently disagree that there has been any substantial lessening of competition in this line of commerce. We disagree—you want me to go through the agreements?

The Court: Yes, I think you better put those that you sort of agree upon—you sort of agree on ACSR?

Mr. Bergson: Right. We agree that wire and cable generally, aluminum and copper combined, is a line of commerce.

We agree that insulated aluminum and copper wire and

cable is a line of commerce, together, this is one of the Government's lines.

We agree that conduit is a line of commerce, not aluminum conduit, but steel and aluminum conduit constitute a separate line of commerce.

There hasn't been any evidence on this point, I think we [fol. 1089] fudged a little bit on whether or not copper, bare, wire and cable, constituted a separate line of commerce, copper and aluminum, bare, constituted a separate line of commerce. We feel that because of our concession on ACSR and all aluminum cable, bare, that it is hard to reconcile that with copper and aluminum, bare, line of commerce, although we had urged that in our brief.

I think those are the areas of possible agreement.

Now, how we approach those areas and the effects of those areas, we are as far apart as the poles.

We disagree that aluminum insulated wire and cable is a separate line of commerce as contended by the Government.

We disagree that aluminum wire and cable generally, including both bare and covered, is a separate line of commerce, and we disagree that aluminum conduit is a separate line of commerce. We disagree that there is a separate line of commerce known as E.C. pig and ingot and redraw rod. [fol. 1090] Does that set it up?

The Court: I think so.

Mr. Bergson: And that service drop—I had forgotten about service drop—that service drop is a separate line of commerce because that is just another insulated product.

Mr. Melchior: Do you agree or disagree on that?

Mr. Bergson: We disagree.

Mr. Melchior: You disagree on that?

Mr. Bergson: Yes.

The Court: All right. Perhaps maybe I can start you out on your argument by asking you why haven't they proven a cause of action?

ARGUMENT ON BEHALF OF DEFENDANTS BY MR. BERGSON

Mr. Bergson: That really gets me started.

I think the best way to argue this, Your Honor, ignoring the law if we should, I don't know whether you want me to make the same argument on the law I made on the opening

statement, what constitutes a line of commerce, what is the relevant market, is it based on the question of peculiar characteristics and uses or is it the test of what the area of effec-
[fol. 1091] tive competition is. Frankly, we think the cases pretty clearly demonstrate it is the area of effective competition, and in those cases where the peculiar characteristics and uses test have been used, that in those cases it has been demonstrated that those peculiar characteristics and uses constitute the area of effective competition; that there are no interchangeable or substitute products.

I think that the best summarization of the test is the whole quote in the General Motors-Dupont Case, which we recited in our brief and upon one sentence of which the Government, or on part of one sentence of which the Government relies, or the statement of Judge Herland, in the Screen Gems Case, where he says that the interchangeability and the peculiar characteristics and uses test are merely verbalisms stating the same thing, and that the real problem for the Court to determine is the area of effective competition and what transpired within that area of effective competition.

Now, with that backdrop, if it is enough, and I would be
[fol. 1092] glad to expand on it——

The Court: Yes, I think it is. You and the Government disagree on the law as to the standard to be applied in a Section VII case?

Mr. Bergson: Right. The Government says that taking the language of one sentence from General Motors-Dupont, they say the test is peculiar characteristics and uses. Now, the language in General Motors-Dupont, just using the sentence that they refer to, is sufficient peculiar characteristics and uses as to constitute a separate line of commerce, not the mere existence of physical characteristics and uses, but substantial physical characteristics and uses as to constitute a separate line of commerce. And the line of commerce as the Court said in the preceding sentences, is the area of effective competition.

Now, the Government in its brief has adopted a new concept, which I think they call distinguishable economical context. I am sure you read that.

[fol. 1093] The Court: Yes, I did.

Mr. Bergson: And for the life of me I don't know what it

means, and there is no support for any such language in any of the cases that I am aware of.

Now, the cases that they have relied on are cases where the Court has found as a matter of fact that there are no substitute products, there are no products with sufficient characteristics and uses as to prevent them from finding a separate line of commerce.

These cases have gone off on the facts that have been adduced in these cases.

In Bethlehem Steel, for example, the Court found that there were no substitute products. In the Crown Zellerbach Case that the Government relies on, the Court found as a matter of fact that the product that the Defendants were trying to bring in were not substitute products, they couldn't be used for the same purpose, they did not constitute—well, let me see if I can put it differently, that there were no products other than the products involved which were within [fol. 1094] the area of effective competition.

Now, in this case we have ten lines of commerce as alleged by the Government, so we have to determine whether there are ten areas of effective competition. Now, the Government has said that ACSR and all aluminum cable, bare, is a separate line of commerce. We agree with that because that product or those products constitute an area of effective competition. There are no other products which can properly be brought within the definition of that line of commerce. Sure, there is overhead bare copper, but the Government proved that that is used mainly in sea coast areas; that it has been largely taken over by aluminum; that the cost differential between the two is so great that they don't come within the same area of effective competition.

[fol. 1095] We say in respect to that line of commerce that the Government has not shown any substantial lessening of competition within that area of effective competition.

The Government has shown, and they have proved it to a fare-thee-well, that bare ACSR bare and all aluminum cable has occupied the overhead transmission field. But they haven't shown by one iota of proof that competition has been lessened in that field, in that line of commerce. And when I say lessened, it is not just lessened, it is substantially lessened. Lessened as the courts have said and as the Con-

gress said to a degree that would injuriously affect the public. As the courts have said, "have brought it measurably closer to monopoly power."

Now, what is the "measurably closer" so far as ACSR is concerned. What has the Government proved. The Government, so far as ACSR and all aluminum cable bare is concerned, has proved that in 1958, the year before the [fol. 1096] acquisition, Alcoa—would you look, your Honor, at Government's Exhibit 435, which is the second chart in the notebook that the Government handed you.

The Court: I have it.

Mr. Bergson: Now, in ACSR and aluminum cable bare in 1958, the year before the acquisition, Rome Cable had three tenths of one percent of the market. Alcoa had 32.5 percent of the market.

In 1954, which doesn't appear on the chart but which is in evidence as a result of cross-examination of Dr. Martin, Alcoa had 48.4 percent of this market.

In 1960 after the acquisition Alcoa and Rome together had 30.7 percent of the market.

Now, how the addition of this infinitesimal share of the market can be claimed to have brought Alcoa, which was on a decline and a steady decline for a period of six years and the decline has continued since the merger, measurably [fol. 1097] closer to monopoly power or substantial lessening of competition within this line of commerce, defies the imagination.

The Supreme Court in a Section III case, this is Section III of the Clayton Act, it uses the same language, substantially lessening competition and tending to a monopoly, this is the inclusive dealing provision where the courts have said that the test is one of quantitative substantiality, which is numbers and not qualitative substantiality which is the test in Section 7 cases, where you consider all of the factors in the industry, have said even in a Section III case that one tenths, that one percent of the market is so infinitesimal that the court would not be concerned with it.

Now, one of the big arguments that the Government has made here is that the integrated companies have gained by three tenths of one percent. Why they lump the integrated companies together I don't know, because the integrated [fol. 1098] companies compete like mad against one

another, and there is no evidence in this case to establish anything to the contrary.

The share of the independents has gone up since the merger. Not only that, your Honor, but two of the independents sat here on the witness stand and said that they have plans to double their capacity.

Now, I submit, your Honor, that you don't need anything more than that to show that there has been no substantial lessening of competition or any, to use the quote correctly, the language of the statute, "may substantially" and "may" is used in the term reasonable probability that it will.

And in the face of testimony of every single government witness, not our witnesses, the Government witnesses who were making ACSR, in the face of their testimony that this merger hasn't hurt them, I don't see how it is possible to hold that there has been any reasonable probability that [fol. 1099] competition will be substantially lessened in this line of commerce. We can put evidence in, but it isn't going to change the picture. We will emphasize it. But on the basis of the record before you now, I don't see how it is possible to hold, and this is not a question, I don't think they made a prima facie case, but here it is not a question of a prima facie case, it is a question of your construing the evidence that is before you and determining whether or not in the light of that evidence you believe that there is a reasonable preponderance of the evidence that this would happen. I don't think it is possible for you to make such a finding on the basis of the record.

Now,—I think that is all I need say about ACSR and all aluminum cable.

The Court: Yes.

Mr. Bergson: On the next government line of commerce, insulated aluminum wire and cable products. It is our posi- [fol. 1100] tion, I think it has been demonstrated in the evidence before you, that the area of effective competition here is not insulated aluminum wire and cable products, that it is insulated wire and cable products, both copper and aluminum. The Government's own expert, Mr. Fosdick, showed that in overhead distribution a covered product is used. That copper occupies over 20 percent of the field on new construction, completely ignoring replacement. Com-

pletely ignoring replacements. Every company, every witness that the Government put before you were witnesses who testified that their machinery could be used interchangeably with minor and inconsequential effort merely by changing the lubricant and wiping the dies clean. That you make either copper or aluminum products. Interchangeability is one of the most important things in determining a line of commerce.

The Court: The Government disputes that.

[fol. 1101] Mr. Bergson: The Government disputes that, but it hasn't proven it. We have proven through the Government's witnesses that there is complete interchangeability.

You mean they dispute the fact of interchangeability?

The Court: No. If I understand it right that goes back pretty much to the Cellophane case; doesn't it?

Mr. Bergson: No. No. It is interchangeability in manufacturing processes.

The Court: Oh, I see.

Mr. Bergson: Now, on the question of interchangeability of machinery, this has been an important factor in Section 7 cases. In the Brown Shoe case, which the Government won in the district court and which is now on appeal in the Supreme Court, the defendants urged that there should be separate lines of commerce for low-priced, medium-priced and high-priced men's shoes; low-priced, medium-priced, high-priced ladies' shoes. The Government said [fol. 1102] that is a lot of stuff. You can make low priced shoes and high priced shoes on the same machinery. The machinery is completely interchangeable. All you have to do is use better goods and you get high priced shoe.

When the Solicitor General argued the Brown Shoe case in the Supreme Court he relied most heavily on that argument. When the court decided the Brown Shoe case—and we have quoted the language in our brief—the court said there is no such thing as medium; no such thing as a line of commerce for high priced shoes or low priced shoes because everybody knows that the same machinery can be used for making both.

Well, you and I know when a person wants to buy a pair of shoes he is either in the market for a pair of high priced

shoes or a pair of low priced shoes. If you are going to spend thirty dollars for a pair of shoes you don't go into a store that sells five dollar shoes. Nevertheless, the Court [fol. 1103] court held and the government urged that the interchangeability of machinery was sufficient to bring them all within the same line of commerce.

Now, there wasn't a single witness except the witnesses who testified on the little fine wires and said that the wires may break when they draw them down to size, whatever it was, 36 or 58, there wasn't a single witness, including Mr. Morley, this morning, who testified that the machinery was not interchangeable. On the contrary every one of them testified that it was.

Now, the other case where interchangeability came up was in the Bethlehem Steel case, and the defendants there urged interchangeability. And the court said, "No. No." But why did it say no. "The evidence establishes" said Judge Weinfeld, "that the defendant's production flexibility or mill product line theory is indeed pure theory." [fol. 1104] Well, if the defendants didn't meet the factual issue, of course. But we have met that factual issue of changeability without calling a single witness of our own to the witness stand.

Now, here our products each have exactly the same end use. Nobody has questioned that. Everybody has testified that copper line wire does the same job as aluminum line wire. Everybody has testified that copper triplex does the same job as aluminum triplex. They testified that aluminum is in the ascendancy now because of a price differential. But there is still on new construction 22 percent on copper and in old construction there is no evidence adduced whatsoever, by the Government.

So it is our contention that the Government has not established that insulated wire and cable can be a separate line of commerce.

But we go further than that. We say let's assume, and [fol. 1105] I assure you we make that assumption solely for the purpose of argument, that aluminum wire and cable insulated does constitute a separate line of commerce. Has the Government shown any substantial lessening of competition? That there is a probable substantial lessening of competition in the insulated aluminum wire and cable

line of commerce? But again all you have to do is look at the Government's own charts.

In 1958 Rome and Alcoa combined had 16.3 percent. In 1959 it had, they had 16.6 percent; and in '60 they had 14.8 percent.

But then you got to look at this together with the other Government's chart which they call the concentration chart. Now, that chart I think on insulated is Government Exhibit 440.

The Court: Yes.

Mr. Bergson: That is Chart 7. In 1958, the year of the acquisition, this is ignoring the fact that they again—now [fol. 1106] how the Government does this I don't know, or how it can make the assumption that the integrated companies don't compete with one another and lump them all on one side and the non-integrators on the other, but even taking that assumption, that the non-integrated companies had 34.6 percent. But that included 7.4 percent of Rome, because Rome was then non-integrated. So in order to make a comparison with '59 and '60, you have to subtract that 4.7 percent and you get 29.9 percent.

And since the acquisition the share of the independents so-called has gone from 29.9 in '58 to 31.9 in '59 and 32.7 in '60.

Does this demonstrate a substantial lessening of competition?

[fol. 1107] Now, Mr. Melchior is going to say you have to look to the future. I say that the past is prologue and it is pretty good evidence of what will happen in the future.

The Federal Trade Commission, as I pointed out in my opening argument, has said the best way to determine what might happen in the future is to see what has happened in the past.

Now if this case was tried, or had been tried on April 1, 1959, then we would have had to speculate as to what might happen. But we have two years of experience here, there is nothing to indicate that the trend is any other way, and I submit that on this basis, your Honor, there is no evidence of a reasonable probability that competition will be substantially lessened even in the line of commerce that the Government contends for and which we do not admit.

This completely also overlooks the fact, as I pointed out

before in arguing for the broader line of commerce, that everyone of the Government's witnesses who do not make [fol. 1108] aluminum, said it would be easy to make, it would be easy to make the aluminum product if the price were right. They don't want to go in it because there isn't enough profit right now.

Now, one of the indicia of monopoly power is the power to raise prices and be able to make it stick. Well, if people can come into an industry, if you raise a price to a margin they think is profitable, then you have no monopoly power or no tendency to monopoly power because the definition of monopoly power is the ability to raise prices at will, or the ability to exclude competitors at will.

But here we have copper company after copper company—not all of them appeared on the witness' stand, there are many, many others who could come into this market at the drop of a hat, if anybody tried to exercise monopoly power.

Now, who has been hurt by this merger? Everybody who testified said he hadn't been hurt. Those who had [fol. 1109] some qualifications in the copper field said it was because they had to compete price-wise. Who gains by competition price-wise? The public. And the public and protection of the public interest is the ultimate objective of the Anti-Trust Law.

The Government in its brief said that the elimination of Rome took out of the market a vibrant, vital factor in the production of aluminum products which would help stem the tide of price squeeze that they have talked about. They haven't shown any evidence of that, they haven't even offered any evidence on that.

So I think that so far as insulated wire and cable is concerned, what our position is, that aluminum cannot constitute a separate line of commerce, and I think we have established that in the Government's case, that even if there were such a line of commerce, the Government has not established by a preponderance of the evidence that there has been or that there is a reasonable probability that there will be a substantial lessening of competition, [fol. 1110] and therefore, I think that their proof fails on that line of commerce. And if it fails on the insulated aluminum wire and cable line of commerce, it fails a fortiori

on the insulated wire and cable line of commerce, including both aluminum and copper.

And their own charts, your Honor, on that, show that the percentage of the market enjoyed by Alcoa and Rome, and even with Rea, in the value of insulated shipments of covered wire and cable was .3 per cent for Alcoa, 1.3 per cent for Rome, 1.3 percent for Rea Magnet wire, or a total of 2.9 per cent, which was the entire total of the amount that they thought was insufficient to include in their charts on aluminum wire and cable. So I think that if their case must fall on insulated wire and cable products, and because of what I said, their case on aluminum and insulated wire and cable falls too, and that there is no proof in this record, absolutely none, that there is a reasonable probability that [fol. 1111] competitors will be harmed, that customers will be harmed—they didn't put any evidence in on that, not a single witness, not a single consumer of these products appeared as a witness to say that he had been harmed by this acquisition or that the public has been harmed.

Now, I submit, your Honor, that that disposes not only of aluminum wire and cable, insulated, but wire and cable, insulated, whether aluminum, or copper, or their broad lines of commerce including all the products, all aluminum on the one had or all aluminum plus all copper on the other hand.

Now, on the bare copper, which apparently is not anybody's line of commerce, I am not sure of that, bare copper wire and cable—that on bare conductor wire and cable the Government has introduced no evidence whatsoever of effects or even tried to introduce any evidence of effects on that line of commerce. Their entire proof on that line of commerce is a statistical chart, which is Chart [fol. 1112] 452, Government Exhibit 452, their Chart 17, which shows Alcoa with 10.3 per cent of the market and Rome was 2 per cent of the market. They have introduced no evidence as to what has happened since the merger. They are relying here solely on numbers, and they are are relying on the fact that Alcoa had 30 per cent of the bare, or whatever it was, 32 per cent of the bare ACSR and all aluminum cable to bring Alcoa's total of the broad line to 10 per cent.

Now, I submit, your Honor, that there has been a com-

plete failure of proof in respect to these lines of commerce.

Now, I think that covers the conductor wire and cable lines of commerce.

Now, another line of commerce that they have relied on—I beg your pardon, my partner advises me I forgot to mention service drop. Service drop, as you head the witnesses say, is insulated line wire twisted around a neutral messenger, according to the Government, into a triplex cable. This is just a single product designation in the line of insulated wire and cable. Now, here the Government [fol. 1113] boldly puts its chest forward and says service drop cable, copper and aluminum, is the line of commerce. Well, most service drop cable of this type is in aluminum, but there is a lot of it that is in copper. But to extract and belatedly, I might add, because, if Your Honor will recall, service drop appeared in this case as a line of commerce only after our pre-trial conference in Syracuse, when the pretrial schedule was prepared, the Government has extracted one product from the range of insulated wire and cable products which anybody in the business of insulating wire and cable products of this kind, as all these witnesses testified to, could make, and said this is a separate line of commerce.

Now, I submit, your Honor, that this may be a product because it is called service drop, but when you are talking about a line of commerce you can't take one product that could be made by anybody making the entire line, or making part of the line and isolate it and say this is a separate line [fol. 1114] of commerce. And you have got to apply the service drop cable, and I am accepting service drop as they have defined it now, because I haven't put our case in yet, but as they define it, service drop is triplex. They have not established that this single product in the range of insulated wire and cable products for overhead use by utilities, if you will, which is what the Government has been talking about so much in this case, can properly be segregated from other insulated wire and cable products for use by utilities in the secondary distribution of power.

Now, another line of commerce, aluminum ingot and rod, used in the production of aluminum conductor wire and cable. You have heard a lot of talk about E.C. grade aluminum. The Government's witness, Mr. Harvey, yester-

day said that E.C. grade aluminum was a designation, that 80 per cent of their production could be put in, could qualify as E.C. grade aluminum. E.C. grade aluminum is nothing but a designation. It is one of the products that is produced by the smelters. If there is no demand for E.C. pig, so- [fol. 1115] called, they make a different alloy; if there is a substantial demand for E.C. pig, they could make it all in E. C. pig. But the Government, playing its numbers game in attempting to contract the market says that the line of commerce is pig and ingot for electrical conductor purposes, and they say as a result of that Rome Cable Company which produced E.C. grade rod and bought aluminum pig and ingot, they don't say how much of it was E.C. grade, they just said aluminum pig and ingot, if you remember that chart, was substantially foreclosed as an outlet for other suppliers of pig and ingot, and here they bleed for the primary producers, the poor primary producers have lost a market for a few million pounds of E.C., of pig and ingot to Rome Cable which Alcoa had been supplying before the merger anyway, and the Government's charts show that to a very large extent, not completely, and say that this foreclosure of miniscule percentage of the production of pig and ingot in the United States [fol. 1116] is a substantial foreclosure.

I submit, your Honor, the facts just don't support this as they have been put in evidence.

Now the Government says also that Rome was a supplier of rod, and they say that competition between Alcoa and Rome in the supply of E.C. aluminum rod has been lessened. You remember we went through that chart, and I would like to invite your attention to it again, although I hate to fumble for these things—it is Chart 13, it is Government Exhibit 448. Rome was the supplier of E.C. redraw rod from 1954 through the first quarter of 1959 to the extent of the numbers on the chart. But if you remember, your Honor, we brought out on cross-examination that most of that rod was sold for non-E.C. purposes, it was sold to the Aerofin Company which used it in the manufacture, I think, of air conditioners.

Now, I don't know whether that fact appears of record, but it does appear of record that it was sold for non-E.C. [fol. 1117] purposes, because Dr. Martin testified that he

knew that the Aerofin Company did not make electrical conductor. You will recall that.

Now, you compare what was actually sold for E.C. purposes, which was 15,000 pounds in 1956, 77,000 pounds in 1957, 15,000 pounds in 1958, 14,000 pounds in 1959—in the first quarter of 1959, and 15,000 pounds in the second quarter of 1959—

The Court: Where are you getting those figures from?

Mr. Bergson: I am subtracting the figures that were used for Aerofin which we brought out on the record and I wrote them on my chart.

The Court: All right.

Mr. Bergson: And we compare those figures with Government's Chart No. 10, and here the Government has given the sales of E.C. redraw rod in 1956, 1957, '58, and '59 by the integrated producers, they forgot about Southwire who testified that they sold rod; they forgot about the [fol. 1118] Canadian they just picked the domestic producers because people across the seas don't count in our economy according to Mr. Melchior, that it is improper to even think that a domestic wire and cable manufacturer might buy rod from a non-integrated producer or from some foreign source, forget about them, just take the figures that are included here and, incidentally, General Cable's rod production is not included here because this is the integrated companies, but General Cable isn't integrated for the purpose of this chart, it is only integrated for the purpose of some of the other charts. But Rome's percentage of the sale of E.C. redraw rod for electrical conductor purposes was so small you could hardly figure it. It is in the hundredths of a per cent, or tenths of a percent at the most, certainly so insubstantial as not to give rise to a reasonable probability that competition will be substantially lessened.

Of course, Rome isn't going to be selling in competition with Alcoa any more, but this is true in the case of every [fol. 1119] acquisition, and as your Honor pointed out, Section VII doesn't outlaw every acquisition, if it did the Court would be flooded or there wouldn't be any acquisitions. The only acquisitions that are outlawed, as your Honor cogently observed, are those where there is a reasonable probability there will be a substantial lessening of

competition or tend to create a monopoly. But the percentages here are even smaller than the percentages in the Tampa Electric case, the Section III case that I referred to earlier.

The Court: Didn't one of these witnesses buy foreign ingot—yes, I think it was foreign ingot.

Mr. Bergson: Yes.

The Court: And made E.C. rod out of it?

Mr. Bergson: Right. And he also said that the foreign ingot he bought was not so-called E.C. ingot, and Mr. Harvey testified that the stuff he ships for E.C. ingot is just a high purity ingot.

I will tell you, there is no evidence in the record on this, [fol. 1120] your Honor, and I am trying to confine myself to the record.

The Court: Well, go ahead.

Mr. Bergson: Because I do think this motion should be granted, and if you don't disqualify me for going outside the record, E. C. aluminum, E.C. grade aluminum is an alloy or is a form of ingot which has added to it a very, very small quantity of boron. The purpose of putting boron in is to take out of the metal those impurities—the impurities clinging to the boron—which impede the conductivity of the metal. Any aluminum can be used to conduct electricity, but you want to get as high conductivity as you can. So by the addition of boron in some instances, by other processes in other instances, you can get a conductivity of aluminum of what they say is 61½, 61 to 62 per cent.

[fol. 1121] Now, on the basis of this record, and the only supplier of aluminum that the Government had here was Mr. Lawrence Harvey, of the Harvey Aluminum Company, who testified that the foreclosure to Rome as a source for his pig and ingot didn't hurt him at all, that horizontally or vertically in the government's line of commerce, E[C] aluminum pig or ingot, which there isn't, there is no such line of commerce, or in EC redraw rod, there has been no showing whatsoever of a reasonable probability that competition will be substantially lessened or that there is a tendency or that there may be a tendency to monopoly.

Now we come to conduit. The arguments that are made so far, or to a large extent that are made so far as insu-

lated wire and cable is concerned is the same, so far as the line of commerce is concerned. Interchangeable. Here we have product interchangeability as well. I don't know about manufacturing interchangeability. There is no evi- [fol. 1122] dence of manufacturing interchangeability. But there is substantial evidence and no evidence to the contrary, no credible evidence anyway to the contrary, that aluminum conduit, rigid conduit, I am talking about rigid conduit here, constitutes a separate line of commerce. This is to our disadvantage to take this position. Because if aluminum conduit were a line of commerce, Rome didn't make any before the acquisition and Alcoa did. And therefore where was the lessening of competition?

Now, the Government will argue, I assume, that Rome could have gone into the conduit business, the aluminum conduit business. But the only evidence in the record as of this moment is that Rome couldn't have gone into the conduit business because the Government's witness, Mr. Resnick, yesterday said Rome didn't have extrusion press. Rome didn't have this and Rome didn't have that and [fol. 1123] couldn't have gone into the conduit business, aluminum conduit business. So it would be to our advantage, contrary to the attempt to take the position that aluminum conduit is a proper line of commerce. We can't conscientiously do that. It is an incomplete and utter disregard of the facts. The facts are that Rome made steel conduit before the acquisition. Alcoa has never made steel conduit. So Rome was in steel and Alcoa was in aluminum. No evidence that Alcoa would get into the steel business. There is no evidence that Rome could get into the aluminum business. There obviously would be not only substantial lessening of competition but no lessening of competition at all.

But we stated in our brief, and I don't want to put a halo around my head or anything like that, but we couldn't conscientiously take the position that aluminum and steel didn't compete. Because they do. And the witnesses who were here, with the exception of Mr. Resnick, who wouldn't [fol. 1124] recognize the existence of steel conduit except under cross-examination, has stated that rigid aluminum conduit and rigid steel conduit competed. They performed the same function. One witness, Mr. Aymes I think it was,

said that one of the differences between the two that might be a separate line of commerce was that one rusted and the other corroded. But I don't know the difference between rusting and corrosion. That is what rusting is, is corrosion. But that is neither here nor there.

The fact of the matter is that they do compete and the record I think shows that unequivocably. Mr. Harvey testified that it was the steel conduit prices that drove the aluminum conduit prices down. That when he had to reduce his price list, he was reducing it to meet the price of steel conduit.

There is no evidence—Mr. McNair, of the Hazelwood Company, testified that aluminum and steel competed. He [fol. 1125] said he liked some of the properties of aluminum better. Of course he would. He sells it. But he meets competition in steel in the marketplace every single day.

Now, what is the situation in steel conduit. In conduit. I beg your pardon. The Government has introduced a tabulation and for the purpose of this argument I am forced to accept the validity of the Government's chart on conduit. This is Government Exhibit—I don't have the exhibit number on my copy.

Mr. Mahaffie: 455.

Mr. Bergson: 455. I think it would be Chart No. 20. Now here the Government shows on this chart, which they mentioned as a result of the letter that they received on February 1st and which was introduced in evidence today from the Bureau of Census raising the universe from 120,000 to 125,000, that of the conduit market Alcoa had 3.5 percent and Rome had 3.5 percent. As a percentage of [fol. 1126] the total industry. I submit that this is not significant.

I am not going to allude to the fact that we think the chart is incorrect. But if we have to come to that we will meet it in our own case. But the Government has introduced no evidence in the conduit line of commerce other than these figures. Because they have spent their entire case trying to prove that aluminum and steel were separate lines of commerce. And there is no evidence in this case at this date as to what effect the adding of these two percentages together has on competition in the field of conduit.

And the evidence, I submit, your Honor, is woefully lacking. Not lacking, it is non-existent.

The Government has alluded in this case to a superior sales organization and the joint sales of wire and conduit. They have talked about it. I don't think they proved anything by it. But the Government has shown through the [fol. 1127] only witness who ventured a guess that Alcoa and Rome's conduit, at first he said they had two separate sales forces and then when we pinned him down it is one sales force, the sales force that Rome had.

The Court: Mr. Bergson, on that chart, 455, it states the value of shipment of conduit in the United States as percentage figures. Is that limited to aluminum conduit?

Mr. Bergson: No, sir.

The Court: Does it include both aluminum and steel?

Mr. Bergson: Yes, sir.

The Court: Well, the question of course that comes into my mind, it probably might better be asked of Mr. Melchior than you, if you include the two of them in your chart how is it, if I understand it right, the Government claims that the aluminum conduit is a single line of commerce?

Mr. Bergson: Well, they have been trying to ride both [fol. 1128] horses in this case all the way down the line, your Honor. They have two lines of commerce. Do you have that brief before you?

Mr. Melchior: Your Honor, there is a separate tabulation.

The Court: I am not going to make a lot of concessions here. I am not going to answer your question.

Mr. Bergson: Well, you don't have to. I will show you the brief. Line of Commerce No. 10 is conduit, aluminum and steel. That is what this chart relates to. Then they have a separate line of commerce they call aluminum conduit.

Now, they spent their time in this case trying to prove there ain't no such thing as a line of commerce that they allege here. In any event the evidence it seems to me shows that so far as the aluminum conduit, let's assume that contrary to the fact that they proved that aluminum conduit is a separate line of commerce. They also proved [fol. 1129] that aluminum conduit too, by and large, is a brand new industry.

Now, it is true, and I don't know whether the record shows this or not, but I will say it contrary to my own interest, that Alcoa began making aluminum conduit in the 1920's—1922 I believe it was. But they never sold much of it. Well, yes, what was used as conduit.

In 1958 when Mr. Hazelwood got into the business as one of the pioneers there were a few companies in the business. Kaiser had gone in, according to government witnesses. Subsequently, according to Mr. Harvey, Harvey went in. Channel Master went in in 1960. Aluminum Rigid Conduit went in in 1960, went out in 1961. But this is a brand new industry. And the entry into this industry from the time that Alcoa started in it in 1922 up until 1958 was nil. Since that time there has been entry into this industry.

Now, how the Government can claim now that there is a [fol. 1130] substantial lessening of competition in this new and surging industry, if there is such a line of commerce, is beyond me.

Sure, they put in evidence saying the independents can't compete against the big boys because we can't consign stock, and we don't have wire to sell with our conduit and therefore we cannot sell and so forth. But they are selling it.

Mr. McNair said his sales in 1961 were up over 1960; and his 1960 were over 1959. The only one who was complaining about the conduit business was the man who went into the conduit business on a shoestring and a whistle.

I submit, your Honor, that in the aluminum conduit line of commerce, if such there be, there has been no showing of a probable lessening of competition. Quite the contrary.

Now, I think I covered all lines of commerce.

The Court: Yes.

[fol. 1131] Mr. Bergson: I don't think I can overemphasize my position here, that on the basis of the evidence that has gone before you that in any of the lines of commerce that the Government has alleged, they have not shown a lessening, that in any line of commerce there may probably be a lessening of competition or a tendency of monopoly.

And there is one thing I have not covered, and I would

like to finish and cover it and be complete. We still have the section of the country.

The Court: That is just what I was going to ask you.

Mr. Bergson: There are two sections of the country alleged for conduit. The United States as a whole and the so-called 11-state western market.

What constitutes a market? A market is not a locality. A market is a place where buyers may buy and sellers may sell. Now, of course, it is true that in the eleven west-[fol. 1132] ern states, the people in the eleven western states buy in the eleven western states. But that does not constitute the eleven western states as a market for the purposes of Section 7.

What constitutes a market for the purpose of Section 7 is that there is an area where there are buyers and there is an area where only certain sellers can reach the market.

Now, in this case we have had testimony from the Government's own witnesses that the only conduit plants located west of the Mississippi are Mr. Harvey's plant and Rome Cable's plant at Torrance, California. Both of them in Torrance, California.

Every other conduit manufacturer in the United States is located east of the Mississippi River. And Mr. Resnick shipped his in by rail. Carload. Right to the western market. And he sold in the western market.

Mr. Harvey testified that his sales were mainly on the [fol. 1133] west coast. And who did he say was his principal competitor. The steel manufacturers, all located east of the Mississippi. He mentioned Youngstown, in Youngstown, Ohio, which he put west of the Mississippi first. He mentioned Triangle Conduit, which is in New Jersey. Because the witness from Triangle testified that that is where it was. And all of the conduit manufacturers who have national distribution sell in the eleven western states.

The Court: Very frankly, I don't remember any particular evidence that even establishes this eleven western states.

Mr. Bergson: Well, there is some evidence.

The Court: Yes.

Mr. Bergson: In some of the documents which you have not read. And in some of our documents we talk about the eleven western states.

Now, I don't want to go beyond the record, but we are [fol. 1134] talking about our sales in that area. There is nothing in those documents upon which a finding can be based that from a competitive standpoint the eleven western states constitute a separate market, because if they did we darn near would have 100 percent of it.

The documents show that we have 18 to 20 percent. Rome had 10 to 20 percent. That Rome had 10 to 20 percent of the sales in the eleven western states. But these documents were sales documents. They were to indicate where the selling areas were. They don't prove that because of the words "eleven western states" are used in them that the eleven western states constitute a market for Clayton Act purposes.

And there has been no evidence by the Government. And every bit of evidence is to the contrary, that there is no natural barrier, either freight or otherwise, to prevent a company on the east coast of the United States from [fol. 1135] competing with a company on the west coast of the United States.

Mr. Harvey said his principal price competitor was Youngstown Steel. Certainly not within the western state area.

You just can't say that because people buy in a certain area that that constitutes a market for Clayton Act purposes.

Utica, New York would be a market then for Clayton Act purposes. And anybody who had a factory outside and was selling in here wouldn't be part of the market.

If the XYZ Plumbing House which was located in Utica, New York sold in Utica, New York, doesn't it have competition from Syracuse, from Rome? I don't know anything about the geography around here, but it seems quite obvious that you just can't say that because a buyer is physically located in a place that that constitutes the market.

[fol. 1136] What constitutes a market is the ease in which the sellers can factually reach. And this is what all the cases hold. And there is no evidence in this case that other sellers cannot reach that market.

Now, on the basis—I have talked testimony primarily. The Government has put in evidence some 400 documents.

Most of them are old; many going back to 1951, '52. Many of them are speculative; many of them are estimates. Of course you have to consider them in evaluating a motion to dismiss.

But I submit, your Honor, that there is nothing in those documents which would change the effect of this merger. And that effect I submit is not the effect charged by the Government.

The Government I think on the disputed lines of commerce has failed miserably to meet this burden of proof. I think it has failed miserably in its burden of proof to establish sections of the country, and I think it has failed [fol. 1137] for more miserably in its efforts to establish that the effects of this acquisition may reasonably be expected to substantially lessen competition and tend to create a monopoly. And I therefore urge, your Honor, to grant the defendant's motion to dismiss.

The Court: Take a short recess.

(At this point a recess was taken after which the trial was resumed.)

[fol. 1138] The Court: All right, Mr. Melchior, what are you going to do with that tough argument of your opponent?

COLLOQUY BETWEEN COURT AND COUNSEL

Mr. Melchior: I hardly know where to begin, your Honor, there are so many points I should touch upon.

I want to make sure that the Government makes it clear, your Honor, that if there may be an intent on your part to dismiss this action we would like to reserve the opportunity to marshal all the facts we have in the record at some length, perhaps not necessarily this afternoon, but at a later date.

The Court: Well, in answer to that, there's no question about it. I think he made a rather strong argument. I would be inclined to give the Government the best of it on any question that is reasonably close.

Mr. Melchior: Yes, I would think in a motion for dismissal, I would think the Court should, and I am sure it does realize that there has been introduced into evidence [fol. 1139] in this case a substantial volume of documentary

evidence which plaintiff has really not had an opportunity to analyze for the Court, and we would respectfully urge that it be given this opportunity at an appropriate time.

Now, I think under a motion to dismiss there is an extremely heavy burden facing the defendant. In order for the action to be dismissed, it would be necessary that the defendant show that there is no reasonable probability of a substantial lessening of competition in any of the lines asserted by the Government, or any of the sections of the country asserted by the Government.

The Court: That isn't the law, is it? You said the defendant would have to show——

Mr. Melchior: The moving party would have to show.

The Court: The burden is always on the plaintiff. It doesn't shift.

Mr. Melchior: On a motion to dismiss.

The Court: But you don't shift the burden of proof on [fol. 1140] a motion to dismiss.

Mr. Melchior: No, but we assert that before it can be dismissed, after the Government's case is in, that it must be shown that there has not been a substantial lessening in any line of commerce in any section of the country asserted by the Government.

The Court: You have to show that there has been. If they say nothing——

Mr. Melchior: In order to prevail, plaintiff must show it.

The Court: And his motion is in substance a motion to dismiss for failure of proof.

Mr. Melchior: We have asserted ten lines of commerce.

The Court: Yes, but I want to clear up this other, I think you misspoke yourself. That is not my understanding of the law. The burden is not on the defendant to show that there is no substantial lessening, the burden is on the plaintiff to show there is.

[fol. 1141] Mr. Melchior: Maybe I should phrase it this way, in order to secure dismissal, defendant must show that the plaintiff has failed to demonstrate——

The Court: That's right.

Mr. Melchior: Now, I think at the outset, I am not entirely sure how to answer Mr. Bergson on all the points in the shortest and briefest way, but it would seem to me a good starting point, and this was the starting point I

used in our opening statement, would be to distinguish again between the Clayton Act and the Sherman Act insofar as the question of impact is concerned. I will reserve my discussion of lines of commerce to a little later, because I think this is important.

ARGUMENT ON BEHALF OF GOVERNMENT BY MR. MELCHIOR

In the first place with respect to the question of impact, defendant continues to use words which mean actuality. He does not seem to want to use the phrase "reasonable probability." He does not seem to realize that it is the Government's burden only to prove that there is a reason-[fol. 1142] able probability of a lessening of competition. He talks in terms of monopoly—this does not show monopoly; occasionally the phrase "trend to monopoly" creeps in, but we have the word "monopoly" mentioned and we have the word "restraint" mentioned, and the word "restraint" is not in the Clayton Act, and I think it is essential that the Court realize this distinction.

I also think that the word "incipiency" is very important in this connection. The legislative history of the Clayton Act, and particularly the 1950 amendment, pointed out that in order to show a Section 7 violation it was not necessary to show a full fledged restraint. The purpose of Section 7 and the purpose of the whole Clayton Act is to nip in the bud, as it were, I believe those were the words used, or to prevent in their incipiency those activities and those conditions which would ripen at some date in the future [fol. 1143] into full fleged Sherman Act violations.

Now, I think I should emphasize, and I believe the Court did itself emphasize this at the beginning of this session, we do not assert and we do not try to prove by any of our witnesses that there is any agreement or conspiracy in violation of Section 1, or 2 for that matter, of the Sherman Act. That has not been our purpose at all. As I indicated many times during the hearing, my purpose was to point out what market conditions were and how these market conditions aggravated the economic position enjoyed by the non-integrated fabricators and how, against this economic background, this merger is a very serious thing from a competitive standpoint.

Nor is it the government's purpose to try and prove that Alcoa is still a monopolist in the field of aluminum. That issue was settled many years ago, and it is very true that since the middle 30's when Alcoa did have 100 percent [fol. 1144] or thereabouts in the field of aluminum, their position has been declining. But I think I should point out to the Court, and this you can take judicial notice of, that Alcoa's position in the whole field of aluminum has been declining for several reasons, one of which of course was a government monopoly suit and the relief we secured therefrom. Another one was the fact that during and after World War II the federal government poured millions of dollars into installations for the production of primary aluminum and disposed of these in many cases at great losses to other companies who eventually came into the industry as primary producers themselves. These buildings were paid for by the American taxpayers and these buildings now have been used by these other parties to produce aluminum and, ipso facto, to reduce the strong monopolistic position enjoyed by Alcoa.

Now, we have this what I could describe as an ogolopolist [fol. 1145] condition in the field of aluminum. This is true. Control of the industry by a few in primary aluminum. The Government is still interested in getting more competition. It has come along in that respect. Instead of three we now have six. One of the individuals who testified from one of these corporations who came into this business through government assistance, he began as a small machine shop and now he is the fourth largest primary producer, I believe.

Now, I don't think this decline in Alcoa's share of the total market can be attributed to any desire on the part of Alcoa to have a smaller percentage. These are historical facts of the situation which brought this condition about.

Now, I think I should also state that it should not be the purpose of this Court or the law to permit Alcoa to halt this decline in its position which has been paid for by the American taxpayer by now giving them an im- [fol. 1146] munity under Section 7 to acquire a company of the size and position of Rome so that their decline can

be halted and levelled out, and I think this is very important.

Now, the third point I think I should make is that during the testimony and during the proceedings in this case it has not been our purpose to try and show that either Alcoa or any of their integrated producers and competitors for that matter, any of the non-integrated competitors have been in violation of any federal law. Our only charge in this case is that this merger, this acquisition by Alcoa of Rome is in violation of Section 7 of the Clayton Act.

Now, I should also like to emphasize, if it would please the Court, what the Court's function is in a Section 7 proceeding. The Court has expressed some concern with the great volume of evidence and proof that seems to be required in some of these Section 7 cases, and I can express sympathy for the job faced by the Court in analyzing all [fol. 1147] this data. I think we should point out that in this particular case the Government has actually streamlined its case much beyond that in many of the other Section 7 cases. I think the parties have cooperated to a great extent, and the Court has been very industrious in urging us to bring this case down to proper proportions. I think the fact that we have less than 500 documents in this proceeding, and that we have completed the Government's case in something like six or seven days, indicates that there has been a studied attempt on the part of all parties to bring this case down to proportion.

Now, what is the function of the Court in this situation? It is not the function of the Court as we see it to find that actual damage to competition has resulted. We do not allege that. There might have been some damage. As a matter of fact, some of the witnesses seemed to indicate that they had been damaged or thought they had [fol. 1148] been damaged or may be damaged in the future. This is very unusual testimony in Section 7 cases.

I have some familiarity with most of the ones filed by the Government since the 1950 amendment, and I think this case is unusual and unique in that for the first time we have had quite an array of industry people who are willing to sit on the stand and state to the Court that they don't like this situation, they don't like market conditions and they don't particularly like the dominance exerted by

Alcoa and the other producers. And I think they said that and they had to overcome quite a bit of personal reluctance to do this. I think the Court is quite well aware it is quite tough to have a small businessman come in a federal court and make statements which might appear to be against the industry giants, and this is one of the problems the Government faces in every one of these Section 7 cases. As a matter of fact in some Section VII [fol. 1149] cases we have given the case to the Court purely on documents, because we couldn't get a witness, we could not find a man that was willing to come into court and say words to this effect, so I think this case is unique in that respect.

Now, what is the duty of the Court in this situation? I think the Court of Appeals case, Crown Zellerbach against F. T. C. which was somewhat recently decided in the Seventh Circuit, and at the moment is the latest word from the highest court on Section VII other than General Motors-Dupont, which is the Supreme Court enunciation, states what the test of Section VII is, what the word probability means, and the Court stated: "The test as to whether the merger produced a reasonable probability that it would lessen competition or tend towards monopoly is not an easy one to apply because obviously—" and I underscore these words—"it involves in a degree the forecasting of the future."

Now, we submit, your Honor, that this is the function of this Court and this is the function assigned to this [fol. 1150] Court by the Congress, and this is one of the reasons we felt it necessary when we had our industry witnesses on the stand to ask them to conjecture, to assess, to evaluate, to predict what the result may be.

Now, there were substantial objections to our questions, but we feel it essential that the Court should have the benefit of the views of the men in the industry, the men closest to the firing line who would best know and best be in a position to advise the Court in this respect.

Then the quotation from Crown Zellerbach goes on:

"The wording of the State and the Legislative history demonstrate that not every merger was intended to be prohibited."

Now Mr. Bergson has made much of this. Mr. Bergson has seemed to indicate that it is the Government's position that all mergers are bad. Now, this, of course, is not the Government's position. The Government's position in this case is that the largest aluminum company in the United [fol. 1151] States, fully integrated from the ground to the fabricated product, cannot acquire under Section VII one of the most substantial independent wire and cable producers in the nation, a strong, healthy company enjoying a reputation in its field.

The Crown Zellerbach quotation goes on:

"In fact, in drafting the amended statute in 1950, Congress made some changes designed to prevent any such conclusion. A mere possibility of a lessening of competition would not suffice; on the other hand, actual proof of injury to or restraint of competition was not contemplated, because the enactment was designed to go beyond the Sherman Act requirements of such proof and to furnish remedies more readily available. It is not a requisite to the proof of the violation of Section VII to show that restraint or monopoly was intended."

Now, there are many ways in which we could measure this acquisition against the prohibitions and criteria of Section VII. One of the simplest would be to look to the [fol. 1152] language of the Congress and often quoted by the cases in this field, which indicates the type of acquisition intended to be prohibited. We submit that the elimination of Rome as a strong, healthy, independent factor in the field of wire and cable, its elimination by Alcoa on its face is sufficient to find this merger illegal. We submit it was not necessary to have presented this array of industry witnesses. We feel that under the law a mere showing of the size and importance of Alcoa and the size and importance of Rome, on those figures alone we feel that we would have met the test of Section VII.

The Court: Is there any case that ever held anything like that?

Mr. Melchior: I think the Bethlehem Steel case held precisely that. The Bethlehem Steel Case, if you will read the opinion closely, you will find that there was little in that case other than percentage share of the market. Now,

there was in that case, in addition, a showing of the full integration of Bethlehem, the full integration of Youngs- [fol. 1153] town, and there were several witnesses in that proceeding who testified as to difficulties they were having in one very particular narrow field, that field happened to be wire rope and rope wire, which a very small part of the empires of both Youngstown and Bethlehem. The Court in its opinion stated that the material facts in this case are undisputed, and he indicated that these facts have generally been determined prior to trial. The trial of that proceeding involved only one phase of that case, and that was the vertical phase. All the statistics involving the horizontal merger were all in and agreed to prior to the commencement of the trial, and the trial covered solely the vertical situation.

There was a motion for summary judgment in this case and it failed.

The Court: Yes.

Mr. Melchior: Because the Court stated it wanted to give the defendant its day in court, but then in the opinion, the very significant statement is made that the facts in this case, material facts in this case, are undisputed, which [fol. 1154] indicates to me that the Court did not feel that the testimony of the witnesses at the trial was necessary to this decision.

Now, this is conjecture, of course, on my part.

The Court: But that doesn't answer my question. Is there any case that holds from the size alone there is a violation of Section VII? You made the statement that you thought that all you had to do would be to just show the statistics of these two companies and that would constitute a violation of Section VII. I am not aware of any such case.

Mr. Melchior: There is no case on that, Your Honor. As a matter of fact there are only three government cases, there are only three cases in which the government has litigated successfully, and none of these involve the situation where the Court was clear on that basis. I think there is language in the legislative history which would give rise [fol. 1155] to the argument that if the percentages are large enough that is all you would have to show. Now, we don't feel necessarily that in each of the lines of com-

merce we have urged here, that the percentages are large enough to win this case purely in percentages, but we feel, however, that we approach that in certain lines, but rather than risk the case on that alone, we felt that we should bring in industry conditions.

I would like to refer the Court to this language in the House report which said, and it is an oft quoted phrase, and I don't like to repeat it, I will just read that part that I think is appropriate, it says: "Acquisitions of stock or assets have a cumulative effect and control of the market sufficient to constitute a violation of the Sherman Act may be achieved not in a single acquisition but as a result of a series of acquisitions."

Then it goes on: "The bill is intended to permit intervention in such a cumulative process when the effect of [fol. 1156] an acquisition may be a significant reduction in the vigor of competition, even though this effect may not be so far reaching as to amount to a combination in restraint of trade," and so forth. It says, "Such an effect may arise in various ways," and here I think is the significant phrase in this proceeding, "Such as the elimination in whole or in material part of the competitive activity of an enterprise which has been a substantial factor in competition." Then it lists other reasons. We think in the context of this market and in viewing the size and dominance of Alcoa in the whole aluminum and aluminum products field, this elimination of Rome alone is sufficient to bring this merger within the terms of Section VII.

There has been substantial testimony and there of course is much in the documents to show the size and importance of Rome. I might cite a few statistics as to the appropriate lines of commerce. Mr. Bergson covered them but I would like to point specifically to the aluminum insulated [fol. 1157] and covered wire and cable line wherein Rome's 1958 share was 4.7 per cent of the market. In the field of service drop cable, where its share was 5.1 per cent of the market. This was the year immediately preceding the merger.

The Court: Let me interrupt you, Mr. Melchior. I am of the opinion that service drop cable is not a special line of commerce.

[fol. 1158] Mr. Melchior: Well, I think Mr. Bergson's

use of the term service drop was very significant. Our line of commerce——

The Court: Service drop is just a name.

Mr. Melchior: I would like to explain what we think it is.

The material that we have alleged to be a line of commerce is service drop cable, not service drop. Now, I think there was brought out by testimony the difference between wire and cable. Now, we urge that our line of commerce, service drop cable, is that form of multiplex wire that is wound together and runs from the telephone pole to the house.

Now, there sometimes is used another product which is called line wire, and it runs down in two or three or four different and single wires. We think this is an entirely different product. It is a product that is being rapidly displaced by the new multiplex, and we feel our line of commerce is service wire cable, multiplex cable, often called triplex or quadraplex, and this is an important distinction.

I know it has been difficult for Your Honor to visualize these things without real exhibits.

[fol. 1159] The Court: I think I know about service drop cable, and also this wire. I know it. But what my problem is, it seems to me it is just another electrical conductor product. These wires are wound around a conductor; why should that be separated as a separate line of commerce?

Mr. Melchior: We separated it because under our concept of the case we have lines of products within lines of products.

The Court: I know you do.

Mr. Melchior: The same as defendant does, so I guess we agree in theory, we can have a line of commerce within a line of commerce.

The Court: I don't care what you people agree, it doesn't bother me, but what I am trying to find out is how is it—I don't care whether they agree to it or not, to me it is just simply another type of cable, if you want to call it that, it has a particular use——

Mr. Melchior: That's it, another type of cable, it has a particular use, and that is the very point, Your Honor,

that we urge is the reason it is a line of commerce. You see, we adhere to the peculiar uses and characteristics [fol. 1160] standard of it.

The Court: Yes, but you haven't got much characteristics in this thing. You have this service drop used generally, I suppose, as they have indicated; certainly that is the evidence and that is what I must go by. But it seems to me that it is just like an aluminum frying pan and an aluminum pan that is not a frying pan.

Mr. Melchior: We think that not only does service drop cable have certain peculiar and unique characteristics which distinguishes it from other forms of aluminum and copper wire and cable, but we think that all insulated aluminum wire and cable has characteristics which distinguish it from all other insulated wire and cable, and we think thirdly that all insulated wire and cable, as a conductor, have characteristics which distinguish them from other products.

The reason we picked out service drop is because this is one particular very narrow line of commerce where we felt the damage would be most acute. If we look at the figures we find——

The Court: I haven't got that far, I am not talking about [fol. 1161] the damage at all, I am trying to talk about whether it is a line of commerce, and I guess you answered it, you're depending upon its particular use.

Mr. Melchior: That's right, and its peculiar characteristics; it looks different than other wire and cable, it certainly looks different than power cable, it looks different than ACR.

The Court: Certainly, but you put a different color insulation on it it would look different yet. So you can't go on those things. You can make it look different on the outside.

Mr. Melchior: I don't think the industry makes it look different because it wants it to look different, it has designed it in a certain way for a certain use, it sells at different prices than the other products and it has this peculiar use.

The Court: So do cheap shoes and dear shoes.

Mr. Melchior: Apparently the Court in that case felt that men's shoes could be distinguished from children's

shoes by virtue of the age or sex of the wearer, it didn't [fol. 1162] think the cost of the shoes was sufficient to set up separate lines. As a matter of fact, the Government did not urge in that case——

The Court: I don't want to get into a debate about that.

Mr. Melchior: No. We feel on this line of commerce question, Your Honor, that I don't like to use the word substitute, but I will, we feel every product has a substitute and——

The Court: That is tantamount to saying every product is a line of commerce.

Mr. Melchior: I am working the argument the other way, that if every product has a substitute then there would be only one line of commerce, there is a substitute for everything, but merely because a product is a substitute for it and on occasion can be used interchangably with it does not in our view demarcate what the line of commerce is.

We felt Congress in drafting Section 7, and the Supreme Court in the General Motors-duPont case in interpreting the phrase "line of commerce" had as its idea to protect competition within lines such as this in their incipiency, [fol. 1163] they didn't want to just try to protect broad lines, they wanted to protect narrow lines.

The Court: I have read those histories, some of them in great detail, some of them narrow, and I am not going to write the history because you can find contradictions even in the history.

Mr. Melchior: I realize that.

The Court: There's no use going into that. What I am trying to find out is your argument, putting it concisely, is service drop is a separate item of commerce, separate line of commerce. Frankly, I have been a little doubtful about it, it is just another cable product with a conductor in it.

Now if we use every one of these different products as a separate line of commerce, I have just got the idea that Congress didn't mean that at all.

Mr. Melchior: I think we could urge a number of other lines of commerce in this case. As a matter of fact, Your Honor, I think——

The Court: I know you could.

Mr. Melchior: I don't think it is essential.

[fol. 1164] The Court: Why do you use service drop? That is my only question.

Mr. Melchior: Our reason for picking out service drop is because we felt the impact in that line may be greater than in the broader insulated line.

The Court: That is no reason at all. In other words, you are choosing a line of commerce by its impact.

Mr. Melchior: No, we are saying——

The Court: That is just what you said.

Mr. Melchior: I meant to say that, Your Honor.

The Court: Do you mean to say that you can choose a line of commerce by working is backwards, finding the impact first and then deciding "there's a line of commerce"?

Mr. Melchior: We didn't do it that way.

The Court: But you just did tell me—let's take it slow, that you chose the line of commerce because of the impact.

Mr. Melchior: We selected it——

The Court: Now, I doubt if that is the right way of [fol. 1165] choosing or establishing a line of commerce.

Mr. Melchior: We decided that the line, insulated wire and cable, was an appropriate line of commerce. After we looked into that line we found there were a number of subordinate product lines within that broader line. Then we tried to determine whether there would be an impact in any of these more narrow lines where the impact might be more pronounced than in the whole line of commerce. We considered magnet wire and we considered weatherproof and we considered several others and we decided not to take up the Court's time with all of these, but we decided to limit our consideration in these narrow lines.

The Court: Why isn't service drop a part of insulated wire and cable?

[fol. 1166] Mr. Melchior: It is a part of it.

The Court: Then why shouldn't they sell it?

Mr. Melchior: Because we feel that the impact would be greater in service drop than in the broader line. But we do have the broader line too, as you know.

The Court: Yes, I know you do. I am talking about the entire line. Of course I don't think you can determine a line of commerce by looking back and finding out what its

impact is and then go back and say therefore it becomes a line of commerce. That is the only way I can consider your statement.

Mr. Melchior: I said we selected that among several we considered to be lines of commerce. We considered there were several insulated lines, many broader lines of insulated wire and cable. We say there were a number of product lines which appeared to have peculiar uses and characteristics and we noted that Alcoa had ten percent of this line and Rome had five percent roughly, and the addition of the two would give them fifteen percent in [fol. 1167] the market. We felt therefore the probable impact would be greater and more direct and that is why we allege this.

The Court: That is not my question at all. How is it a separate line of commerce? What you are doing is telling me the result. What I have to start off with first is to find out what the probable line of commerce is and then I go to the impact.

Mr. Melchior: Yes.

The Court: And I think you should do the same thing.

Mr. Melchior: I think we did. I think we are right at that line and offered the General Motors-DuPont criteria, which was the peculiar use and characteristics. We found out that service drop cable had a peculiar use. It was used between the pole and the house. We also found out that it had peculiar physical characteristics. It had that winding effect which distinguished it from other wire and cable.

The Court: Every cable has a winding effect. Do you know any that hasn't?

Mr. Melchior: Not just the way this particular cable has. [fol. 1168] The Court: That is my understanding of what cable means, generally speaking. It is winding. It is a combination of smaller elements into the whole. Because something is winding doesn't make it a line of commerce.

Mr. Melchior: We also found it was generally considered in the trade to be a line. Industry people speak of it as such. The Government collected statistics on it. And it was generally recognized in the catalogues of Alcoa and Rome that this was a particular product. Adding all these factors together, and we discussed them in our brief, all

these factors indicated to us that this was a separate line of commerce.

We urged that spikes in the Bethlehem Steel case was a line, a separate line of commerce, as well as hot rolled sheet or cold rolled sheet.

The Court: I don't agree with you, but go ahead.

Mr. Melchior: I don't know whether I want to take the Court's time unless the Court thinks I should and go through each of the lines of commerce as Mr. Bergson did. But I would like to discuss aluminum conduit and conduit generally.

[fol. 1169] Here we have a situation which I think I can make as an example of all others.

Apparently the defendants and plaintiff agree that conduit included both steel and aluminum rigid and EMT are not an approapriate line of commerce against which this proceeding can be discussed. And I don't feel it is necessary to offer proof if we are pretty much agreed on that. We directed our proof to the question of aluminum conduit as a separate line.

The Court: Well that's just it.

Mr. Melchior: I beg pardon?

The Court: As I understand the defendant, they probably go for the steel and aluminum.

Mr. Melchior: That's right.

The Court: But you have set that for aluminum alone.

Mr. Melchior: We say both.

The Court: I understand that you set the first one but you do set up the aluminum alone.

Mr. Melchior: We feel that aluminum rigid conduit and aluminum EMT is separate because of its peculiar physical characteristics. We have plenty of testimony from witnesses and plenty of testimony, documentary evidence, that [fol. 1170] there are substantial differences between aluminum conduit and steel conduit. We admit that steel and aluminum compete with each other. We don't deny that. But this doesn't indicate a line of commerce, we feel. We feel that is the Cellophane test. Merely because two products compete doesn't mean under the Clayton Act that they are in the same line of commerce. I think the Sherman Act connotation may come up with this answer. They are

trying to prove it is substitutable but that is not the case. The test is peculiar use and characteristics.

Aluminum conduit is a different product than steel and why we think it is a separate line is because there was testimony from some witnesses that in time aluminum will replace steel for most uses. There is testimony that in the Manhattan area alone the use of aluminum currently is approaching seventy or eighty percent. This to us indicates that these two lines may ultimately merge. There was testimony that the steel industry will fight back. I expect that they will. And that is why we are willing to admit that not only do you have an aluminum [fol. 1171] line of commerce but a line that includes both.

The Court: It is hard for me to understand how to set up in one line of commerce aluminum conduit and steel conduit, as one line of commerce.

Mr. Melchior: We are in agreement on that.

The Court: I don't care whether you are or not. I don't care whether you are. I don't care what you people agree on. I am trying to get information for myself.

Mr. Melchior: Yes sir.

The Court: Then to go on and say that aluminum alone is a separate line of commerce, that is the thing that is hard for me to follow. Where your first allegation is that the two of them constitute a line of commerce and then one of them alone constitutes a line. That is what is hard for me to get.

Mr. Melchior: I think there is much basis for this in the Bethlehem case. There the Court found that the steel industry as a whole was an appropriate line of commerce. The whole steel industry and it's multifarious [fol. 1172] products. That was one line of commerce. In addition to that it found that particular impact lines within the steel industry were also lines of commerce.

The Court: But you are taking two different industries here. You are taking the aluminum industry and steel industry and putting two of their products together and saying that that constitutes a separate line of commerce.

Mr. Melchior: We are putting steel and aluminum conduit together.

The Court: Yes. But the thing that is hard for me to understand is that you split that in two and say that

a single product from a single manufacturer is also a single line of commerce.

Mr. Melchior: We feel that the probable impact will be much greater in aluminum as aluminum grows in importance and may ultimately take over the whole metal conduit line field and the impact will then also be felt in the whole steel and aluminum line.

I think there is multiple judicial precedents for finding a line of commerce within broader lines.

[fol. 1173] The Court: No question about that.

Mr. Melchior: You just can't appreciate the logic of it.

The Court: I can't even appreciate the common sense of it either. You will have to admit to start with that you set up your aluminum and steel conduit as competitive in the same market, and the evidence has been here that they compete with one another. But then you simply take one out and say "We will treat that separately". Maybe you are right about it, but it is hard for me to understand that.

Mr. Melchior: We do that in the wire and cable field, as you well know. The government has urged from the inception of this case I believe that the relevant lines of commerce, where the probable impact will be most felt is in the field of aluminum conductor wire and cable. Not only of aluminum but the two lines within the broader line. The insulated and covered aluminum line and the bare and ACSR line.

Now we are willing to agree with defendants on their [fol. 1174] urging that the broader conductor line which includes both aluminum and copper, are also a line. Now it is our view in the wire and cable situation, much the same as it was in the conduit situation, that the immediate impact would be in aluminum. And ultimately it will be in all wire and cable because of the growing importance of aluminum.

Now there was ample testimony that aluminum has displaced copper in a number of areas. As a matter of fact for overhead transmission it has just about completely displaced it. And we think from the testimony of the witnesses that this displacement may continue because of the wide difference in cost and because of certain different physical characteristics.

And as the government sees it we can not only urge the aluminum line of commerce but the broader line of both. And of course the government can win on either one or both. And I think the Court would be entirely consistent in finding a probable impact in the aluminum line as well as in the line which includes both aluminum and copper.

Now unless Your Honor—I don't want to make this a complete discussion of all the issues. I couldn't do it—[fol. 1175] it wouldn't be fair for the government for me to try to do it now.. So if you have any questions, I shall try to answer them.

The Court: Yes. What about your first couple of charts here? It seems to me to show, if I understand it right, that the share of the market for these two companies in conductor wire and cable and ASCR I guess, decreased rather than increased since the merger. That is shown by your charts.

Mr. Melchior: Which particular one are you looking at Your Honor so I will look at the same one?

The Court: The first one. That is the aluminum conductor wire and cable.

Mr. Melchior: Yes. That is aluminum conductor wire and cable.

The Court: Yes.

Mr. Melchior: This is all aluminum, both insulated and bare, and it shows that in the year 1959, which was the year of the merger, Alcoa had 26.9 percent of the total and Rome had 1.6 percent.

Now if I may make a comment there, and I would like to particularly since defense counsel keeps talking about [fol. 1176] this diminution figure and expresses the view that 1.6 percent is nothing. Now I don't have before me the dollar value involved.

The Court: Let's get finished with what I started out with. Isn't it a fact that their share of the market has gone down rather than increased since the merger?

Mr. Melchior: This just shows the year, '59.

The Court: I know. But the evidence includes '60.

Mr. Melchior: Well we don't have that on here.

The Court: Then apparently you can't answer it. And the same thing on the second chart.

Mr. Melchior: Let's assume that this is the case and it

may be the case, but I don't think this would indicate anything because I don't believe the impact required has to be immediate. I can very well understand that Alcoa's percentage may continue to go down.

The Court: But isn't it a fact that anybody's prophecy [fol. 1177] —some philosopher said, the substance of it was that he can only predict the light that flows over his shoulder from the past.

Mr. Melchior: Yes sir.

The Court: Isn't it a rather strong bit of evidence to show that in the practicalities of the market place since the merger that this danger which the government apprehends has not existed? Isn't that rather strong?

Mr. Melchior: I don't think it shows that at all. I don't believe there is enough information to show that. This merely shows the year of the merger. As a matter of fact, just to show it doesn't prove anything at all, if you look at Government's Exhibit 436, which deals with insulated and covered wire and cable we will find that their share has grown.

Now I am not going to stand and argue that because it went from 16.3 percent in '58 to 16.6 percent that it was due perhaps to this merger.

The Court: Well you shouldn't. It is 3/10ths of one percent.

Mr. Melchior: I don't believe the impact will be felt that [fol. 1178] quick in this merger.

The Court: We are still back to the simple question of —isn't it a fact, let's assume it is a fact, that if these first two charts which relate to——

Mr. Melchior: Aluminum.

The Court: First to aluminum conductor wire and second ASCR and bare cable that the share of these companies has gone down—isn't that rather strong evidence which must guide my sense of prophecy?

Mr. Melchior: I don't believe they have gone down. If you look at the several years they have not necessarily gone down. I think in some cases they may have, but in others they have gone up.

The Court: My record indicates that in 1960 it is down. I don't care whether it goes up or down, that is not the

question I am asking. The question is very simple. Doesn't it——

Mr. Melchior: May I direct your attention to one which may give an indication of the——

The Court: I would like to finish this one and get your answer, if you can give it to me.

Mr. Melchior: All right.

[fol 1179] The Court: Let's assume it is a fact. Doesn't the fact that these two charts with the addition of 1960 show that Rome and Alcoa's share in the market has decreased since the merger? Let's assume that is true. Isn't that rather strong evidence which must guide my sense of prophecy?

Mr. Melchior: I think this is a factor you can consider. I don't know that this should be controlling.

The Court: All right. Go ahead to something else. It is obvious. Go ahead.

Mr. Melchior: I don't know what else I can say on that, Your Honor. Because some go down and some go up and I think this is a factor that you——

The Court: I am just taking them that they go down and you say they go up, and I said they have a perfect right to go down. You see, I got to pass on this separately. I don't see why we can't come to the end of it rather quickly. These first two lines of commerce show by your own chart that there is no gain by Alcoa from the merger, in these particular two types of commerce. If that is so, [fol. 1180] it seems to me that it must be a rather strong guide to my prophecy to the future. It must inevitably lead me to the conclusion that you have failed to show a reasonable probability of the lessening of competition.

Now you may take and argue just the opposite, and I am inclined to be with you on those lines of commerce that show that they did increase. In other words, what good are these charts if you tell me "well you should not draw any conclusion from it."

Mr. Melchior: I think the conclusion you can draw from these charts is what their position was in the years leading up to the merger and we bring them up to the merger year. Now there is——

The Court: And they are brought up to the year after the merger, by the evidence.

Mr. Melchior: We didn't bring them up because we didn't have the information.

The Court: The evidence is before me now. It is in your case. Brought up to 1960.

Mr. Melchior: Well I think you should consider this fact in conjunction with all the other evidence we have received. [fol. 1181] The Court: Certainly. And I asked a very simple question that you could have answered in fifteen seconds.

Mr. Melchior: I don't want to say that that should be as strong as you would like me to say it, Your Honor.

The Court: All right. That is the answer. And it could have been done five minutes ago. Now if that is true then those charts that show that they gained in the share should also be of the same type of consequence?

Mr. Melchior: That's right.

The Court: In other words I should draw nothing significant from these charts?

Mr. Melchior: That's right. I don't think the one year period is long enough for you to place——

The Court: Then where is your case on the probability of the lessening of competition, if it isn't right in those charts? I don't recall any other evidence that amounts to much.

Mr. Melchior: We can only give statistics up until the time of the merger, but have a lot of industry testimony [fol. 1182] as to what industry conditions are.

May I direct your attention to another chart that may be relevent, which is the next three based on this. I think this may be of more significance. For example, 438. I think this is much more significant than the first one.

Now it doesn't relate particularly to Alcoa and Rome but it does draw a distinction between the share of the market held by integrated companies, and if you will look and note the——

The Court: Counsel, what is your answer to the proposition that that seems to be that there is no competition between the integrated companies? As I understand it, they are just as highly competitive as anybody else.

Mr. Melchior: I think they are. The evidence indicates it.

The Court: Why are they grouped together any more than for instance some of those that testified?

Mr. Melchior: To show the gradual diminishing share of the market held by the non-integrating companies. We tried to show that Rome is not.

[fol. 1183] The Court: It is a question of competition not of integration. And if the competition is between the integrated companies, as long as you have full competition you don't violate the law.

Mr. Melchior: As long as you have full competition.

The Court: Yes.

Mr. Melchior: I am not sure that you have full competition when you have three or four in an industry.

The Court: Neither am I. But certainly you can see that this, when you are saying that this is entitled to more weight——

Mr. Melchior: I think it is entitled to more weight, more weight, when there is a trend because you have from '55 to '59 but I don't think you can draw it from one year. And I am not sure, Your Honor, I am not sure that in these Section VII cases that you necessarily will need a trend or need what the impact is immediately after a merger. I think it may be sometime before actually the full effects of this is felt.

The Court: Oh so do I, Counseller. There is no dispute. [fol. 1184] The only thing that I would call your attention to I think, because I have not got your idea, I don't think your evidence of whether I can base a prophecy on a substantial lessening of competition in any of the lines of commerce is very strong. Certainly I don't seem to be able to get it from the sheets, from these graphs or charts.

Mr. Melchior: Well I think these are just the bases we have to take along with the other information we have. Both.

The Court: What other information have you got?

Mr. Melchior: We have almost five hundred documents in the record, and I want to point out some information in there.

The Court: True, I have not read the five hundred documents, but I will. Of course you can argue about the lines of commerce and the market and so on. But I actually see very little evidence here of anything that I could base a rational prophecy on of a substantial reduction in competition. I turn immediately to those three charts. I think they show just the opposite. Some of the others, [fol. 1185] some of these other charts do show some gain, but not very much.

Mr. Melchior: As a matter of fact I think some of these charts show up and down. But if you would take the long enough period of time I think you can see the trend.

The Court: I got to decide it from the evidence that is before me.

Mr. Melchior: Can Your Honor visualize the elimination of Rome from the market as an independent entity, as being an important consideration? Can Your Honor visualize this? This is a simple thing to see. Rome Rome was here as a strong forty million dollar corporation, independent in 1959. Rome is not here any longer. Rome is now a part of Alcoa. It seems to me that is a very dramatic way of seeing what the probable lessening was to the wire and cable industry. Rome is no longer independent. And the Congress has said the elimination of a substantial factor is sufficient to show violation.

This I think is a very strong argument. These figures that we have merely help to support that.

[fol. 1186] The Court: You are back to the proposition that the merger alone constitutes a violation of Section VII.

Mr. Melchior: I think that is sufficient.

The Court: Well, of course, I don't. And I don't think that you have any case that goes near holding it, do you? Sure we can say dramatically Rome is not here.

Mr. Melchior: I might also point out that not only is Rome not here but there have been others who have been eliminated since 1957—who have been eliminated by merger.

The Court: The corner groceryman is not here. The independent storeman is not here. The little man everywhere has receded under our method of doing business, has somewhat I think been cut down in size.

Mr. Melchior: That is true.

The Court: Now maybe that is wrong. But I don't think any Court can ever pass upon the social aspect of business competition in this country. I think that the whole pro-
[fol. 1187] sition of the law is to get a healthy competition and it isn't healthy where Alcoa or any other company has to sit idly by and watch the men and their product go by. And it seems to me the government ought to be the last one—and I am not talking about the merger—to prevent their making their business a profitable one.

Mr. Melchior: I think I indicated we have no quarrel with Alcoa as to size.

The Court: I don't know whether you have or not. Many times during the course of this trial you have used the word "dominance" and "price squeezing" directing it back to primary producers.

Mr. Melchior: That's right.

The Court: So it must be in your mind.

Mr. Melchior: It was in my mind. These are dominant companies and the Congress has said a dominant company shall not enhance its dominence by merger.

The Court: But Congress never intended that a company whose output demand for its services has been going down, whose product has been going down should be prevented [fol. 1188] from taking any reasonable step as long as they don't particularly harm somebody else to increase or help their own position.

Mr. Melchior: But they are not permitted to do it by the merger route. That is what I think the Congress has stated.

The Court: I think the merger itself is not unlawful and the burden is still on you to show those three essentials before it can be declared unlawful. I think I am going to hold that you got to establish those three. You got to establish your lines of commerce; you got to establish your competition and the likelihood of reduction of competition. And you can't sit back and simply say because this didn't occur Congress wouldn't like that. I don't think I will hold with that at all.

All right, gentlemen, I thank you. I guess I got a little better definite idea of the issues and maybe you understand mine.

[fol. 1189] All right, now. This don't need to go on the record.

(Discussion was held off the record which the Reporter was asked not to take.)

The Court: I am reserving decision and taking the defendants' case.

Recess this case until Monday morning.

(Whereupon at 5.25 p.m. o'clock an adjournment was taken to Monday, February 19th, 1962, at ten o'clock a.m.)

[fols. 1190-1191] [Title omitted]

Transcript of hearing—February 19, 1962

* * * * * * *

[fol. 1192] The Court: All right, I guess the case is with the Defendant. All right, Mr. Bergson.

Mr. Bergson: Mr. Schatzel.

RUDOLPH A. SCHATZEL, called as a witness in behalf of the Defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Bergson:

Q. Mr. Schatzel, will you please state your name and address.

A. Rudolph A. Schatzel. Do you want the street address?

Q. Yes.

A. 1101 North George Street, Rome, New York.

Q. What is your place of employment?

A. Rome Cable Corporation at Rome, New York.

Q. What position do you hold at the Rome Cable Corporation?

A. At the present time I am a consultant to the Rome Cable Corporation.

Q. What was your immediate past position with Rome Cable Corporation?

A. Until January 1st it was Vice-President, Director [fol. 1193] of Engineering and Research.

Mr. Bergson: Your Honor, I would like to use Mr. Schatzel both as a fact and expert witness, so I will qualify him as an expert witness.

The Court: All right.

By Mr. Bergson:

Q. Will you please state the previous positions which you held in the wire and cable industry?

A. In the wire and cable industry as such, in 1924, I won't go through all the dates, I was assistant director or research for the Rome Wire Company at Rome, New York. And in 1927, when that became the Rome Wire Division of General Cable Corporation, I was the technical director of the Rome Wire Division of General Cable Corporation. And in 1935 I became the Director of Research for General Cable Corporation and held that position until about the middle or the spring of 1945, when I entered the government service as a technical consultant for the War Production Board and later overseas for the army, the headquarters in Europe——

Q. Was that Schaaf?

A. I tried to remember that name, Schaaf, and at that [fol. 1194] time as a member of the Technical Industrial Intelligence Committee, which was organized as a joint committee with the English.

On my return, on my discharge from that duty, and from the War Production Board, I entered the employ of Rome Cable as Vice-President and Director of Engineering Research.

Q. And when was that?

A. August, 1945.

Q. And you held that position until you became a consultant on January 1st?

A. Right.

Q. 1962. Now, what was your educational background, Mr. Schatzel?

A. I was graduated from Union College, Schenectady, with a degree of bachelor of science in chemistry. And took my masters degree while continuing there as a teacher and instructor in chemistry. Then I went to Massachusetts Institute of Technology as a teaching Fellow in Physical Chemistry and took further graduate work in physical chemistry and physics.

Q. Are you a member of any professional associations that have to do with the wire and cable industry?

A. Yes.

[fol. 1195] Q. Would you tell us what those are or were?

A. Well, at the present time I am a life member of the Insulated Power Cable Engineers Association, and

represent the IPCEA, on certain committees of the American Standards Association. I am a life member of the American Society for Testing Materials and a member of many of its committees. For 18 years I was the Chairman of its Committee on Insulated Wire and Cable. I am a member of the American Standards Association, member of its Standards Counsel and until January was Chairman of this Committee on Insulated Wire and Cable.

[fol. 1196] Q. When did you become chairman of that committee?

A. In 1945. Until recently—I think I still am—I'm not sure on that—a member of the Industry Advisory Committee for the Underwriters Laboratory, and I think that's about all that I can recall right now.

Q. Are you a fellow of the American Institute of Chemists?

A. Yes, American Institute of Chemists and the American Chemical Society, a member.

Q. Were you ever a member of the American Institute of Mining and Metallurgical Engineers?

A. Yes, until the end of the last year I was.

Q. Were you ever a member of the British Institute of Metals?

A. British Institute of Metals, yes, and British Institute of Rubber Industry, and I have been and still am—I forgot that—a member of the American Institute of Electrical Engineers.

Q. Mr. Schatzel, have you prepared for use in this case a chart entitled "A typical Electrical System"?

A. Yes.

[fol. 1197] Mr. Bergson: Your Honor, I would like to hand up to you defendant's Exhibits AR-12 through AR-20a for identification, and I will introduce these from the chart.

The Court: Mr. Bergson, can I retain this?

Mr. Bergson: Yes, sir, that is what we are going to put in the record.

Q. Mr. Schatzel, you have a copy of this "Typical electrical system"?

A. Yes.

Q. When was that chart made up?

A. Well, this was made up—I can't place the exact date, but I'd say July, 1960.

Q. July, 1960. Now, would you describe for his Honor the typical electrical system, stating what types of wire and cable are used in each part of the system—and perhaps the best way to do that would be for you to take this pointer which I find here and just tell us what that system is.

A. Well, the chart represents a typical electrical system. It does not represent all of the possible types of electrical [fol. 1198] systems that there are, but in this range most of our transmission systems of the country could be described. From some source of energy we have the generation of power and its transmission generally overhead, which we haven't shown here, to a transformer. It may be underground, depending upon proximity of it. And that is generally in the voltage of from 2,000 to 15,000 volts, which is shown here. Then it is transformed up for more efficient transmission to distances as a bulk energy to some distant point, for distribution.

Q. May I interrupt you there. What type of wire and cable is used for the transmission from the transformer station to the distribution substation?

A. From here? This?

Q. Yes.

A. Overhead wires, generally the steel-reinforced aluminum cable, ACSR, or copper cable, which in new installations today I can testify to here, which is in operation throughout the country, there are still large amounts of copper cable transmitting at—well, the Boulder Dam line is 287,000 volts, which is all copper. At up to 400,000 volts, [fol. 1199] which is the typical of the Niagara Mohawk line running close to our airport.

Mr. Melchior: I wonder if counsel would stand to the side.

Mr. Bergson: I beg your pardon.

A. (Continuing) The principal type of cable used in here is ACSR of various kinds, of design—I think we may get into that later.

Q. Pardon the interruption. I thought it might be helpful.

A. From here, a step-down transformer is used to bring this into what we call sub-transmission. Now in the system

of Mr. Ware, of the Virginia Electric Power Co., he omits this and he calls his system everything below 66,000 is distribution. But the more usual system has a range which they call sub-transmission, and in this the same type of cable is used as is used in the regular transmission, except that in here frequently for all or a part of this, we may have an underground cable. We have underground cables that can operate up to a good part of this range, but many of them operate at 60,000 and over. So that in this it is common to have an underground system, as well as an [fol. 1200] overhead, and that we have shown by this dotted line.

Then we finally come to what is known as the distribution system, and we have shown this going through a step-down transformer and has a voltage of 2400 to 13,000. That again is variable. Many times it may be 15,000, it may be as high as 22,000, but this is typical of a large number of systems, and again in this system and even to a greater extent than here, we will have an underground system distribution as a unit to the overhead.

Then we finally come to what is known as the secondary——

Q. Before you get to that, would you tell us what type of wire or cable is generally used in the primary distribution system?

A. The primary distribution system, again, is largely ACSR overhead, although in some cases it is all aluminum, and I might say that in this system too there is some all aluminum, depending on the terrain of the country. Where the terrain permits poles where there is not much ice or snow loading or windage, then the weaker type of construction can be used, and in many cases the pole distance [fol. 1200-a] which has to be made closer won't offset the general cost of the line. The overall cost. But in general it is aluminum or ACSR.

[fol. 1201] Q. Is there some copper used?

A. Some copper is used. And here there are places where copper is preferred, particularly since we are getting into areas where there is industrial atmospheres and it might be along the sea coast. I think we had testimony about that.

Q. When you say "here," you are talking about primary distribution?

A. Primary distribution.

Q. The "heres" don't show on the record as to what you are talking about.

A. All right, pardon me. Then this shows again an alternate underground and that doesn't have to stop at that pole. It can be a complete system. Next is secondary distribution and we come here (indicating) to a transformer, which is a further step down to use voltages, utilization voltages or customers voltages, which has a maximum of 600. That again has variations and we show a line here as an open wire line and in that there may be mostly bare aluminum or ASCR or some copper, or in many sections there be triplex used in here, in the place of the open wire. And the triplex that they—I don't think I need to describe it here.

Q. I think you might as well.

[fol. 1202] A. It is simply two or three, depending on the type of service, insulated aluminum or copper conductors twisted an- around an aluminum ACSR or a steel reinforced copper or hard drawn copper. Those combinations are all possible depending on strength required. Then we show here the services——

Q. Before you get there, is that in the secondary distribution? Is any of that covered or insulated line wire?

A. Yes. This is covered line wire either fibrous or polyethylene or neoprene, if it is open line wire. That is practically all on that. And that can be true to a large part of this (indicating) too.

Q. And what is the conductor used in this line, in this covered line wire? Is that aluminum, copper, or either?

A. Both. But predominantly at the present time it would be aluminum. But I would say in this area (indicating) it is hard to tell which is predominant.

Then over here we have our services to the premises which we show here as three different types of services. Again, we may have an open wire line just the same as this. And in that case it would be the same type of cov-[fol. 1203] ered conductor, smaller in size. Then we also have the alternate which in many sections is underground. And then we have what we call a cable which could be a

triplex or any of the other types of service entrance cable.

Q. Service entrance or service drop?

A. Service drop. Pardon me. The only qualification that we can make of what we call utilization of voltages is that this again is a matter for the customer to decide. We can have utilization on any one of these steps: A large steel company like the United States Steel or Bethlehem or Aluminum Company or Kaiser could put in their own transformer and take power direct from this. That will be utilization.

Q. Just as in this primary distribution you show industrial?

A. Yes, like over here (indicating). That is one taken directly from the primary distribution and used in a small industrial plant.

Q. And so far as the commercial is concerned it can come from primary or secondary distribution?

A. Correct.

OFFERS IN EVIDENCE

Mr. Bergson: Your Honor, I would like to offer the Chart 12, which is designated Defendants' Exhibit AR-12 [fol. 1204] for identification in evidence.

The Court: I will receive it.

(Defendants' Exhibit AR-12 for Identification received in evidence.)

Mr. Melchior: Judge Brennan, now should we interrogate the witness about each exhibit as it comes in or shall we wait?

The Court: I don't care, whatever you think will be more efficient.

Mr. Bergson: I think it would be more efficient if we let Mr. Schatzel finish his direct testimony and then you can interrogate him——

Mr. Melchior: On all the ones that go in?

Mr. Bergson: Yes. As I did on your charts.

Mr. Melchior: All right.

By Mr. Bergson:

Q. Now, Mr. Schatzel, I show you two circular or cylindrical pieces of metal and I would ask you to tell his Honor what they are.

A. Well, this is (indicating) 3/8 inch aluminum redraw rod. Perhaps we should clarify that and say it is E.C. alu-
[fol. 1205] minum redraw rod. And this is (indicating) a 3/8 inch hot rolled electrolytic copper, also redraw rod.

Q. Now, are these the rods from which aluminum wire and cable are drawn on the one hand and copper wire and cable are drawn on the other hand?

A. Yes, with the one exception. Usually we use a smaller size.

Q. I am sorry. I show you——

A. (Indicating) This is the 5/16 copper and this is the more common size used.

Mr. Bergson: I am not going to offer these, your Honor. Would you like to see them?

The Court: Yes. Perhaps I can get enough of these to make a do-it-yourself kit.

Q. Now, Mr. Schatzel, I show you a product board, a copy of which, a colored copy of which has been marked Defendants' Exhibit AR-13, together with a legend describing the products thereon as Defendants' Exhibit AR-13A, and ask you whether that product board was prepared under your direction and supervision?

A. Yes, it was.

Q. Now, would you explain to his Honor what these various products are?

[fol. 1205a] A. Can I stand?

Q. Yes. Stand and point to them.

A. This upper one (indicating) is a high voltage transmission conductor which we call expanded ACSR type, has a steel core and it is then expanded by fillers of paper or jute with aluminum metal to hold this outer conducting core and to make it larger. And this other is a——

[fol. 1206] Q. Now, the other one is No. 2. The first one you were talking about is No. 1.

A. I will remember that. No. 2 is a standard ACSR which is 336,400 circular mils in size, and that is a relatively small transmission conductor.

Q. Would you explain to his Honor how you arrive at the circular mil size?

A. Well, in order to have some system of measuring

these wires, we have established wire gauges, but in the larger sizes we run out of numbers because the wire gauges run from 1 on down to 50 or 60. The smaller size. It is a retrogression. And the larger the size the smaller the wire. So above 1 they use a different system, and since they are all stranded the first ones go up to about 4/0, they call it. This is a little larger than that. And then, again, it is a question of how to tell what the size is, and so we designate them by circular mil area. And the circular mil is the square of the diameter in mils, a mil being 1/1000th of an inch, so one circular mil would be a wire that had 1 mil in diameter. 4 circular mils would be one [fol. 1207] that had 2 mils in diameter, and so forth. This one is 336,400 circular mils in diameter, and the one above it is 1,275,000 circular mils in diameter.

Q. Now, prior to the acquisition of Rome Cable by Alcoa, did Rome Cable make either of those two products?

A. No.

Q. That is No. 1 or No. 2 on the product board entitled "Transmission overhead."

A. That's right.

Q. All right, now. Would you explain the sub-transmission overhead.

A. Well, this being both lower voltage, as we see here, and carrying small blocks of power, is generally again somewhat smaller. Can be smaller in size and somewhat more simple in construction. And No. 3 is a 4/0 ACSR bar transmission conductor, and that is just one size, and there may be some sizes where smaller, and where larger sizes would be used. It is representative of the type. Not the only type. And below that is the equivalent of No. 2/0, AWG, of copper for doing exactly the same thing. This is 4/0 AWG aluminum, this is 2/0 AWG copper. No. 3 is [fol. 1208] 4/0 aluminum and No. 4 is 2/0 copper. Hard drawn copper.

Q. Prior to the acquisition did Rome and Alcoa both make the 4/0 ACSR?

A. Yes.

Q. That is No. 3 on the product board. And prior to the acquisition did Alcoa make the copper product that is No. 4 on the product board?

A. No.

Q. Rome made that, but Alcoa did not?

A. Rome made that, but Alcoa did not. Right.

Q. Now, you said that ACSR, as typified by this cable under No. 3, came in various sizes?

A. That's right.

Q. What was the maximum size that Rome made prior to the acquisition?

A. 4/0 as represented here.

Q. It made small sizes but not the larger sizes?

A. Yes. It made the smaller but not the larger.

Mr. Bergson: I offer Defendant's Exhibits AR-13 and 13-A.

Mr. Melchior: No objection.

The Court: Received.

[fol. 1209] Q. Now, Mr. Schatzel, I show you a product board entitled "Primary Distribution Overhead," a color photograph of which is marked for identification as Defendant's Exhibit AR-14 and a legend describing such products as AR-14-A, and ask you whether this product board was prepared under your direction or supervision?

A. It was.

Q. Would you please explain to his Honor what these products are.

A. No. 1 is 4/0 AWG ACSR bare conductor, same as we see on the previous board, and that we have already described.

Q. That is used for what?

A. Well, that is used in this chart here for overhead distribution; primary distribution. In this general range of voltages which I qualified and said could be higher than that. The next is another type of aluminum conductor which is used for the same purpose, and that is 4/0 also, but it is all aluminum. It is not steel reinforced. And it serves the same purpose. And No. 3—that was No. 2 I just mentioned—No. 3 is all copper. 2/0, hard drawn cop-

[fol. 1210] per, again used for the same purpose, and is of equivalent conductance to these other two. No. 4 is a 2/0 AWG ACSR polyethelene or neoprene—can be either —covered, weatherproof, or the word here has been used, "line wire." That is used also for the same purpose, particularly in urban areas near cities and within cities.

No. 5 is a smaller size copper. It is the same conductance and it is a hard drawn copper polyethelene covered weatherproof or line wire. That too could be neoprene.

The Court: No. 4 is aluminum?

The Witness: No. 4 is aluminum. 2/0.

No. 5 is copper. No. 2.

Q. Are they both used for the same purpose?

A. They are both used for the same purposes. No. 6 is a 2/0 polyethelene insulated tree wire. This you will see has the same conductor size as this, but it has heavier insulation and a different type of insulation, and that is used in cities or in the country where it has to go through heavy foliage, and the abrasion of the tree would work through ordinary insulation. In some cases this is used for that purpose, but with tree guards—that is plastic or [fol. 1211] wood guards that clamp to the wire. But where the foliage is thick, and there isn't just one or two limbs, or where it is brush, this would have to be used.

Q. This is No. 6?

A. That is No. 6.

Q. What is the conductor metal in that?

A. Aluminum. It could be copper. Either one can be used. And the No. 7 is the equivalent of it. It is No. 1 polyethelene insulated copper tree wire.

Q. No. 6 and No. 7 are comparable products. One with aluminum as the conductor, and the other with copper as the conductor?

A. That's correct. Now, as No. 8 is a self-supporting aerial cable. You will see it differs from the triplex in that the three insulated conductors are twisted together and strapped to a neutral which is the supporting member. This neutral is a strength member as well as a neutral conductor, and that usually is used at fully insulated—at any voltage up to say 15,000. This happens to be 5,000 volts. Below is the same thing exactly, but with aluminum and a heavier rubber type of insulation instead of polyethelene, and this is an ACSR messenger. This is No. 9. [fol. 1212] Q. That is No. 9. And are 8 and 9 used for the same purpose?

A. 8 and 9 are used for the same purpose, yes.

Q. Now, of these products that you have described on

the primary distribution overhead board which products did both Alcoa and Rome make before the merger?

A. No. 1, 2 and 4.

Q. Now, No. 1, you said was 4/0 ACSR?

A. 4/0 ACSR.

Q. Which is the same as that product on the transmission overhead board?

A. That's right.

Q. And the other is 4/0 of aluminum cable?

A. Of aluminum, that's right.

Q. And the third one is No. 4?

A. That is 2/0 ACSR polyethylene or neoprene covered weatherproof or line wire.

Q. Can you tell me whether any products on that board that were made prior to the merger by Alcoa which were not made by Rome?

A. Made by Alcoa——

Q. But not made by Rome?

A. No.

[fol. 1213] Mr. Bergson: I offer Defendants' Exhibit AR-14 and 14A for identification.

Mr. Melchior: No objection.

The Court: Received.

(Defendants' Exhibits 14 and 14A for Identification received in evidence.)

By Mr. Bergson:

Q. Now, Mr. Schatzel, I show you a product board and entitled "Secondary Distribution Overhead," a color photograph which has been marked for Identification as Defendants' Exhibit 15, and a legend describing the products on that board, which has been marked for identification as Defendants' Exhibit 15A, and ask you whether or not that product board was prepared by you or under your direction or supervision?

A. It was.

Q. Now, would you please describe what each of the products on that product board is?

A. No. 1 is a 1/0 ACSR bare conductor. That is relating this to the chart (indicating). We have shown a small-

er size as is used for smaller blocks of power and this is used as overhead distribution, secondary distribution. No. [fol. 1214] 2 is a 1/0 aluminum exactly the same thing, but of course without the steel reinforcement and is equivalent in conductance to the ACSR.

Q. It is used for the same purpose?

A. It is used for the same purpose. And No. 3 is a 2 AWG hard-drawn copper conductor also of equivalent conductance of numbers one and two, and used also for the same purpose. Then No. 4 is a 1/0 aluminum with polyethylene or neoprene covered weatherproof or line wire. You see it is equivalent in conductance to the others but has a covering or partial insulation on it. And No. 5 is a No. 2 copper polyethylene covered line wire equivalent to No. 4 in aluminum and used for the same purpose. It could also be neoprene but here is just the polyethylene. No. 6 is a 2 AWG copper neoprene triplex, and it is used as we explained here, again can either be as part of the distribution system between poles or from pole to house as a service drop. So, again, I would call attention to the fact that while we are mentioning here specific sizes, these are representative and sizes smaller and sometimes larger are used for the same purpose, depending upon need.

[fol. 1215]. No. 7 is a three-conductor, No. 6, which is a service drop cable. This here (indicating) consists of two insulated copper conductors with a concentric copper conductor surrounding and a braid overall. This could also be used and has been and is used with aluminum. But here (indicating) only copper is shown.

And No. 8 is a 2 polyethylene or neoprene aluminum triplex for service drop cable. And again that can be used either as service drop or for distribution in place of open wire.

Q. And these conductors which you have just described, which were made by both Alcoa and Rome prior to the merger?

A. No. 1 and 2 were both made by Rome and Alcoa. No. 4 was made by both. And No. 8. No. 8 with polyethylene only was made by Alcoa.

Q. No. 8 with neoprene was sold by Alcoa?

A. Yes, was sold. Sold both. I guess 1, 2, 4 and 8.

Q. Maybe it would be a good idea to clear up for the record what these letters mean on these charts. What does the "A" stand for?

A. The "A" is Alcoa and the "R" is Rome.

Q. And where they both appear together?

[fol. 1216] A. That means they both make them.

Q. And where they appear separately it means only one did?

A. Either one, yes, sir.

Mr. Bergson: I offer Defendants' Exhibit 15 and 15A for identification.

Mr. Melchior: No objection.

The Court: Received.

(Defendants' Exhibits 15 and 15A for identification received in evidence.)

By Mr. Bergson:

Q. I show you, Mr. Schatzel, a product board entitled "Primary distribution underground and secondary distribution underground," a colored photo of which has been marked for identification as Defendants' Exhibit 16 and a legend describing the products which has been marked as Defendants' Exhibit 16A for Identification, and I ask you whether this product board was prepared by you or under your direction or supervision?

A. It was.

Q. Now, would you explain briefly for his Honor what those products are?

A. No. 1 is a 2 AWG copper conductor insulated with [fol. 1217] polyethylene and a lead sheath. It is rated at 15,000 volts.

No. 2 is a 500,000 circular mil copper with polyethylene insulation, a shield, which is this copper tape wound around, a polyvinyl chloride jacket and also rated at 15 KV, 15,000 volts. Now, the reason for the shield on this and not on this (indicating) is that the lead sheath itself acts as a shield.

And No. 3 is a 400,000 circular mil copper conductor insulated a butyl rubber compound shielded and a neo-

prene sheath, also rated at 15 KV. These are used as shown in this, as an alternate to the overhead for the underground distribution. And in many places and congested areas this is desirable and sometimes necessary.

No. 4 (indicating) is a No. 2 copper conductor with butyl insulation and a semi-conductor shielding tape in front with a concentric surface of tin, copper conductors. This is for direct burial in the ground and is a common type as an alternate to this (indicating).

No. 5 is a half million circular mil copper with a special [fol. 1218] insulation which we call rozone, which is ozone resistant for high voltage and again with a neoprene sheath, which is rated at 5,000 volts and at those voltages a shield is not ordinarily required.

And the No. 6 is to simply show the same type of thing excepting in this case, a three-conductor cable. And I might say that in all of this excepting these (indicating) we could have one, two or three conductors made into the cable rather than laying three separate cables in the ground. But this is to show the variety of types that may be used. And, again, these are typical and the range in sizes can be anything from this (indicating) or smaller, to this (indicating). Depending on the blocks of power to be transmitted.

[fol. 1219] Q. The first "this" being 1, and the second "this" being 3?

A. Yes. Thank you very much.

Q. Did Alcoa make any of these primary distribution underground products prior to the merger?

A. No, Alcoa made no rubber insulated cable of any type, or any of these types of cable.

Q. Mr. Schatzel, you have shown only copper here. Did Rome make any of these cables in aluminum?

A. For primary distribution, it was experimental.

Q. Now, on secondary distribution, would you please explain that.

A. Well, on the secondary distribution cable, again, these are all rated at 600 volts. While we show here 110 to 600, it is common practice in the industry to insulate and rate all for 600, so they can be used for any of the intermediate voltages. So I won't describe the voltage. They are all 600-volt cables.

No. 1 is 2/0 AWG copper with rubber insulation, and this is specially compounded rubber for moisture resist-[fol. 1220] ance. Not for high voltage, but moisture resistance, and with a neoprene sheath. And No. 2 is the same thing with a 4/0 aluminum. This was 2/0 copper. This is the equivalent conductor of aluminum.

Q. Is it used for the same purpose?

A. It is used in limited extent for the same purpose. No. 3 is a 4/0 copper, and that is a type that is made with a somewhat thinner neoprene sheath for duct use. The first one, No. 1, was intended for direct earth burial, or could be used for that. No. 3 where we would have some protection against mechanical damage by a duct, can be of a thinner sheath. And the No. 4 is equivalent aluminum. That is a 350,000 circular mil aluminum which is equivalent in conductance to the 4/0 copper, which is shown in No. 3. This in all other respects is the same. No. 5 is a No. 2 copper, three-conductor type RR for direct earth burial, or for duct use, with a neoprene sheath. Three individual conductors, insulated, cabled, and a neoprene sheath over all.

Q. Now, of these conductors that you described for secondary distribution underground, were any made by Alcoa prior to the acquisition?

A. No.

[fol. 1221] Q. All made by Rome prior to the acquisition?

A. Yes.

Mr. Bergson: I offer Defendant's Exhibits 16 and 16-A for identification.

Mr. Melchior: No objection.

The Court: Received.

Q. Mr. Schatzel, I show you a product board entitled "Utilization," a color photograph of which has been marked for identification as Defendant's Exhibit AR-17, and a verbal description of which has been marked AR-17A for identification, and ask you whether you prepared this product board or whether it was prepared under your direction and supervision.

A. Yes, it was.

Q. Now, relating this product board to the typical electrical system, where does it fit in the typical electrical system?

A. Well, in our typical electrical system we have, with the other samples, now brought the power to the premise, whatever that premise is—small factory—store—whatever it is. And beyond that it is the use, or utilization within the premise or on the premise that this cable is supposed [fol. 1222] to function.

Q. What are these cables? Without going into each one individually, what is the purpose of these cables? What are the purposes of the cables?

A. The purpose is to furnish power for whatever equipment, apparatus or function is desired in the home or in the factory.

Q. Is this what is generally known as the building wire type of product?

A. Well, this is a little broader than the building wire type of product. It includes, as it does, No. 13 here an interlocked armor power cable which would be used for distribution of power to a factory, and so we call that a power cable. And in general parlance we distinguish between power cables and building wire, although they are power cables.

Q. Are these products made with both aluminum and copper as the conductor?

A. Yes. As a matter of fact, the board shows 1, 3 and 5 with copper conductors, and 2, 4 and 6 are their equivalents with aluminum conductors.

Q. Are there any aluminum equivalents for 9, 10, 11, 12 and 13?

A. No.

[fol. 1223] Q. Prior to the acquisition, did Alcoa make any of these products?

A. No.

Q. Did Rome make all of these products?

A. Rome made all of these products.

Q. And Rome continues to make all of these products?

A. Correct.

Mr. Bergson: I offer Defendant's Exhibits 17 and 17-A for identification.

Mr. Melchior: No objection.
The Court: Received.

Q. Now, I show you a product board entitled "Other Representative Rome Products," a color photograph of which has been marked for identification as Defendant's Exhibit AR-18, and a description thereof marked as Defendant's Exhibit 18-A, and ask you whether this product board was prepared by you or under your direction and supervision.

A. It was.

Q. Now, again without going into detail, will you describe generally for the Court what these products are. [fol. 1224] A. Well, in general these products cover a very board range of where wire and cable is used in industry or government for specific applications. For instance, the first four of those show a copper and aluminum magnet wire which might be used in transformers or relatively good sized motors. The next ones show rubber, insulated plastic insulated polyethelene or polyvinyl chloride in special compounds of these types used for control of apparatus in central stations, or for control of missile launchings or for control of shipboard apparatus and equipment aboard Navy vessels. Commercial ships. And on the right, No. 15 is a cable of a type that would be used both for missile control of equipment, or it could be used and is used for control of computers, like in the SAGE or warning systems, or in control of pressures and so forth on pipelines. The uses are many, and the types of cable are rather complex.

Another group here are for railroad signal systems. For instance, No. 21 looks like a very large cable. Well, it is. But it is used for power and used in railroad signal systems and operation of automatic equipment on those systems. Then we have some small wires and they [fol. 1225] can be very small, which is shown in 22 and 23. Those can be used for wiring up such things as radios, television, electric typewriters, smaller computers, or any type of apparatus that might be used—well, in either offices or in the home.

Q. Now, were any of these products made by Alcoa prior to the acquisition?

A. No.

Q. Were they all made by Rome?

A. Yes.

Q. Are they still being made by Rome?

A. Yes.

Q. Now, I notice the product board says "Other representative Rome products." Are there other products made by Rome which have not been portrayed here?

A. Oh, yes, many. And these that are portrayed here are typical only. They exist in a wide variety of sizes and colors and numbers and configurations, and we show in here, for instance, No. 19 is a particular type of mining cable. We supply tremendous numbers of types of cables for operation of mines. These were selected as being typi-
[1226] cal of probably two thousand, in that neighborhood.

Q. And of the two thousand, were any made by Alcoa prior to the acquisition?

A. Of this type, no.

Q. What is the conductor metal used in those products?

A. All of these are copper.

Q. Are there any in which aluminum can be used, or is used?

A. Well, there is none in which aluminum—I did say—pardon me—in the beginning that we had shown here some aluminum square magnet. That is experimental. It is not a wide usage, but I would say that in general there is none of these in which aluminum at present is being used in volume, or liable to be used with our present knowledge, except in an emergency.

Q. Of all of the products that we have discussed on all of these product boards, is there any in which copper cannot be used?

A. No. None.

[fol. 1227] Q. Copper can be used in every product?

A. Right.

Mr. Bergson: I offer Defendant's Exhibit 18 and 18-A for identification.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibits 18 and 18-A for identification received in evidence.)

By Mr. Bergson:

Q. Mr. Schatzel, I show you a product board entitled "Service Drop Cable," a colored photograph, copies of which have been marked as Defendant's Exhibit AR-19 and the corresponding legend as AR-19-A for identification, and ask you whether that product board was prepared under your direction and supervision.

A. It was.

Q. Now, Mr. Schatzel, when was that product board prepared?

A. That product board was prepared about two months ago.

Q. The others were all prepared when?

A. Well, two were prepared I would say sometime in [fol. 1228] 1960, just prior to 1961. I think it was to be ready at one time where we thought this might happen in the fall of 1960 and it was to be ready at that time.

Q. Did I ask you to prepare that product board?

A. In a way, yes. Yes.

Q. You say "in a way"—it was through my associates?

A. No. I think that you asked for it. I suggested that we would have some boards and you asked that it be prepared.

The Court: He got it anyway.

The Witness: He got it.

Q. Will you describe for the Court the products on that product board.

A. I think I owe the Court and all here an apology. In making this up I didn't notice that the legend here is such that you cannot read it.

So under the first group here that legend is insulation, plastic and neoprene. And the second one applying to here (indicating), this is here, the insulation is plastic or neoprene, and this, the conductor is aluminum or copper. [fol. 1229] The first group, 1, 2, 3, 4 and 5 are all triplex type. We would say that they were multiplex, as in this service here it could be two, it could be three, it could be four. But this is typical triplex. And the first one is, and all of these I might say are all the same size, and all with insulated aluminum conductors number 4 AWG.

The first one then is No. 4 stranded aluminum conductor insulated with plastic or neoprene and with a No. 6 ACSR messenger or neutral.

No. 2 has the same insulated conductors which were generally described, and with a No. 4 solid alumoweld neutral. Alumoweld I might explain is a steel core with an aluminum sheath.

No. 3 the insulated conductors, two with a No. 4 all aluminum neutral. So far we have ACSR neutral, alumoweld neutral and an all aluminum neutral.

No. 4 are the same aluminum conductors insulated with plastic or neoprene and a No. 6 copperweld neutral. This copperweld is stranded. It could be solid but it is more difficult to handle and it compares with this alumiweld. It is a steel core with a copper sheath surrounding it.

And No. 5, the same insulated conductors with [fol. 1230] a hard drawn copper neutral. These are all types of service crop cable that are used under varying conditions or circumstances.

Q. Now 6 and 7.

A. Now 6 and 7 are the—No. 6 which is equivalent in conductance, No. 6 is copper, stranded copper, with a copperweld neutral and with a hard drawn solid core copper neutral.

Q. That is No. 7?

A. No. 7, pardon. These are all equivalent.

Q. They are equivalent with Nos. 1, 2, 3, 4 and 5?

A. Correct.

Q. The only difference between the two being that one is with copper conductors in 6 and 7 and aluminum conductors in 1, 2, 3, 4 and 5?

A. Right.

Q. And are these used for the same purpose?

A. Yes.

Q. Now, what are the remaining items on the board?

A. Well, this group (indicating), No. 8, 9, 10 and 11, No. 8 is a, we call aluminum style "K". And sometimes [fol. 1231] called a ribbon type. This is two insulated conductors with an asphaltic compound over it and into that is stranded an aluminum sheath. So it is insulated aluminum conductors with a neutral which is wound around it as a ribbon and used as a third conductor. It is a three-

conductor cable, which is the same as these are (indicating). The other is called a DD, it just happens that it is made a little differently. It is made with the two conductors here in a Figure 8 together. And this is aluminum strap wrapped around it.

Now, this "K" may have some, there may be some question of what it stands for. It simply stands for the fact that it was developed by Kansas City and it became popular out there and others have started using it and so we have called it "Style K" because that is where it originated. The red here, I might say, is not a necessary color. As a matter of fact, the usual color is grey. But some utilities have standardized on red for some reason. And that is what we call Type "SD."

Q. What does "SD" mean?

A. Service drop. That happens to be the Underwriters designation. And these are, the first number, No. 10 is an [fol. 1232] aluminum conductor with a concentric sheath of wires around it, there are two aluminum conductors with concentric survey aluminum wires, a paper type and a fibrous with weather resistant type. And this is what we refer to among the cables in this service.

Q. "This" being No. 10?

A. No. 10. No. 11 is copper type SD equivalent to No. 10 in all respects in construction, excepting it is a smaller size because of the difference between—in conductivity between copper and aluminum.

No. 12 is a No. 4 solid copper polyethelene covered line wire, or weatherproof.

And No. 13 is a four solid aluminum neoprene covered weatherproof, And No. 14 is a No. 4 solid copper with a fibrous, that is a braid or knit covering saturated with an asphaltic compound.

Q. Are these used for service drops?

A. Yes.

Q. And are they shown in the electrical system?

A. They are shown here as open wire.

[fol. 1233] Q. And how are they used to perform the function of service drop?

A. Well, all of them bring power from the last pole to the premise. And all of these I mean are overhead or service drop, and the only other way to bring it into the

premise is underground, and that is shown by some of the other boards.

Q. And is that construction in use today?

A. Oh, yes.

Mr. Bergson: I offer Defendant's Exhibits AR-19 and 19-A for identification.

Mr. Melchior: I object to this exhibit, your Honor. Shall I examine the witness or state my reasons?

The Court: State your reasons.

Mr. Melchior: I beg your pardon?

The Court: Well, you better give your reason.

Mr. Melchior: The witness has described the first three groups as various types of cable. The exhibit is entitled "Service Drop Cable" but the witness has described the last three conductors represented as wires. Therefore, we [fol. 1234] urge that this exhibit is a misnomer and misleading because the last three are wires and the others are cable.

Mr. Bergson: I submit the line of commerce indicated by the government is service drop.

Mr. Melchior: And cable.

Mr. Bergson: And cable, and I think if anything, if there is such a line of commerce, anything that performs a service drop should be within the line of commerce.

The Court: I think we won't be confused about it. All you have to do is look at it and see that the latter three are wires. I will receive it.

(Defendant's Exhibits 19 and 19-A for identification received in evidence.)

The Court: I think you only have one more. I think I better take a short recess.

The Clerk: The Court is in recess.

(At this point a short recess was taken after which the trial was resumed.)

[fol. 1235] Q. Mr. Schatzel, I show you a product board entitled "Alcoa-Rome Overlap Products," color photograph of which has been marked as Defendants' Exhibit AR-20 for identification and accompany legend which has been marked as Defendants' AR-20A for identification,

and ask you whether this product board was prepared by you or under your direction and supervision?

A. It was.

Q. Will you please explain to the Court what this product board represents?

A. We have previously shown ACSR, and this shows an ACSR product in the range of size from 6 to 4/0, which was the range which Rome Cable made, and which is part of the range which Alcoa also made. It shows all aluminum shown here as AAC, and it shows from No. 8 to a million circular mil size.

The Court: Thousand.

A. (Continuing) Well, this is a thousand but it is MCM. A thousand thousand. This is a thousand thousand or a million circular mils. And this is a range that was common to both companies. Next is aluminum line [fol. 1236] wire. There is no distinction here as to the covering, and the range again that was common to both companies was No. 6 to one million circular mils. And also in the multiplex, No. 6 to 4/0 multiplex. And these were the types of wire which both companies made.

Q. Now, on aluminum multiplex, which is the fourth product on that board, for what purpose was that used or can that be used?

A. Well, that can be used either as a distribution cable, particularly for secondary distribution, or for service drop. It has also been used for multiple street lighting, and that is not an uncommon use for it.

Q. Now, Mr. Schatzel, am I correct in understanding that all of these products for trade here in these product boards, these four are the products which both companies made?

A. In that range of sizes. Yes.

Mr. Bergson: I offer Defendants' Exhibit 20 and 20A for identification.

The Court: Received.

(Defendants' Exhibits 20 and 20A for Identification received in evidence.)

[fol. 1237] Q. Now, Mr. Schatzel, I show you a group of exhibits marked Defendants' AR-21, 22, 23 and 24 for identification.

A. Yes.

Q. And ask if these exhibits were prepared by you or under your direction and supervision?

A. They were.

Mr. Bergson: Here is a set for your Honor (hands documents to the Court).

Q. Now, would you describe briefly what Defendants' AR-21 for identification is?

A. Well, this exhibit consisting of these four pages describe what is involved in the making of insulated cables beyond the conductor. We accept the fact that we have a conductor of aluminum or copper. The rest of the cable, then, consists of the insulation itself, protective coverings which are required to various environments that the cable operate in. And this exhibit lists the types of insulating materials commonly used consisting of fiber yarns, varnish materials and plastics and then details under rubber as thermo setting materials the types of rubber that are used, and some of the materials commonly used in the [fol. 1238] compound of rubber for various purposes and applications and requirements.

And then the same thing for the thermoplastic materials, the types of thermoplastics and the compounding materials used in the making of useful insulating compounds from them.

And the last sheet, or "protective coverings" are the outer protective sheathing, or it may not be sheathing, it is armor or ropes or braids or plastic coverings which are used primarily for protecting the insulation against the environments and the sheat-s.

Mr. Bergson: I offer Defendants' Exhibit 21 to 24 for identification.

Mr. Melchior: No objection, Your Honor.

The Court: I will receive them.

(Defendants' Exhibit 21 through 24 for Identification received in evidence.)

By Mr. Bergson:

Q. Now, Mr. Schatzel, referring to Defendants' Exhibit 22, which is entitled "Insulating Materials Thermoplastic,"

I ask you if you know which type or types of insulating material were used by Alcoa prior to its acquisition, prior to the acquisition of Rome, in its aluminum insulated [fol. 1239] wire products?

A. Well, in the manufacture of line wire and triplex—now, is this prior to the——?

Q. Prior to the acquisition.

A. Prior to the acquisition, the only type that would be used on there would be polyethylene and the high-molecular weight and type.

Q. That was the only one that was used by Alcoa?

A. That is the only one.

Q. Now, of the same materials how many were used by Rome?

A. All of these with the exception of irradiated polyethylene.

Q. Now, turning to Defendants' Exhibit 23 called "Insulating Materials Thermo Setting," which, if any, of these was used by Alcoa in the manufacture of insulated wire and cable prior to the acquisition?

A. Would this be in their manufacture?

Q. In the manufacture, I asked.

A. None, in their manufacture.

Q. Now, in their sale, which product was used?

A. The one product neoprene type GN.

Q. That is the third one?

A. That is the neoprene, you see, there are several [fol. 1240] types there. Four types of neoprene. GN is the type that was commonly used and is commonly used for this type of insulation, that is, the line wire.

Q. Line wire and triplex?

A. Yes.

Q. You made a distinction between manufacture and sale by Alcoa. Do you know where Alcoa obtained the neoprene GN line wire and triplex which it sold, prior to the acquisition?

A. Yes. Rome Cable manufactured that for them.

Q. Now, of these materials on Defendants' Exhibit AR-23, which did Rome use in its manufacture of insulated wire and cable?

A. That is prior to the acquisition?

Q. Prior to the acquisition.

A. Well, I will give you what they did not use.

Q. All right.

A. Polysulphide rubber was not used. WRT neoprene was not developed yet. Just developed in the last couple years. Ethyl-propylene copolymers, and ethyle-propylene diene terpolymers. Those are still somewhat experimental —with the exceptions—no—and cross linked polyethylene. This was experimental, but not being used—with those [fol. 1241] exceptions, Rome used all of these.

Q. Now, has Rome, since the acquisition, stopped making any of the types it made prior to the acquisition?

A. No.

Q. Has it added any new types?

A. Yes, it has added the cross linked polyethylene which is a standard material. And to an experimental extent, the ethyl-propylene copolymers. How about the neoprene rubber WRT?

A. That is regularly used.

Q. Does Rome use it?

A. Yes, that is the standard product today.

Q. Now, I call your attention to Defendants' Exhibit AR-24 which is a table entitled "Protective coverings." And I ask you if Alcoa, prior to the acquisition, made any of these products?

A, No, not used them as protective coverings, no.

Q. And how about Rome?

A. Rome used—I think Rome used all of these.

Q. Now, Mr. Schatzel, would a company in your opinion with the ability to make more complicated wire and cable that you described to us this morning, be in a position, if it so desired, to manufacture weatherproof or line wire? [fol. 1242] A. Would a company that manufactured these——

Q. A company that had the competence to manufacture——

A. Yes.

Q. If it had such competence, would it be able to manufacture triplex?

A. Yes.

Q. Mr. Schatzel, I show you a document, entitled "American Standards Specifications for Weather Resistant Wire and Cable Neoprene Type," which has been marked as

Defendants' Exhibit AR-25 for identification. I ask you if you are familiar with that publication?

A. Yes, very familiar.

Q. Now, would you tell us what the American Standards Association is?

A. The American Standards Association is the official standardizing body representing the United States at all international standardization work. It is the representative or it is the child, I would say, of all of the standardizing organizations in the United States, and recognized by the Federal Government as an official standardizing group in the United States for specifications of all kinds. It includes practically everything that we use. Cement, steel, copper, aluminum, plastic, rubber, and all other types.

[fol. 1243] Q. I notice that this document has on it "Approved January 15, 1954." Are these specifications in effect today, so far as you know now?

A. Yes, they are.

Q. Now I invite your attention to page 1, paragraph 11.

A. You say page 1?

Q. Page 5, I am sorry. I beg your pardon. Page 5, paragraph 11, and ask you whether that paragraph, which is entitled "Scope" makes any distinction between copper and aluminum conductor?

A. It does not.

Mr. Bergson: I offer Defendant's Exhibit AR-25 for identification.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit 25 for identification received in evidence.)

By Mr. Bergson:

Q. Mr. Schatzel, I show you a document marked Defendant's Exhibit AR-26 for identification which is entitled "American standard specification for weather resistant wire and cable, polyethelene type, American Standards [fol. 1244] Association", and ask you whether you are familiar with that document?

A. Yes, I am.

Q. I notice that that was approved August 13, 1957. Are the specifications contained therein still in existence?

A. They are in use today, yes.

Q. And I invite your attention to page 6, paragraph 11.

A. Yes.

Q. Entitled "Scope," and ask you whether in that paragraph any distinction is made between copper and aluminum conductor?

A. No distinction is made.

Mr. Bergson: I offer Defendant's Exhibit 26 for identification.

Mr. Melchior: No objection.

The Court: Received.

(Defendants' Exhibit 26 for identification received in evidence.)

By Mr. Bergson:

Q. Mr. Schatzel, I show you a specification marked Defendant's Exhibit AR27 for identification which is entitled "IPCEA—NEMA Standards Publication, thermo-[fol. 1245] plastic insulated wire and cable for the transmission and distribution of electrical energy," and ask you whether you are familiar with that document?

A. Yes, I am.

Q. Now, would you tell us what the Insulated Power Cable Engineers Association is?

A. The Insulated Power Cable Engineers Association is an association of individual engineers of the power cable manufacturers in the United States, for the purpose of drawing up standards of construction and performance of cable.

Q. It is well recognized in the industry?

A. Yes, it is very well recognized.

Q. Are these specifications followed by the industry?

A. They are followed by the electrical industry and by the cable manufacturers industry.

Q. What is the National Electrical Manufacturers Association?

A. The National Electrical Manufacturers Association is a trade association of electrical manufacturers in the

United States. The number in it is voluntary provided that it meets requirements of the association. Or repre-
[fol. 1246] sents the electrical manufacturers in the association. And it represents companies, I might say, and not individuals.

Q. Now, would you turn to part 3, page 1 of this document which is dated July, 1961, and I ask you whether part three is still in effect?

A. Yes, it is.

Q. Now, looking at paragraph 3.1 which describes—why don't you read paragraph 3.1 into the record.

A. Paragraph 3.1; is that it?

Q. Yes.

A. The heading is "Material"—"The insulation shall be a thermo-plastic type of compound meeting the dimensional, electrical and physical requirements specified in part 3. The insulation shall be applied directly to the surface of the conductor or the conductor covering and shall fit tightly to that surface."

[fol. 1247] Q. Does that make any distinction between copper and aluminum as the conductor metal?

A. No.

Mr. Bergson: I offer Defendant's Exhibit AR-27 for identification.

Mr. Melchior: No objection.

The Court: I will receive it.

(Defendant's Exhibit 27 for identification received in evidence.)

Q. Now, I invite your attention to part 7, page 5, and particularly the paragraph 7.3.1 entitled "Scope." Would you read that section into the record?

A. (Reading) "7.3.1. Scope. This section covers secondary and service drop cables composed of one or more polyethelene insulated conductors and one neutral conductor for use as a supporting member. These cables are for use on circuits not exceeding 300 volts to ground."

Q. Does this section make any distinction between copper and aluminum as the conductor?

A. It does not.

Q. These have been received.

The Court: Yes.

[fol. 1248] Q. I now show you a document which has been marked for identification as Defendant's Exhibit AR-28 for identification, which is entitled "IPCEA—NEMA Standards Publication, rubber-insulated wire and cable for the transmission and distribution of electrical energy." Are you familiar with that publication?

A. I am.

Q. Is it published by the same group that published the previous document?

A. Yes.

Q. Do you know whether it is still in force?

A. Yes, this is still in force.

Q. Now, I invite your attention to Part 7, page 7, and particularly to the paragraph numbered 7.4.1 entitled "Scope." I ask you to read that paragraph into the record, if you will, please.

A. "7.4.1. Scope. This section covers secondary and service drop cables composed of one or more neoprene-insulated conductors and one neutral conductor for use as a supporting member. These cables are for use on circuits not exceeding 300 volts to ground."

Q. Does this specification make any distinction [fol. 1249] between copper and aluminum as the conductor?

A. It does not.

Q. Now I invite your attention to Part 3, page 1, and particularly to the paragraph numbered 3.1, and would ask you to read that paragraph into the record.

A. (Reading) "3.1: Material. The insulation shall be of vulcanized rubber carbon meeting the dimensional, electrical and physical requirements specified in Part 3. The rubber hydrocarbon in the insulation shall consist essentially of natural rubber or synthetic rubber, as specified in Table 11. The insulation shall be applied directly to the surface of the conductor or conductor covering, and shall fit tightly to that surface."

Q. Is any distinction made there between copper and aluminum as the conductor?

A. No distinction.

Mr. Bergson: I offer Defendant's Exhibit AR-28 for identification.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit 28 for identification received in evidence.)

[fol. 1249a] Mr. Bergson: Your Honor, I am about to change subjects.

The Court: Yes, we will recess until two o'clock.

(Whereupon, at 12:45 p.m. a recess was taken until 2:00 p.m.)

[fol. 1250] AFTERNOON SESSION

APPEARANCES: Same as Morning Session.

RUDOLPH SCHATZEL, resumed the stand, and testified as follows:

Direct examination. (continuing)

By Mr. Bergson:

Q. Mr. Shatzel, if a company had an extruder for extruding polyethylene and an extruder for extruding neoprene, and a twister and test equipment, I mean and test equipment for triplex, what other products could it make other than line wire and triplex?

A. It would be just an extrusion equipment?

Q. Yes, never mind the drawing and stranding equipment.

A. And equipment for testing triplex, that is the only thing to be decided?

Q. Yes.

A. That is all it could make.

Q. Now, what other equipment and what sort of know how would a company have to have to make the more sophisticated type of products that Rome was making?

A. Well, that would be a line of copper and thermoplastic insulated cable, of the range that Rome made.

[fol. 1251] And assuming that they have the space, they have the building, they would have to start, of course,

with mixing equipment for rubber, which would include weighing, storage, and mixing mills, strainers and storage place for insulations, cooling equipment for compound, because some of it would have to be specially cooled, refrigerating equipment for water. Then, of course, that is assuming that they already have equipment, vulcanizing equipment, but they would need some extrusion equipment, which we ordinarily call pan-curing or batch curing for larger sizes, such as some of these samples here (indicating), and vulcanizers, deep panning equipment, lead extrusion, heavy cabling; they would need tape, braiding of various types and sizes, not just one size, because you run the gamut of small to large, and braiding from not only textiles but metals including copper, steel, aluminum. And, of course, packaging equipment for all of this.

And then, of course, there would be testing equipment of a wide variety covered by the specification which we put in evidence this morning of the IPCEA-Nema, none of which is required for *the* either line wire or triplex. [fol. 1252] I won't go into details on that, but that is rather considerable. Just for the electrical equipment. Mechanical equipment for testing the rubber and plastic insulations and special equipment for measuring moisture absorption. Equipment for measuring the environmental attacks, such as mold and low temperature up to minus 80 degrees centigrade; minus 65 is the standard government requirement. Equipment for measuring the effect of temperatures up to around 200 degrees centigrade anyway for certain type of insulation.

There would be a variety of small equipment that they would have plus personnel to do the testing, a laboratory man for compounding of rubber because we don't buy rubber compound, we make them; design them, change them; modify them; both to fit the requirements of customer specification and to take advantage of the advance in the art which we hope may be somewhat in the lead of some competitor.

And I think that is about the setting up of a rubber plant for insulated wire, and that is what it is.

Q. Well, now, when you said the laboratory personnel, [fol. 1253] would there be any other type of personnel

you would need for know how? Would there be any additional know how required?

A. Oh, engineering, yes. Yes. I meant to include that as laboratory, but it isn't ordinarily so. That is, in the design of cable and in the servicing of customers.

Q. Now, let's forget these complicated structures, and let's get back to the insulated or covered line wire and triplex. Can copper and aluminum line wire and triplex be insulated on the same machine?

A. Oh, yes.

Q. Now, let's go back one step further in the operation. Can copper and aluminum be drawn on the same machinery?

A. Yes.

Q. That's going back two steps, I guess. The intermediate step is stranding. Can copper and aluminum be stranded on the same machine?

A. Yes.

Q. Now would you describe the process by which the copper or aluminum rod is drawn down to the various sizes of wire?

A. Well, that, essentially, is describing the machine. [fol. 1254] The aluminum rod or copper rod—you said aluminum rod?

Q. I said either.

A. (Continuing) is taken to a wire drawing machine, and this machine consists of a unit which has a capstan lubricating system which pumps a lubrication, in the case of copper, a solution or a dispersion of oil in water. Relatively low percentage of oil, or soap, or a combination of oil and soap, is pumped over the wire, and acts both as a lubricant and a coolant. As it goes into the die and around a capstan in this case, a capstan that is in a vertical plane. Well, a capstan is purely a smooth wheel around which we wrap the wire, and it pulls the wire through the die. The wire drawing machine consists of a number of these units. The die box, a lubricating unit for pumping lubricant, and a capstan arrangement in parallels, and the wire goes through a series of dies, usually nine to thirteen on these machines. Could be smaller or less number, but I doubt there is many more than 13.

And that reduces the wire usually by about 20 per cent reduction area in each pass through each die.

Q. Now, is each pass a different wire gauge size?

[fol. 1255] A. Each pass is not exactly a wire gauge size. It is close to it, but it finally reduces this wire to about —well, if it starts out with 3/8 rod to a wire, that's about what we would call a No. 8. That would be .125 inches in diameter. And if we want to draw it further than that, we repeat that process on smaller machines.

Q. Now, you mentioned when you drew copper you use an oil and water lubricant. If you wanted to draw aluminum on that same machine, what would you have to do?

A. Well, then you would change the lubricating system, and the lubricating system in that would be a heavier soluble oil or a more or less heavy emulsion of a mineral oil. We avoid the use of mineral oil in copper. We use it in aluminum. But there are people that use mineral oil in copper, also.

Q. Now, would the machines have to be cleaned?

A. Yes, they need to be cleaned. The two solutions are not compatible, so you just—good housekeeping—you would clean the machine thoroughly.

Q. How much of a job is it to clean the machine?

A. Well, it takes quite a little doing to get all of [fol. 1256] this oil out, so you don't contaminate your solution, whether it's copper or aluminum, and it would take a couple of hours.

Q. Now, after the wire is drawn, if you want to strand it, how is that done?

A. Well, it's the same process as in making rope. We have a number of different types of stranders, where a single wire or group of wires is led through a central guide and a series of spools of wire are then rotated and lay up—first, generally, a layer of six, then twelve, and so forth, in layers around that central core. Now, that is the usual type of concentric strand in which—I say lay up—we usually reverse the direction of lay, so we put first on the left hand, then on the right hand, then on the left hand, and so forth.

Q. Now, the same machinery, you said, can be used to strand copper and aluminum?

A. That's right.

Q. What is necessary to switch over from copper to aluminum, or switch from aluminum to copper. Is there any step necessary for that?

A. No particular step. We, however, since aluminum is a somewhat softer metal, we take a little more care. [fol. 1257] Sometimes use a wooden or softer guide in the—rather than steel guides, but steel guides are used. Outside of that precaution, why, we wouldn't have any change.

Q. And when you insulate, you can insulate interchangeably without any intermediate steps?

A. None whatever.

Q. Now, directing your attention to the period when Rome Cable first began to insulate aluminum wire and cable, did Rome encounter any technical problems in shifting over from copper to aluminum of any consequence?

A. No.

Q. Did Rome hire any new technical personnel?

A. No.

Q. Do you know a Mr. Fuller?

A. Yes, very well.

Q. What is Mr. Fuller's full name?

A. Truman S. Fuller.

[fol. 1258] Q. When did he—did he ever become employed by Rome Cable?

A. He became a consultant for Rome Cable.

Q. And for what purpose was he retained when he became a consultant for Rome Cable?

A. He became a consultant, I don't believe I mentioned a date, but in either January or February of 1954, and he became a consultant primarily to assist in general metallurgical and other laboratory problems. But it happened that I had known him for a great many years very favorably, and when he retired *for* General Electric, he happened to mention that he was retiring and I asked him if he would like to come up and spend a few days with us. He spent three days a month.

Q. Was he retained for the purpose of assisting you in your aluminum wire and cable products?

A. Not specifically, no.

Q. Did he—what was his primary function?

A. Well, he had a considerable experience in a wide

variety of materials. He had, at the time he was the head of works laboratories of all the General Electric plants and had also the position as chairman of what they called [fol. 1259] their metals committee, which was a committee to coordinate their use and efficient use of metals of every kind within all of their various plants, to see that each plant had the information that was available one to the other and was using it. And so he had a very broad knowledge of all kinds of materials, and had a very specific knowledge of copper, where he had done a considerable amount of work. But our main use of him was purely as a consultant in the laboratory that contained a great number of young men. And we felt that he could stimulate and coordinate and get them working better as a team. That was his primary purpose. He did it very well.

Q. Was he hired because you felt you needed help in working with aluminum?

A. No.

Q. Now, you testified earlier that Rome made only the smaller sizes of ACSR, the size 4/0 and under. Those I think you testified were primarily distribution products. Did Rome at any time give consideration to manufacturing the larger sizes of ACSR, the transmission size?

A. It gave consideration, yes.

Q. And what was the result of the consideration? [fol. 1260] A. Well, the results were we decided not to do it.

Q. And why did you decide not to do it?

A. The first thing was that we did not have the specialized technical personnel, engineering. We did not have all of the equipment that was needed. And I think others would be more competent to testify to this than I am, but we did not feel that we had a market that we could compete in; that we had no standing in the market; and that we didn't have the specialized sales force necessary for it. It was just too large a problem at the time for us to enter. While we did need a small amount and in the small size to round out our line in the primary distribution field.

Q. Now, Mr. Schatzel, I show you a document entitled "Aluminum and general meeting held January 15, 1952," which is Government Exhibit 69, and invite your atten-

tion to the middle of the third paragraph, and I will ask you to read that into the record.

A. (Indicating) This paragraph here?

Q. That one.

[fol. 1261] A. All right. "It looks as if we would not be in the ACSR until May, 1952 or early 1953. Both Schatzel and Rolston agree that if we produce one million pounds of aluminum per month we would need ACSR in our line."

Shall I continue on that?

Q. Yes. Go ahead.

A. "Fraser questioned on how our insulated accounts could help for ACSR business. Schatzel said we would need tensile equipment, but our testing requirements would be 25,000 less as wouldn't need modulus testing. According to Rolston, 500,000 pounds a month of ACSR would represent billings of $225,000. Fraser will pass this information on to Ellis."

Q. What type of ACSR were you talking about there?

A. Well, I was talking about primarily, since I said in that there (indicating) that we would not need the modulus testing equipment, that is the only key I could see, to the smaller sizes. If we were going into the larger size we would need modulus testing equipment.

Q. So that you were talking about the size of ACSR that you subsequently did go into?

[fol. 1262] A. Or slightly larger, but not the full line.

Mr. Bergson: You may cross-examine.

Cross-examination.

By Mr. Melchior:

Q. Mr. Schatzel, we enjoyed very much this morning your explanation of all these products. And I was particularly impressed by the designation you had on a number of them. I believe you testified that these products with an A designated on the exhibit were manufactured and sold by Alcoa prior to the merger, and those that are designated with an "R" were manufactured and sold by Rome prior to the merger. And those with both "A" and "R" were manufactured and sold by both. Is that correct?

A. That is correct.

Q. There seemed to be a number of them that had "R" on but no "A".

A. That's right.

Q. I believe you made some comments with particular respect to AR-18, which as I recall was the one designated "Other representative Rome Products." That is over here, Mr. Schatzel, the second one from the end. You see, down here, sir.

[fol. 1262a] A. Oh, yes, I see it.

Q. You won't have to get up.

A. I can follow it from this (indicating) too.

Q. Yes.

A. Yes, thank you.

[fol. 1263] By Mr. Melchior:

Q. I believe you indicated that that very well represented the wide variety of products manufactured by Rome which were not manufactured by Alcoa?

A. That's right.

Q. You described this as a broad line of product?

A. Described which?

Q. These products made by Rome that were not made by Alcoa?

A. Yes, I did.

Q. Would you compare this line of product that was made by Rome Cable prior to the merger with the other wire and cable companies that you were familiar with at that time? Would you consider Rome to have a very broad line of wire and cable products, or a restricted line?

A. Well, it is difficult to define for you, "broad." We had a broad line in one respect, but not as broad as some others, so——

Q. For example.

A. Well, for instance, we did not have as broad a line as General Cable, Anaconda, Phelps-Dodge. I presume there would be others. Let's say that we had as broad a [fol. 1264] line, but in different lines than, let's say, Essex. So that we were, I would say, intermediate.

Q. The first group of companies you mentioned, other than Essex, were all integrated copper companies, weren't they?

A. They would be integrated copper companies.

Mr. Bergson: Just a minute. General Cable?

A. (Continuing) General Cable is not. That's right.

Q. I see.

A. Not Essex.

Q. I excluded Essex. Other than Essex. But for the integrated copper companies and General Cable, do you think Rome's product line was about as broad as the other non-integrated companies, from your knowledge of the industry?

A. I would say it compared favorably, yes.

Q. Wat it broader than Alcoa's?

A. In the wire cable industry?

Q. Yes.

A. Oh, certainly.

Q. Substantially broader?

A. Well, these samples here testify to that.

Q. Represent that. Yes. You mentioned General Cable. [fol. 1265] Do you know of any company that has a broader line of wire cable products than General Cable? At the time of the merger, I am speaking of. The Rome-Alcoa merger.

A. That's of wire and cable?

Q. Wire and cable. That is conductor wire and cable products. The products we are concerned with in this proceeding.

A. No, I think they are representative of the broadest. There would be some that have different items in lines. Others they don't have: It's a broad line.

Q. You were employed by that company for some years, weren't you, sir?

A. Yes, I was.

Q. Now, I would like to direct your attention to AR-21, which happens to be this document, entitled "Insulated materials." Do you have that before you, Mr. Schatzel?

A. Yes.

Q. There are a series of four you spoke of—AR-21, AR-22, AR-23, and AR-24. Do you have those before you?

A. I have that right here.

Q. Now I would like to direct your attention specific- [fol. 1266] ally to AR-22.

A. Would you identify that?

Q. That is entitled "Insulating Materials, Thermoplastic." The second one.

A. Yes. Thank you.

Q. Let me ask you this. The caption of this document is entitled "Insulating Materials, Thermoplastic." Does this document represent, in your opinion, a fairly complete representation of insulating materials of a thermoplastic nature?

A. Yes, I would say so.

Q. Is it complete, to your knowledge?

A. Well, to my knowledge, as far as I know it's complete.

Q. All right. Now, directing your attention to AR-23, which is entitled "Insulating Materials, Thermosetting," and there are two groups below that—rubber and compounding ingredients. Now, from your knowledge of the insulating industry, the insulating business, do you think this represents a complete listing of the various types of thermosetting insulating material?

A. If I could qualify this by saying that each of these types that I have put down here represents a family. [fol. 1267] For instance, I have put down here GRS type of rubber. Well, that represents—oh, probably 25 different rubbers. And butyl rubber represents at least ten. Represents families of rubber. So, as families, this is complete. As individuals, it is not.

Q. I see. As families, then, the chart is complete.

A. The same is true of the compounding ingredients.

Q. Fine. Now, with respect to AR-24, which is entitled "Protective Coverings," which has certain subheadings, entitled "Metallic, Fibers, and Non-Metallic Extruded." What would be your comment as to the completeness of this particular representation?

A. This, I think, is quite complete, with that same qualification, that these will be families of materials.

Q. In other words, you just didn't put down details of each one of these categories. There would be too many.

A. Yes. That's right.

Q. Now, with respect to these three tabulations, AR-22, AR-23, and AR-24, I believe you testified with respect to [fol. 1268] which of the categories Alcoa manufactured and sold, and which Rome manufactured and sold?

A. Yes.

Q. With respect to AR-22, if I understand your testimony, you indicated that the only one utilized by Alcoa was high molecular polyethylene, is that correct?

A. Yes.

Q. But with respect to Rome, you indicated that Rome used all the others except irradiated polyethylene?

A. That's correct.

Q. Now, with respect to AR-23.

A. (Interrupting) Might I ask, if you are referring now to the present, or prior to——

Q. Well, I think when you testified, was it not as of the time of the merger?

A. At the time of the merger.

Q. Yes. That's the import of my questions.

A. All right.

Q. Now, with respect to AR-23, which are your thermosetting insulating materials, if I understood your testimony, you stated that Alcoa, prior to the acquisition, used none of these insulating materials, but it did sell neoprene rubber GNW type as an insulator for conductors?

[fol. 1269] A. Yes.

Q. Is that correct?

A. Yes, it sold triplex and line wire insulated with that type of compound.

Q. I see. Then with respect to Rome, prior to the merger, I believe you stated that Rome used all types of these except certain of them which you considered to be somewhat experimental, at the time, and I believe you designated three or four categories, is that right?

A. That is correct.

Q. Finally, with respect to the protective covering, AR-24, I believe you testified that Alcoa did not use any of these protective coverings for its conductor materials, whereas Rome used all of them?

A. That's right.

Q. Now, from the standpoint of type and varieties of insulation, how would you characterize Rome's product line as compared with other companies engaged in the business of insulating conductor wire and cable from a broadness of product standpoint? Would you characterize it as broad line?

A. Well, I would say it was a broad line in rubber and thermoplastic insulated cable. I don't know whether [fol. 1270] that's the answer you want.

Q. Well, I want your answer, whatever it is.

A. I would qualify, then, that a broad line of insulated cable would include varnished cambric and paper cable of various types, and some of the silicon rubber type and compounds with these of varnished cambric as well as the very high temperature plastic type tethylon which Rome was not a factor in.

Q. Rome was not in that field of insulation?

A. None whatever.

Q. Was Alcoa?

A. Neither one.

Q. But as far as your protective coverings were concerned, how would you characterize that? Are there any protective covers that are not shown on this tabulation? Any general categories? Or is this a pretty complete——

A. This is pretty complete. Now, Rome's participation in some of it is small, as for instance, steel wire armor, or steel tapes.

Q. Well, I didn't mean to inquire as to how much, but they were in that line.

A. They were in that line.

Q. They were in all of these lines?

[fol. 1271] A. To some extent.

Q. And this is as far as you know a fairly complete line of protective coverings?

A. Yes, this is supposed to represent the industry.

Q. Mr. Schatzel, I wonder if you would tell me exactly what triplex is. You used that term in your direct testimony?

A. Well, triplex is a three-conductor cable in which the two—there is two insulated conductors and a bare or neutral conductor and in which the two insulated conductors are twisted with a specified lay. Around the bare neutral conductor. That conssitutes triplex.

Q. Would you tell me the difference between triplex and duplex?

A. Duplex, there could be—generally duplex cable, and I think perhaps we will have to go to the exact definitions here—but duplex cable would be generally two conductors

and—but the designation very often is concerned as two parallel conductors rather than two twisted. Such as these two wires over here is a duplex—I will have to look up the ASA definition, if you don't mind, and see just [fol. 1272] what that is, but it's used—pardon me. Well, this defines them as twisted. Duplex is a cable composed of two stranded conductors twisted together. Used in the industry, though, it may not be stranded. It's two conductors twisted together.

Q. Is duplex used for the same purpose as triplex?

A. Yes.

Q. For what purpose is that?

A. That's for service to a house.

Q. I see. Now, would you distinguish triplex from quadruplex for me?

A. Well, quadruplex is a cable in which there is three conductors twisted around the neutral. Four conductors in all.

Q. Is this used for the same purpose as triplex?

A. It is generally used for the same, but for a larger or different type of an establishment. It might be an apartment house or a shopping center or something of that——

Q. Where a little heavier load is required? Is that it?

A. Or a different type of service, yes.

Q. Tell me the difference between these three, if any, and multiplex cable.

A. They constitute multiplex.

[fol. 1273] Q. All three of them constitute a category known as multiplex?

A. That's right.

Q. Now, Mr. Schatzel, would you tell me the difference between multiplex cable and weatherproof wire. You used those terms this morning, I believe, in your testimony.

A. Yes. Weatherproof wire is in some cases a misnomer, because the cable usually of a large size such as we are talking here of a million circular mils or 4/0, we have a number of strands twisted together, is called—if you had those in steel, that's a steel cable. Or it's called a cable in itself.

[fol. 1274] Q. We are talking about weatherproof wire.

A. I know it.

Q. Mr. Schatzel, we don't use steel cable as weatherproof wire.

A. But you are using a stranded conductor as weatherproof wire.

Q. I want you to tell me about weatherproof wire.

A. Weatherproof wire is simply a single solid conductor or stranded conductor with a covering over. Not an insulating covering, but a covering.

Q. Weatherproof wire is represented by a, is it the bottom three wires on that last——

A. That's right.

Q. —exhibit?

A. That's right.

Q. That is weatherproof wire. What is weatherproof wire used for?

A. Well, it is used as this chart I mention here, for distribution and it is used for service drop; both.

Q. It is used for both. Is there a difference in the volume of usage as between distribution and for service drop [fol. 1275] purposes? Can you estimate what the use is today?

A. There is, but I imagine it is larger—I have no figures.

Q. From your knowledge of the industry can you form an opinion?

A. It is a larger use of weatherproof wire in distribution than in service drop, certainly.

Q. Can you give me an idea on a percentage basis?

A. No, I couldn't.

Q. Is it more than 50 percent used for distribution of all the weatherproof wire used?

A. I would imagine so. I have no knowledge.

Q. You have no knowledge?

A. No.

Q. How long have you been familiar with weatherproof wire, Mr. Schatzel?

A. Oh, about thirty years.

Q. How long have you been familiar with multiplex type of cable?

A. Ever since it started use.

Q. And when was that?

A. I have no knowledge. In 1946.

Q. Was that when it was developed?

[fol. 1276] A. Yes.

Q. Do you know who developed it?

A. We did.

Q. And by you, who do you mean by we?

A. Rome Cable.

Q. Rome Cable developed it?

A. Let me say triplex as such has been a type of wire for a long, long while. And it has been used for services to houses for a long, long while. But the particular type of triplex that we are talking about, where we have two conductors twisted around a bare neutral, has only been used since 1946 in any volume.

Q. I see.

A. Before that it was insulated conductors but still triplex.

Q. Now, I am talking about the type that Rome Cable developed, which I think is the subject of the discussion here today. Would you say that the use of triplex has been on the increase since 1946?

A. Oh, certainly.

Q. It is a growing product?

A. I think so.

[fol. 1277] Q. And you say it is used for service drop purposes?

A. And distribution.

Q. And distribution. And I believe you said weatherproof wire is used for service drop purposes and also for distribution?

A. Right.

Q. Now, directing your attention to the service drop function, have you noted any trend in the use of either triplex or weatherproof? Is there a noticeable trend over the last several years?

A. Yes, I think there is a trend. It is towards triplex, but I have no exact figures on this.

Q. But from your knowledge of the industry and all its commodities, you say that triplex is on the increase?

A. That's right.

Q. In other words, if there were a new housing development out in some part of Utica and service entrance cable were to be used, you would form an opinion as to

what the possibilities might be as to whether they would use triplex or weatherproof line?

Mr. Bergson: I think you said service entrance. I think what you meant was——

[fol. 1278] Mr. Melchior: I meant to say service drop.

A. You mean triplex for service drop?

Q. Triplex as service drop or weatherproof wire as service drop.

A. If a new development, I imagine that it would be triplex.

Q. In other words, can I conclude from your remarks that triplex is replacing weatherproof for service drop purposes?

A. That is the conclusion that in some cases we couldn't make because it is a matter of company policy of a utility. I know regions where company policy is that triplex will not be used.

Q. Can you tell me——

A. But from the approach countrywide I think that might be the logical conclusion.

Q. Mr. Schatzel, directing your attention to this electrical layout, this first chart, I would like to ask you about one little item on there. At the very end, AR-12, do you have that before you?

A. On this.

Q. It is entitled "A typical electrical system."

[fol. 1279] A. Yes, I have that.

Q. If you will note at the end of the system you have conductors running to what appears to be residential premises.

A. Right.

Q. And one is by open wire; one is by cable and one was by residential underground.

A. Yes.

Q. Now, on the open wire representation, what would probably be used there for service drop purposes?

A. Weatherproof or line wire.

Q. Yes. Now, on the cable what would probably be used?

A. That would be, it could be any one of these cables that we see here.

Q. Your service drop cable?

A. Any one of the service drop cables.

Q. Yes. Now, the one I am interested in is the residential underground. Would you tell me what—we know which ones you mean.

A. Yes.

Q. On residential underground, would you tell me what [fol. 1280] type of conductor is used in that situation? I don't believe you brought that out on your direct testimony.

A. On that copper is generally used.

Q. Copper as a metal conductor?

A. Yes.

Q. Well, would you use weatherproof wire underground?

A. No, weatherproof is not an insulated wire. This requires an insulated wire.

Q. Would you use triplex underground?

A. That is not an insulated wire for this purpose, no.

Q. Now, directing your attention to AR-19, Mr. Schatzel, which is the last exhibit—I think you have a picture of it——

A. Yes, I do.

Q. Do you have it before you now? And in particular products numbers 8 to 11 inclusive.

A. Yes.

Q. Can you tell me when those particular products were developed, about?

A. Well, it is at different times. Products 10 and 11 were developed in the early thirties.

Q. How about 8 and 9, do you know about those? [fol. 1281] A. They were somewhat later, probably in the late thirties.

Q. In the late thirties?

A. Yes.

Q. Now, how widely are these products used in the industry, generally, from your knowledge?

A. The first two have been used, I don't know at the present time, the first two were the only type that was used for many years. And so they are in service and used in all sections of the country. That is with copper. Pardon me, that would be number 11.

Q. You are talking about number 11?

A. Yes.

Q. On AR-19?

A. That's right. 10 is used and has been used recently, but I wouldn't know to what extent. It is not large.

Q. It is not large?

A. No. 8 and 9 is confined to certain sections of the country and in those particular sections it is probably, well, it is the largest type used, like in Kansas City and some other localities. But overall again, around the whole [fol. 1282] country, it would not be large. It would be a relatively small percentage.

Q. I see.

A. But they are in continuing use.

Q. Were these products manufactured by Rome Cable prior to the merger?

A. These were manufactured—well, No. 10 was not. With aluminum, was not manufactured.

Q. I didn't hear the last part.

A. No. 10, as far as I know, my best recollection is, was not manufactured with aluminum prior to the merger, although I can't be sure of that.

Q. Do you know whether those four products are manufactured by Rome-Alcoa today?

A. They are manufactured by Rome.

Q. By Rome?

A. Yes.

Q. Can you give me an indication of what your sales or shipments were in the last year when you were employed on a full time basis?

A. No, I can't.

Q. Can you give me a percentage?

A. No. I could only say that compared to the other types [fol. 1283] that you have on here, triplex and weatherproof, it is small.

Mr. Melchior: Oh, I see. No further questions.

Mr. Bergson: No redirect, your Honor.

(Witness excused.)

Mr. Adler: Mr. Hemeter.

LESLIE H. HEMETER, called as a witness on behalf of the defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Adler:

Q. Please state your full name.
A. Leslie H. Hemeter.
Q. What is your position?
A. At the present time I am retired.
Q. And when did you retire?
A. November 1st, 1960.
Q. And what was your position prior to your retirement?
A. After the Rome Cable-Alcoa merger I was assistant vice president and general salesmanager and prior to that time I was assistant product manager for a number of years.
[fol. 1284] Q. And your employer prior to the acquisition?
A. Aluminum Company of America.
Q. Aluminum Company of America?
A. That's right.
Q. During the period prior to the acquisition of Rome Cable when you were employed by Alcoa, what were your responsibilities?
A. For how long a period of time do you refer?
Q. Well, let's take the period from 1957 until the acquisition in 1959.
A. From 1957 on I was in charge of field service for overhead transmission, distribution lines for sub-stations in the 48 states and Alaska.
Q. And what did you——
A. In addition to that, because I had construction men scattered around over the country, I took on some additional work, some of which was to keep up with the competitive situation that we were experiencing all over the country.
Q. In the sale of what products?
A. In the sale of cable, both bare and covered.
Q. In connection with that latter duty or responsibility,

did you undertake a systematic program for determining the competitive situation?

[fol. 1285] A. We had some forms that we had our salesmen to fill in on every prospective job that they knew of that was coming up. They would fill out half the form when they learned of it; they would finish the form when the job was completed.

Q. What were these forms you refer to?

A. They were what we call potential business reports. They gave the name of the company, the size of the cable involved and the amount of aluminum weight that was in the job. The name of the line if that was known. In some cases it might give the year's requirement for a particular company or contractor.

Q. Would that information that you just described be in the top half of the form?

A. That's right.

Q. Now, I believe you testified that there was a bottom half of the form that would be returned when the business——

A. When the job was completed that would be filled out. It would tell whether we got the business, whether someone else got it, what the price was if it could be determined, and as I say, who got the job if that could be [fol. 1286] determined. Sometimes it took a matter of time to find that out.

Q. How did the salesmen know the identify of the competitors who got the business?

A. Well, there is a number of different ways. On governmental jobs, for example such as TVA and Bonneville and so on, there are sales bids opened publicly and read, so that would be public information. With private utilities and contractors sometimes the salesmen would be on very friendly terms with them and they would give them the information as to who the order was given to. If they were not given that, if they knew the conductor was to be used on a given line they would later on go out when the line was being built, if it was one of my field service men, and observe the cable reels that were being used to pull the cable off and build the line with, and those reels would have the name of the manufacturer on.

Q. Would you say it was part of the salesman's job to learn which competitors were getting the business?

A. Absolutely. That was a part of it, because I wanted to know what our competition was.

Q. How complete was the coverage or potential [fol. 1287] business report program in terms of the amounts of total business involved?

A. That is somewhat of a hard question to answer, but I would say probably better than 75 percent at least, because there were oftentime jobs—now I don't know who supplies power to this City of Utica, but whoever the power company is may give an order out to a company for cable without ever calling for bids. They might figure they had a good price from some salesman and they would place the order without ever sending out an inquiry. Our salesman might never know of that job. So of course he wouldn't enter it on his report.

We had one or two salesmen who unfortunately were not as much on the ball as they should, and they didn't give in as complete reports as they should have. But by and large they did a very complete job, as best they could find out, on all the business that was being placed.

Q. And this covered a large part of the prospective cable business, so far as Alcoa was concerned?

A. I would say 75 percent or more, and I might say that [fol. 1288] on some of these prospective business forms salesmen would list, they would make out separate reports for lines that might be going up maybe four or five years away, and we would have those so that we would know when they were going up.

Q. Did you use the potential business reports in conducting your sales program?

A. We used these potential business reports to keep a very accurate record of all the business that was placed with the competitors and if we knew who got the business it was listed on that competitors' name. In some cases where we were unable to find out who got the business, we had a list of what we called "unknown competitors", giving the competitive business report number and the date and the price.

Q. Excuse me, did you use the information as to competitive prices in your business?

A. That was one of the important points in that connection. If we found that we could tell whether our competitors were going out and cutting prices and if a job was going up we knew something about what we had to price in order to meet the competition.

Mr. Adler: Will you mark this.

[fol. 1289] OFFERS IN EVIDENCE

(List of jobs, et cetera marked as Defendant's Exhibit AR-29 for identification.)

Q. I show you defendant's Exhibit AR-29 for identification and ask you to tell the Court what that is.

A. Well, the first one on the page happens to be——

Q. Excuse me, would you just tell the Court what the entire document is.

A. Well, it lists the particular jobs that were lost, gives the customer, the date of the final report, the potential business report number, the amount below schedule that it was sold at, the conductor size and the pounds of aluminum.

Q. Was this based on the potential business report?

A. That is correct.

Q. About which you testified earlier?

A. That is correct.

The Court: What time period does it cover?

Q. What time period does this cover?

A. That began in 1957. I am not absolutely positive, [fol. 1290] but I think there are reports that go back to April of 1957, because we sent out a letter about the 12th of April, 1957, requesting the salesmen to send this information in.

Q. In other words, the potential business report program started in April?

A. That is correct.

Q. Of 1957?

A. That is correct.

The Court: How long did it continue?

Q. How long did it continue?

A. To my own personal knowledge, it was going when I quit the company, the 1st of November, 1960.

[fol. 1291] The Court: Does this exhibit take up from 1957 to 1960?

The Witness: Yes, sir.

Q. Now, Mr. Hemeter, could you describe your procedure in preparing this particular—first of all, was this prepared by you or under your supervision?

A. The majority of it I did myself. Some of it was prepared under my supervision, and since these reports came in they were put on the list because we considered them very important and my immediate supervisor, who was production manager, was extremely anxious to keep up with the competitive price situation all over the country.

Q. This summary, I believe you testified, and I want this straight—takes the information from the bottom half of the potential business report?

A. That's correct. In other words, the completed part of the report.

Q. Yes. And it is listed here according to the competitor to whom the business was lost?

A. That's correct.

Q. What was your purpose in preparing this summary?

A. Well, back in 1957 we ran into a great deal of competition when prices were being cut all over the country, [fol. 1292] and in order to give us an idea of the business that was in the offing, and what we had to quote in order to get our share of it.

Q. Excuse me. My question was, why did you prepare this summary listing business loss under various named competitors?

A. Well, we wanted to know how much each competitor got.

Q. Do you consider this a reliable guide, who your major competitors were?

A. It was the most reliable information we were able to obtain.

Mr. Adler: I offer Defendants' Exhibit AR-29 in evidence.

Mr. Melchior: We object to the introduction of this document on the ground that it is hearsay twice removed, and the witness has testified it is only about 75 per cent correct. The witness testified he only prepared part of it himself.

And the general unreliability of the figures contained therein.

The Court: Well, are there foundation documents available?

Mr. Adler: Yes, your Honor, they were made available to the plaintiff.

[fol. 1293] The Court: If the foundation documents are available, I think it is admissible.

Mr. Melchior: I don't think they have been tabulated or are included in here. We have been supplied with a number of documents in addition to the business reports.

The Court: That is my question. If they are available to you so you can check them as against the accuracy of the chart. All this is a summary of these foundation documents, as I understand it. Instead of my going through that, which would be quite a job, he has done it.

Mr. Adler: That's right, your Honor.

Mr. Melchior: I am not sure that the summary indicates clearly which of the foundation documents have been summarized.

Mr. Adler: It shows on the document the potential business report number so and so, and so on, listing the number.

Mr. Melchior: The objection was made, your Honor, to the—your Honor, the problem here is that the defendants are attempting to base a tabulation on this, and this is based on even more remote material. In order to know what [fol. 1294] this problem is, we would have to look at Defendant's pre-trial Exhibit D-19, which I don't believe has been given an AR number as yet, and at the bottom of D-19 there is indicated "Source of data," and it says, "Summary of Alcoa's lost business reports and Rome's sales orders." This is headed up merely business lost to them. It mentions the name of the company and as it goes through business lost to certain other companies. There is no way of knowing precisely which of the raw material has been tabulated here. As a matter of fact, the Government attempted to tabulate it and was unable to do it.

The Court: Doesn't that go to its weight rather than its admissibility? After all, it is a report like Fosdick's 12 or 15 pages, it's simply a summarization of some foundation documents, and that's all this is.

Mr. Adler: Your Honor, we submit further that is simply a business record. Mr. Hemeter has testified that as these reports came in, he took the information from them and put it right on here. This in itself is the business [fol. 1295] record admissible under the Business Records Act.

The Court: Well, it may be, and especially if the foundation documents are available. If they are not, you should make them available to the Government.

Mr. Bergson: They are available.

The Court: And have they been available?

Mr. Bergson: Yes, your Honor.

The Court: Well, I think it is admissible. I will receive it.

By Mr. Adler:

Q. Now, referring to Defense Exhibit AR-29, was there a section of that report or summary captioned "Business Lost to Rome Cable"?

A. We have one section that was lost to Rome Cable. Here it is.

Q. Would you read to the Court the items of business lost to Rome during the period beginning April, 1957?

A. On February 24, 1958, we received a final report on Lawns Electrical Co-op, Incorporated; light and power company potential business report 1803. Cable was sold at 1.68 cents below schedule. Conductor was No. 2 ACSR stranded. [fol. 1296] It was 17,400 pounds of aluminum. On January 9, 1959, we lost a job to Fort Wayne Municipal Light and Power Company, potential business report 6279, it was $3.45 per thousand feet below schedule. And it was a covered conductor wire. It was 5,055 pounds.

Q. What was the total number of pounds there?

A. Total number of pounds would be 22,455 pounds. That is all the records we have of lost business to Rome.

Q. Do you recall ever computing the total poundage of aluminum reported lost?

A. I did at various times, but I did not before I left the company and in fact I didn't the last year I was there, so that I wouldn't be able to answer that. But there were probably altogether here, at a rough guess I would say

probably between seventy and eighty million pounds in this period 1954 to 1960.

Q. To which you testified 22,000, was it——

A. Oh, no. I was——

Q. Lost to Rome?

A. Seventy million altogether in that length of time, and I may be low on that.

[fol. 1297] The Court: A little over 22,000 lost to Rome.

The Witness: That's right.

Mr. Adler: Out of seventy plus million.

By Mr. Adler:

Q. When your salesmen were unsure as to the identity of the competitor who got the business how did you handle that for the purpose of this tabulation?

A. They said so, and that they would try to get the information later, and oftentimes it might be a couple months later they would come back and tell who got it, because they would be out, and see the reels and conductor being built on that particular line, so they could identify who it was sold by.

Q. If you were in doubt as to the identity——

A. We put in "unknown."

Q. That is the category in this document?

A. Yes.

Q. I refer you to GX-353. If you would read this paragraph, beginning here——

A. Oh, yes. I might explain to the Court that one of the things I did while I was in the company, I put out monthly an electrical conductor division newsletter which went out to all the salesmen and field men so they would have an idea [fol. 1298] what was going on. This part you want me to read is as follows:

"Competition, like death and taxes, cannot be avoided. But throughout the years it does change. Before World War II our conductor competition was with copper, whereas today it is with other manufacturers of aluminum. The sale of transmission line years ago, our peddlers—and we had some good ones—often were faced with lower competitor's prices than the price for equivalent ACSR. As a result they

had to show that the cost of the completed line would be less with ACSR than with copper."

Q. In making that statement, Mr. Hemeter, were you referring to bare or——

A. Bare conductor in that case.

Q. Were you referring to covered?

A. We had no covered in those days. That was all bare conductor.

Q. When you started to sell the covered, which the testimony has been were all made for you originally on a toll basis and you started selling conductor, would that statement have held true, that is, that your competition was with the aluminum companies?

A. It was both with aluminum and copper. In the be-
[fol. 1298a] ginning some of the companies still wanted to use copper for covered conductor. They were afraid of aluminum because there was a problem, they thought, but due to the price differential between copper and aluminum it was not long before most of them began to switch over to covered aiuminum conductor.

Q. It was being sold by——

[fol. 1299] A. Other aluminum manufacturers, as well as Alcoa, of course.

Q. No further questions.

Cross-examination.

By Mr. Melchior:

Q. Mr. Hemeter, is this the report you prepared over the period from sometime in April of 1957 until the time you left the company?

A. That's correct.

Q. Was this the final form of your report?

A. I notice here these are mixed up. As I kept them, I kept the different companies together, separated. Now these, I notice, are mixed up.

Q. It is not the way you prepared it, in other words?

A. Well, somebody just gathered it all together.

Q. Can you tell whether it is complete?

A. Well, I can tell that it goes up to—I can tell by looking at these reports—here is April, 1960, one of them. When I left in 1960, of course, I did not keep these reports,

and I haven't seen them since. They did go up into 1960 with these.

Q. I'm looking at the——

A. I think there were some, perhaps, later than as shown [fol. 1300] here, because the latest I notice here are April in 1960.

Q. I am looking at the business loss to Essex. I see that goes up to 1958.

A. Lost to who?

Q. Essex.

A. Essex pretty well folded up as far as competition is concerned.

Q. What do you mean by that?

A. Well, I don't know whether they have gone out of business or not, but we just didn't get any competition from them.

Q. They didn't give you any more competition. I see. How about Peranite? Is that complete?

A. Well, the latest one I have is February, 1960. It was never one of the major competitors. The major competitors were Kaiser, Reynolds, and Anaconda. Southern Electric used to be a big one until they sold out to Olin Mathieson. Then they were not so big. Southwire was a fairly big competitor.

Q. Do you have any way of knowing whether records of all your competitors are here? Would there be any way for you to tell? Since this report has been changed around, I [fol. 1301] am wondering whether it is complete now. I wonder if you can tell.

A. Well, I could separate this and pick them out and I could tell very well that way.

Q. Do you know how many competitors you had? How many did you tabulate? How many different companies?

A. Well, we had Kaiser, Reynolds, Anaconda, were the integrated companies. We had Southern Electric and Southwire. We had Central Wire and Cable. We had Nehring Electrical Works. We had Peronites, Essex. And we had Texas. I can't think of that name now. We had a Texas concern that went for a very short while and it went broke. Went out of business. Texas Wire and Cable.

Q. Did you notice there were a smaller number of competitors when you completed your employment than when

you started making this tabulation in 1957? Were there a a smaller number of competitors that you had to tabulate?

A. We were not running into much competition from Essex at that time. What had happened to them, I don't know.

Q. I don't believe you answered my question. You started tabulating this in 1957, let's say there were so many com- [fol. 1302] panies who were your competitors then, and you were tabulating them in 1957.

A. Texas Wire and Cable went out of business, as I mentioned. Essex pretty well folded up, as far as competition. Except for those two, I don't think of any others that dropped out.

Q. Now, did you just tabulate the business you lost to aluminum competitors? I notice your last column is "pounds of aluminum." Does that mean when you lost the sale, your successful competitor sold them aluminum?

A. In these cases the competitor sold aluminum.

Q. You know that?

A. Oh, yes, because that's what this is. We were primarily selling aluminum, and that's what we were keeping a record of.

Q. But you did keep this record up in 1959, and the year 1960?

A. That's right.

Q. Were you selling copper then, weren't you?

A. We were not.

Q. You mean Alcoa was not?

A. Alcoa, as a copper—we might have sold a very small amount of triplex, where they had a copper neutral, but that was so minor it just didn't amount to anything, and [fol. 1303] we would not have kept a record of the copper in that case. We would have kept only of the aluminum.

Q. You didn't tabulate all the sales that Rome lost, then, after the merger?

A. Oh, no, we didn't tabulate Rome at all.

Q. I see. Well, now, I am looking at first one—the group as it was given to us. Your first was business lost to Anaconda. Do you have that on top?

A. Yes.

Q. I notice there it says, "Date of final report." Now, what does that mean—"final report"?

A. Let's take the first one there. The date of final report June 4, 1957, Iowa Power and Light. The initial report, when they learned of that business, might have been in January of that year, and they would send in that Iowa Power and Light was in the market for some conductor, so many pounds. When that order was placed, they would complete the report and send it in and that would show whether we got the business or whether it went to somebody else.

Q. In other words, this first sale you lost to Iowa Power and Light, the final report was dated 6/4/57?

[fol. 1304] A. That's right.

Q. You may have gotten an earlier report on that sale?

A. The first half of that potential business report may have been dated several months before. On the other hand, the salesman may have only learned of that at that time, and completed the entire report at one time. But the purpose of the report was to tell what business was in the offing, so they could be watching for it. Occasionally they didn't know of it until the business had been placed, and they might have completed the whole report at one time.

Q. When did you make that entry on this list—that 6/4/57 entry—when did you make that?

A. Well, it would have been only a few days after. Just as soon as I got the report mailed to me at Pittsburgh I put it down.

Q. It would have been some time shortly after 6/4/57?

A. Oh, yes, sure. It would have been just a few——three or four day afterwards.

Q. It would have been in this particular form?

A. On that list ever since.

Q. I notice the next one is Connecticut Light and Power and that is dated 4/26/57. When did you enter that one?

[fol. 1305] A. I entered it after I entered the one of Iowa Power and Light, because sometimes the salesmen were late getting those reports in. He might have held that report up to find out who got the job. Sometimes they would hold the report up a month or two before they sent it in, trying to find out who got the job.

Q. What date would they put on their report?

A. They would put the date the job was let. This 4/26/57 would have been the time the job was placed.

Q. Well, it says, "Date of final report."

A. All right.

Q. But actually that is not what it is. It is the date the contract is let.

A. The date of the final report is the date I gave on that last half of it, and the last half of it might have shown, and sometimes would show, the date when the order was actually placed.

Q. Where would the date appear on his report?

A. It would appear on the bottom half of it. Now, if it was all completed at the same time, he would show the date on the top and the bottom.

Q. In other words, when you would get a potential business report, sometimes you would have two dates on it—a [fol. 1306] date at the top and a date at the bottom.

A. That's correct.

Q. What would the date at the top be?

A. That was when they first learned of the job coming up. We had potential business reports dated, we will say, in 1958, which showed jobs that wouldn't be coming up, maybe, until 1963 or 1964.

Q. And the second date was the date when the contract was let?

A. When the business was awarded.

Q. That's the date you entered on this list?

A. That's the date I entered on that.

Q. This list you made up as the reports came in was sort of a ledger entry, was that it? As each one came in you just added it?

A. As it came in.

Q. You didn't make up this list all at one time, then?

A. Oh, no, no.

Q. What did you do with this report? Was this report ever reduced to writing in any way? Did you pass it on to any of your superiors? How did you use it?

A. It was typed off. We had typewritten lists of this and gave them to my superior from time to time, about twice a year. He would want a typewritten list.

[fol. 1307] Q. What sort of report did you make twice a year?

A. Simply copied this off.

Q. Give it to him in that form?

A. Give it to him in that form.

Q. Didn't make any comments on this report, or draw any conclusions.

A. No. There were none necessary, because that showed what we had lost.

Q. The document speaks for itself.

A. That's right.

Q. Now, did you, in turn, tabulate any of the business that you were successful in getting from other companies?

A. Yes. I did that. Monthly.

Q. Monthly?

A. And my boss got that report. I did not send—I sent out a letter monthly giving general information, but I only listed on that the orders of 100,000 pounds or more. I did not list the smaller ones. But that list was there for the boss to see.

Q. I see. Was this of any particular size order or all orders that were lost?

A. This was all orders, big and little. If you will notice there, you will see some that are quite small. Some of them [fol. 1308] quite big. 5,000 pounds; 7,000 pounds; here is one for 374 pounds. So I listed them all.

Q. All that you got information from?

A. That's right. Well, I listed all the reports that came in.

Q. You had no way of knowing whether the report was accurate. You had to rely on the reporting salesman?

A. Yes, certainly. But on the whole, we had a very excellent group of salesmen.

Q. Now, I believe you said you began preparing this tabulation on these ledger entries around April 12, 1957?

A. The letter requesting these to be sent in was written and sent out under my boss' signature—I wrote the letter—draft of it—and then sent it out under his signature; and it was dated either the 12th or the 20th, I think the 12th of April, 1957. Naturally there was a little delay before they began coming in.

Q. Do you recall what this letter stated?

A. Yes, I can tell you briefly what it was. Competition was extremely rough, and in order for us to get our share of the business we had to know what our competitors were [fol. 1308a] doing, and what prices they well selling cable

at. And we—this potential report, such as we were asking for, was a trial horse, more or less. We were trying it out in our department to see how it would work. The management had approved it, and requested everyone to comply with the information requested, and send it in.

[fol. 1309] Q. Do you know whether there was any particular incident or set of circumstances which prompted management to send out this letter?

A. We have been losing quite a bit of business to competitors at lower prices than scheduled and the only way that we could get our share of it was to know what our competitors were quoting. And by taking such a record as this we could find out something about what prices they were quoting and be able to meet them.

Q. Are you or were you familiar with other reports used by Alcoa such as business change reports? Did you ever hear of that? Business change report?

A. I didn't see any of those. There were some lost business reports at one time, I believe, but I never got those.

Q. "Lost business reports"?

A. Lost business reports. But I didn't get those. And it was because of the so-called lost business report which didn't prove out very satisfactory that my superior decided that this type of information was required and asked me to write or prepare a draft of a letter to the salesmen asking [fol. 1310] for this information, and that is what I did.

Q. Do you know what the difference between the lost business report was and the report which you had prepared which I believe you called the potential business report, is that right?

A. That's right.

Q. What was the difference?

A. The lost business report gave nothing more than information that they had lost a job to somebody. This potential business report told what business that was coming up in the next few months or a few years, and would give us warning so that if anything happened to that salesman and he was transferred and another one went out there, he would have the information to follow up on that job.

Q. These two reports did not duplicate each other then?

A. No, sir.

Q. You were not in charge of the lost business report?

A. No, sir.

Q. Do you know who was?

A. They went I believe to my superior.

Q. Will you identify him?

[fol. 1311] A. Mr. P. T. Coffin.

Q. P. T. Coffin.

A. But I do know that not a great many of them were sent in because the salesmen hated to report business that they had lost, and they didn't.

Q. The salesmen hated to report business that they lost?

A. Naturally they would.

Q. And these lost business reports didn't work out too well?

A. They didn't work out too well. They didn't give us the information we needed, so we wanted all those which were more complete.

Q. Were these the same salesmen who made these reports?

A. They were the same salesmen who made these reports, and they did an excellent job.

Q. They did an excellent job on yours, but not on the others?

A. They quit the lost business reports 100 percent and they went to these.

The Court: Take a short recess.

The Clerk: Court is in recess.

(At this point a recess was taken after which the trial [fol. 1312] was resumed.)

By Mr. Melchior:

Q. Mr. Hemeter, are you familiar with the new business report entitled New Business Report?

A. I have never seen it.

Q. And I asked you about business change reports but I don't believe I got an answer:

A. I am not familiar with that either.

Q. You are not familiar with it?

A. That is evidently used by a different division in our company.

Q. I see.

A. I beg your pardon, when I say "our company," it is because I am no longer part of it.

The Court: Well, it is all right, call it yours.

The Witness: Thirty-four years and eight and a half months, and it is hard to get out of the practice.

Mr. Melchior: You may examine.

Mr. Adler: Would you mark this for identification.

(Summary marked as Defendant's Exhibit 29-A for identification.)

[fol. 1313] Mr. Melchior: Your Honor, we have not been supplied with a copy of this. This accounts for the delay.

Mr. Bergson: We had not intended to offer it, your Honor, except for the cross-examination.

Redirect examination.

By Mr. Adler:

Q. Mr. Hemeter, I show you Defendant's Exhibit AR-29-A for identification and ask you to tell the Court what that is.

A. Well, it is just a summary that I prepared for my boss in November 25, 1959, which gave a summary of the pounds of aluminum we had lost to our various competitors since April, 1957, and lists all the different companies that we lost to.

Q. I notice on it there has been a handwritten change of dates from 1959 to 1957.

A. Well, that was the secretary's mistake, because she was dating this November 25, 1959, and she gave it the lost business report, which was dated as 1959. That is incorrect. It should be 1957, which is what I put on it.

[fol. 1314] Q. Was this the type of typed report which you testified on your cross-examination that you would prepare from this handwritten document?

A. That's right. Periodically.

Offers in Evidence

Mr. Adler: I offer in evidence Defendant's Exhibit AR-29-A for identification.

Mr. Melchior: We object to that, your Honor, on the same basis that we objected to the raw material upon which it is

based, and with the additional reason that there is an error shown on the face of the document.

The Court: All that this is is an addition, I suppose, of the figures contained in the last exhibit up to a certain date.

Mr. Adler: Yes, your Honor.

The Court: So that all it is is a matter of convenience.

Mr. Adler: Yes.

The Court: Overruled.

The Witness: That happens to be my own handwriting, the 1957.

The Court: Yes. That is what Mr. Melchior I think means [fol. 1315] by an error on the face of it.

The Witness: That's right.

The Court: Overruled. I will receive it.

(Defendant's Exhibit 29 for identification received in evidence.)

Mr. Adler: No further questions. We would like to withdraw that and have copies made for everybody.

The Court: Well, in a quick glance at this Exhibit 29-A, your greatest loss to competitors was really to integrated companies, wasn't it?

The Witness: That is correct.

The Court: So you had competition from integrated companies as well as independents?

The Witness: Oh, yes.

The Court: All right.

The Witness: And I might add just one thing for clarification, that this potential, when these potential business reports came in, the initial part of them, they would fill in [fol. 1316] when the cable order would be placed. It might be immediately, it might be three months, six months, a year, whatever it happened to be. I kept them in an accurate file and every couple of weeks I would go through this and if the time, says the three months or whatever it was, I would write to that salesman and find out what had happened. It might be that the time had been extended for another six months and I corrected it. But I followed that up all the time to see that these were up to date.

Mr. Adler: That was a plan you had followed on the lost business?

The Witness: I had not followed the lost-business. On

this I did. The lost business didn't tell anything except that it is gone. This potential business report told when it was time to be placed and if that time had passed and the report had not been sent in, then I could write and find out what was holding it up.

Mr. Adler: All right. Thank you. I have no further [fol. 1317] questions.

Mr. Melchior: No further questions.

(Witness excused.)

Mr. Bergson: Mr. Ellis.

CHARLES H. ELLIS, called as a witness on behalf of the defendants, being first duly sworn, testified as follows:

Direct Examination.

By Mr. Bergson:

Q. Mr. Ellis, will you please state your name and address?

A. Charles H. Ellis, Williams Road, Mounted Route, Rome, New York.

Q. By whom are you employed?

A. Rome Cable division of Alcoa.

Q. In what capacity?

A. Vice president in industrial relations.

Q. How long have you been employed by Rome Cable Division of Alcoa or by its predecessor company, the Rome Cable Corporation?

A. Since April of 1936.

Q. Now, what positions have you held in Rome Cable Company?

[fol. 1318] A. I was in charge of rubber wires and magnet wire for the first eight months, from April to around November; then I was made production manager of all the operations. The plant was new at that time.

Q. And you had, you were in charge of production at Rome Cable Company from this period until when?

A. Continuously until January 1st, 1961.

Q. And were you an officer of the Rome Cable Corporation?

A. I was.

Q. Were you a director?

A. I was a director.

Q. Now, when Rome Cable first went into the wire and cable business, so far as you know what metal did it use as a conductor metal?

A. Copper.

Q. And when did it begin using aluminum as a conductor metal?

A. I am not sure of the exact date. I believe it was around 1950 or '51.

Q. Was that during the Korean war period?

A. Yes.

[fol. 1319] Q. Now, prior to the 1951 date did Rome manufacture insulated line wire and service drop cables?

A. Prior to when?

Q. Prior to 1951.

A. Yes.

Q. With what type of insulation?

A. Both neoprene and polyethelene.

Q. And did you make a product known as triplex?

A. Yes.

Q. And with what type of conductor metal did you make that product?

A. Copper.

Q. When did you—when did Rome begin insulating copper line wire and triplex?

A. 1948 and 1949.

Q. Now, that was true for both line wire and triplex or just triplex?

A. The records indicate the line wire was 1948 in the neoprene type and polyethelene; and multiplex service drops type was in 1949 in neoprene and polyethelene multiplex. So in 1949 or between 1948 and '49 we were making both of them.

Q. This was before you went into aluminum?

[fol. 1320] A. That's right.

Q. Now, you said you began using aluminum in 1950 or '51.

A. Either '50 or '51.

Q. What products did you make with aluminum when you began to use aluminum as a conductor?

A. I can't tell all the products. I think we did make a line wire of the multiplex type.

Q. Now, when you began manufacturing line wire and multiplex cable with aluminum as a conductor, what new equipment, if any, did Rome acquire?

A. When we first started we acquired no new equipment.

Q. You made a product on the same equipment that you were making copper on?

A. That is for the operations that we used, yes.

Q. When you first went into the production of aluminum line wire and triplex, did you draw and strand your own wire?

A. I know we didn't draw our own wire. I am not sure. We may have bought some individual wires and stranded some.

Q. Then at a subsequent date you began drawing your own wire?

[fol. 1321] A. That's right.

Q. How soon after you began insulating the wire did you begin, I mean drawing it?

A. It was over a year. It was the early part of 1953 when we started drawing the wire?

Q. When you began to draw aluminum wire did you buy any new equipment?

A. No.

Q. What did you do?

A. We took an old rod drawing machine and just changed the dips.

Q. An older copper machine?

A. That's right, an old copper machine.

Q. And changed the dip. Now, how much of an investment was involved for Rome Cable, if you know, to get into the business of drawing, stranding and insulating aluminum wire or cable?

A. Originally?

Q. Originally, yes.

A. It was very little. It was less than $5,000.

Q. Now, during the period that you began drawing and stranding aluminum, did you give consideration to making your own rod?

[fol. 1322] A. Yes, we did.

Q. Out of aluminum. And when did you start drawing your own, making your own aluminum rod?

A. We started experimenting on it, we had our first installation I believe in 1953 for making the rod. It was very close to a year before we were able to make a completely satisfactory EC rod for redraw.

Q. So from the period from 1951 until late 1953 or 1954 you purchased EC redraw rod and drew, stranded and insulated it; is that correct?

A. That is correct.

Q. Now, when did Rome decide to manufacture a product known as ACSR?

A. You say decided to?

Q. Let's put it this way. When did Rome begin the manufacture of a product known as ACSR?

A. I couldn't give you the exact dates on that because I don't know. That had to do with the dates on which we first purchased the steel that would make ACSR and that I would presume was very close to the time when me made any of the aluminum strand.

Q. All right. At the time you began to make ACSR, what [fol. 1323] size of ACSR did you make?

A. We made the smaller sizes that complimented the types of wires we were making the insulation on.

Q. This would be size 4/0 and smaller?

A. Definitely.

Q. Did you at that time give any consideration to whether or not you would manufacture the larger size of ACSR?

A. Yes. I think it was discussed that, what it would take to produce larger sizes.

Q. What was discussed?

A. Well, we were required several times to give estimated lists of equipment that would produce, I will say, limited production in the range of sizes required for the larger than 4/0.

Q. And what was the conclusion that was reached?

A. We finally decided not to do it.

Q. And what was the last time that the question of whether or not Rome should go into the larger size of ACSR —strike that. I lost myself on that. Strike the whole question.

Did there come a time when Rome no longer considered

the question of whether or not it should go into the larger [fol. 1324] sizes of ACSR?

A. To my knowledge there was a time when we dropped it from consideration and it did not come up again.

Q. And that was when?

A. That was in 1956.

Q. Now, what were the problems, if any, that Rome faced in the manufacture of the larger sizes of ACSR?

A. Well, from the manufacturing standpoint it called for additional equipment, especially in stranding. We had stranding equipment, but in the larger sizes it was not of the type necessary for the production of ACSR. It was used for the more flexible, for the more softer type of copper wire. So we were faced with installing very high priced stranding equipment. Basically outside of the stranding, and we were willing to try more than this, which would be the things we had to have.

Q. From the manufacturing standpoint?

A. That's right.

Q. How about testing equipment?

A. We had no testing equipment for evaluation of long line transmission type of ACSR.

[fol. 1325] Q. And you would have needed that?

A. We would have needed it.

Q. And how about engineering skills for the larger sizes of ACSR?

A. I can remember discussions in executive committee and the statements of the vice president in engineering and sales—I would have to admit that my knowledge of what was required, and I can't corroborate that, I found it was necessary to have a skilled engineering group not only for the sale and service of the wire but the design of the systems and all the other factors that went with the ACSR equipment.

Q. Now, you testified that when you originally went into the manufacture of wire and cable with aluminum as a conductor, you used equipment that had been formerly used for drawing and stranding and insulating copper.

A. Copper.

Q. Now, is the machinery that you have in the plant today capable of being used for drawing copper as well as aluminum?

A. Yes.

Q. And stranding copper as well as aluminum?

[fol. 1326] A. Yes.

Q. And insulating copper——

A. Yes.

Q. —as well as aluminum?

A. Yes.

Q. And if you draw copper on a particular machine and you subsequently want to draw aluminum on it, what steps are necessary in order to make the change?

A. Just provide means to supply a different lubricant.

Q. And you clean up the contamination that existed before?

A. Yes.

Q. And this is true with drawing and stranding?

A. To a lesser degree in stranding. Sometimes you have to clean them up.

Q. Is there any problem of cleaning up or change of lubricant in insulating?

A. No, there is no problem. It takes a little time.

Q. Now, when you change from copper to aluminum or aluminum to copper on your insulating equipment, does that take any time?

[fol. 1327] A. Hardly. With the machine you don't know the difference.

Q. Now, when you first made copper triplex, what equipment did you use to twist the various elements of the triplex?

A. We had some old combination twisters we used for a variety of purposes. I believe it was New England Butt Twisters.

Q. Now, are New England Butt Twisters common items of equipment in a wire and cable company?

A. Yes. Older wire and cable companies we find have several of those machines.

Q. Now, if a company had equipment to manufacture line wires and triplex, both polyethelene and neoprene, and it had twisting equipment, would it need any other equipment to make the more sophisticated and complicated products that Rome Cable Company makes?

A. Yes.

Q. You heard Mr. Schatzel testify on that. Would you generally agree with his testimony as to what was necessary?

A. I would agree fully, and that you would need additional bare wire equipment also, in that you would require in coat-
[fol. 1328] ings and other types and similar conductors than would be normally used, so there would be in addition to what he stated on the insulated type, you would need more than the bare wire.

Q. Now, if a company on the other hand had the ability to make, say, and the equipment to make building wire, would it be able to make line wire and triplex?

A. If it had a full line of building wire it would have the equipment to make this too.

Q. Now, you have heard the testimony about the tolling arrangement between Alcoa and Rome. And I think the record will show, I know the documents in evidence show this, that sometime toward the end of 1956 Alcoa had been producing its own polyethelene line wire and triplex which Rome had previously been tolling for it. Is that correct?

A. I believe I agree with that.

Q. Now, when Alcoa took its polyethelene covering business away from Rome, to what use did Rome put the equipment that had been used for covering Alcoa's polyethelene line wire and triplex?

A. I am not sure exactly what the business conditions
[fol. 1329] were, but there are two essential pieces of equipment involved as far as the insulating. One is a plastic extruder and the other was in this case a high speed twisting unit. The plastic extruders could produce both individual wires and base for multiple wires and building wires. It could produce a base. By base I mean single insulated wires which could have multiplex. It could produce the base for signal and control cables of the plastic type and it could produce a base for any variable type of plastic item that was in this list that was shown.

Q. Were those machines put to other use after Alcoa stopped ordering this line wire made of polyethelene and triplex polyethelene?

A. Yes, they were used.

Q. And do you recall what they were used for?

A. Well, the line wire machines I believe weren't, a certain amount were distributed from building wires and we had very little use for the Edwards machine for the amount that was on there. However, the machines could be con-

verted for other products where there had been created an increase in the company.

[fol. 1330] Q. Now, Mr. Ellis, I show you Government's Exhibit No. 60, GX-60, which is a memorandum from Mr. Fraser to you dated October 2, 1951, entitled "Aluminum project," and I ask you to read the first paragraph of that memorandum or letter.

A. "The estimated cost for capital items under the project of casting, rolling and drawing aluminum is $283,530.00. This is made up of the items in the attached list. There may be a few expense items such as lighting and ventilating changes, but they will be of a minor character."

The second paragraph?

Q. Yes.

A. "The main items of equipment are the Ajax melting and pouring furnace with a capacity of 2000 lbs. per hour; the Properzi casting wheel and rolls; a 10-die Vaughn drawing machine. This machine is recommended in spite of the fact that the total cost of the project including it is $9,589 more than a similar list including a drawing machine of the Southern Electrical type."

Q. Now, when you went into the business of drawing, stranding and covering aluminum, did you engage in any expenditure of that type?

[fol. 1331] A. Just the drawing and stranding, no.

Q. And the major part of this item is made up of what?

A. Major part is the Properzi, the so-called casting and rolling to produce the rod.

Q. To produce the rod. How much was that?

A. Of this unit?

Q. Of this 380—this $283,000.

A. This particular unit, the actual equipment for producing the aluminum rod was estimated at $125,000.

Q. Of the 283?

A. Yes.

Q. Now, is there an item in there for a Vaughn machine?

A. There is a drawing machine. That was $65,000 on the one item and another item of $70,000 with the dip system, $5,000 additional.

Mr. Mahaffie: May I ask, is the witness referring still to Exhibit 60?

Mr. Bergson: Yes, and the attachments thereto.

Q. Was that piece of equipment to be used for the drawing of aluminum or copper?

[fol. 1331a] A. In this first estimate?

Q. Yes.

A. At this particular time we laid it out for aluminum.

[fol. 1332] Q. At a subsequent time, before you purchased this, was there an item of equipment identical with that that was for copper?

A. Yes.

Q. I also invite your attention to Government Exhibit GX-68, which is entitled "Aluminum meeting held January 4, 1952," and ask you to look at the second paragraph of that document which refers to "E.R. Changes." What does "E.R." mean?

A. Executive request.

Q. For funds?

A. For funds for capital improvement.

Q. For how much?

A. You are speaking about this? 336,000? The furnace had been promised for May, and should be ready by July. Will Properzi equipment be available some time, having been promised in April?

Q. At the time that meeting was held, was Rome Cable already in the business of drawing, stranding, and insulating aluminum?

A. It was stranding and insulating, but not drawing.

Q. And when the Properzi equipment furnished, or when did Rome acquire the Properzi equipment?

[fol. 1333] A. The Properzi equipment included the ajax and everything ready to start to make rods went on our books in January, 1953, and I use that reference, because when the whole unit was assembled, ready to go, is the time the capital is placed on our books for depreciation.

Q. At that time were you able to make E.C. redraw rod of such a grade that you could use it in your aluminum product?

A. We were not.

Q. How long thereafter did it take you to make a suitable grade?

A. My recollection is it took at least a year; approximately a year.

Q. Now, during the time between that memorandum and the period that you were producing suitable E.C. redraw rod, did you commence drawing aluminum yourself?

A. Yes, we did.

Q. From purchased rods?

A. Yes, we did.

Q. Now, is it a fact that on occasions an item of equipment might be approved under an executive request and never purchased?

A. Yes, maybe I could explain that slightly. The develop- [fol. 1334] ment of capital improvement lists for the executive committee would get general approval, but each request must come for a final approval with the executive committee at the time the engineering work is finished and the quotations and equipment are available.

Q. So that at the time an executive request is approved you don't know exactly when the equipment will be installed, or whether it ever will be installed?

A. No, we made numerous changes because changes would occur in the development of parts of the equipment, which was in the case of the Properzi. We visualized that we would produce rods in a consecutive manner. Remember, Properzi had never been used to produce E.C. redraw rod at the time we purchased it. It had been used to produce rod for a wire at Nichols in Davenport, but that was not a conductivity between 61 and 62 per cent.

Q. That was wire for fence wire, things like that?

A. And Mr. Schatzel and myself and several others had to make the assumption that we could develop the characteristics of the rod to produce a satisfactory E.C. rod.

[fol. 1335] Q. So that at the time of the approval of an executive request that was merely an authorization to start the wheels in motion, and maybe we will go through with it.

A. We had the right to go back to the executive committee and make further recommendation of amplification or deletion, based upon the economics as we found it, or the experimentation.

Q. Thank you, Mr. Ellis. You may examine.

Cross-examination.

By Mr. Mahaffie:

Q. Mr. Ellis, would it be fair to say that an E.R. or executive request was in the nature of an appropriation of funds for a purpose?

A. Yes, it's a request. It's an executive request initiated by either department to the executive committee.

Q. What does it mean when an E.R. within the Rome organization has been approved? Does that mean funds in that amount have been approved for a certain use?

A. That's right.

Q. The exependiture has been approved?

[fol. 1336] A. That's right.

Q. So when this document which Mr. Bergson showed you, GX-68 states, $336,000 approved to date on E.Rs. it's fair to say that as of this date $336,000 had been appropriated by the Rome Cable Corporation for this project?

A. If you mean that funds were earmarked and set aside at that time and $336,000, I wouldn't say that that was true. We had the responsibility, in a large project such as this, as the—for instance, as the Properzi unit itself, when we got quotations on something like that. If something came up, looked like there was going to be a difference in that cost, it was our requirement to go back to the executive committee and make continuous reports, and we could be changed in our approach in that both by the executive committee at any time or on mechanical engineering analysis, if we didn't want to go that way and ask for recommendations.

Q. Then funds had not been spent, and the amount could be changed?

A. Correct.

Q. But it was approved?

A. It was approved.

[fol. 1337] Q. I have no further questions.

The Court: (To Mr. Bergson) Do you have anything else?

Mr. Bergson: I have another witness, your Honor.

The Court: I think we better quit.

(Whereupon, at 4:50 p. m., an adjournment was taken to Tuesday, February 20, 1962, at ten o'clock a. m.)

[fols. 1338-1339] [Title omitted]

Transcript of hearing—February 20, 1962

* * * * * * *

[fol. 1340] Mr. Adler: Mr. Xenis.

Are you ready, your Honor?

The Court: Yes.

CONSTANTINE XENIS, called as a witness in behalf of the Defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Adler:

Q. Would you state your name, please?

A. Constantine Xenis.

Q. What is your position?

A. I am division engineer in charge of the Equipment Division and Development.

Q. For whom?

A. Consolidated Edison Company of New York.

Q. Could you describe briefly the nature of the business of Consolidated Edison, the area it services and the number of customers and the like?

A. Well, we have some two million eight hundred thousand electric customers. We are supplying Manhattan, Brooklyn, Queens, Bronx and most of Westchester with electricity and certain areas, certain parts of these areas we [fol. 1341] also supply with gas and some small parts we supply with steam.

Mr. Adler: Your Honor, I will attempt to qualify Mr. Xenis as to both facts and expert witness.

The Court: All right.

Q. What academic degree or degrees do you have, Mr. Xenis?

A. Well, I have a bachelor of science degree in mechanical engineering. I am a professional engineer, licensed by New

York State, and, of course, I have a number of affiliations with associated societies.

Q. Do you have any honorary associations?

A. Well, I am a Fellow of the American Institute of Electrical Engineers and I head a number of committees on several organizations, some of the AIEE, including some in the gas end of the business.

Q. Would you state, please, what the AIEE is?

A. AIEE is the American Institute of Electrical Engineers, which is a professional organization for electrical engineers. It is a national organization.

Q. Do you have any patents?

A. Oh, yes, I have some 30 or 35 patents in my name.

[fol. 1342] Q. And have you published papers or articles?

A. Many of them.

Q. Covering what subjects generally?

A. Well, covering connections, cable connections; covering special transformer designs used in the distribution system; covering protective systems for distribution systems.

Q. This would be in the field of electrical power distribution?

A. Yes, most of them are in that field.

Q. I think that is adequate. I show you, Mr. Xenis, Defendants' Exhibit AR-76 for identification and ask whether that was prepared under your supervision?

A. Yes, it was.

Q. Would you describe for the Court what that document is, please?

A. Well, this was a study, an engineering and economic study which we undertook in order to determine and reach a policy as to whether we should be using aluminum or copper in our cables in a number of electrical distribution applications for our own specific system.

OFFER IN EVIDENCE

Mr. Adler: I offer in evidence Defendants' AR-76 for identification.

[fol. 1343] The Court: When was it made?

Q. Excuse me. When was that study prepared?

A. This study was completed on February 9, 1959.

Mr. Wertheimer: Is this D-325?

Mr. Adler: Yes, it is.

Mr. Wertheimer: We object, your Honor. We object on the grounds of hearsay. Mr. Xenis, from what we can gather only prepared the first three pages of the report. The rest were prepared in different sections by a number of other people. We also questioned the reliability of the report prepared in 1959.

Q. Mr. Xenis, were the engineers who worked on the various chapers or sections of this study under your supervision?

A. They were under my direct supervision, and I assigned the job to them, and, of course, worked along, and got the conclusions, and finally I drew what I believe to be the essence of that report and submitted it as indicated in the first three pages, which will be, you might say, the cream of that report as applying to our practice.

Q. And are the general conclusions reached in this report [fol. 1344] still being followed by your company today?

A. With one exception, where we had to revise our policy, our recommendations, here, in view of certain things that happened, that allowed us to change our mind in one component, which is the service drop that is used by our company. Certain things—

Q. But apart from that, the general analysis is still valid?

A. Still valid and being followed.

The Court: If I understand it right, Mr. Xenis, your study was prepared by several engineers under your supervision.

The Witness: Yes, sir.

The Court: Each one of them, or some of them, prepared partial—their results are contained in some of the pages of that report.

The Witness: Yes, sir.

The Court: Then what you did was to summarize the combined report.

The Witness: Yes.

The Court: And that summary, or conclusions, I think, are contained on the first three pages of the exhibit.

The Witness: Yes.

[fol. 1345] The Court: Overruled. I will receive the exhibit.

Q. Now, we have referred to the fact that there are three component parts of this study. Would you state what they are, please?

A. Well, one part has to do with the use of busses, busses. Large copper conductors used usually in large buildings, or in connection with several large buildings. Now, that is one part. You don't wish me to give——

Q. No.

A. That's one part. No. 2 is overhead distribution, such as is generally shown on overhead lines mounted on poles. Not transmission lines, now, but these overhead distribution lines, which I am sure there must be many of them right around here. That is part 2. And part 3 is the underground in a city of the nature of New York City. Obviously you can't have your cables overhead in these big thoroughfares, tall buildings; everything is underground. And that, again, is controlled by different factors. Therefore, it was treated separately.

Q. Now, referring to the second part, the overhead distribution part, are your analysis and your findings pretty [fol. 1346] well reflected by the series of four tables contained in the report?

A. Yes. Tables 1, 2, 3 and 4.

The Court: Can I keep this, Mr. Adler?

Mr. Adler: Yes, you may, your Honor.

Q. Will you describe for the Court what is shown on Table 1, and for the purpose of this we might confine your comments to one example—the thousand foot extension, which is the third set of lines from the top.

A. Yes. Well, that particular table—again, now, let's concentrate on the overhead distribution system. That, again, had to be broken down into two components, because you have primary wire, you have secondary wire, and you have service drops. Each of these was studied individually, and then the components were put together in a package which represents a typical job, putting the proportionate amounts of each component to give you a reasonable average of a typical job. Now, Table 1 covers the primary wire which is usually—may vary in voltage—it is a higher voltage—1200, 2400, sometimes higher. Now, in that one—you want me to take the third item, which is for a thousand foot

[fol. 1347] extension. You notice we tried it for several lengths, and you are asking me for the thousand foot, and as you proceed from left to right, the upper line is for copper. The lower line is for aluminum. Certain costs apply to one and not to the other, or they may differ. They may apply to both, but in different amounts. So starting with the first one you have "Remove set of four deadends." I don't know that you wish me to go into detail on that. These are procedures of construction with each material. But in the case of copper you have an item there that is $24.30. But there is no corresponding item for aluminum, because of the nature of the design. Then you go to the next item, you notice you have corresponding costs, which is the installation of four tension splices. You have certain elements of labor and material for copper, and considerably different elements for aluminum. Then you take the next set of items, again, labor and material for the installation of primary dead ends. You have to install the wire sag, meaning to give it the proper contour. Then you add all these items together, and you notice for copper it is $385.98; for aluminum it is $625.44.

[fol. 1348] We haven't considered cable costs yet. This is only materials as to connecting devices, mechanical devices for doing the job. May I proceed?

Now, let's add the cost of the cable which is different for copper and aluminum. And we made a study for two kinds of cable, one where the cable has no insulation, the other where the cable has some insulation of the type that we use. Because while we were making this study there are changes in procedure. Some people prefer insulated wire, some uninsulated, and so we made a study for both. So when you add the cost for the cable and you look at the totals on the right-hand side——

Q. Excuse me, what were the difference in the cost of the cable itself on this example?

A. Well, on the bare cable, whether copper or aluminum, you notice copper was seven hundred and forty-nine dollars and some cents and aluminum was three hundred and seventy-one dollars. In other words, the cable cost was much lower on aluminum.

Now, on the other hand, you have noticed that the other costs up to that point were in the reverse direction. The

[fol. 1349] copper costs were lower, the installation costs, than they were in the case of aluminum. So when you add these two together, if you wish to compare, for example, the covered cable, you will compare line 2 with line 4 in that little group there, and you find that the costs are $1,244.45, compared to $1,280.72. Now, there is no significance in these two costs because they cannot be accurate to the last detail. Fifty or one hundred dollars in such an operation is a small item. So we conclude that the costs are about equal.

Q. Now, return to Table 2—excuse me.

The Court: You refer to the covered, there is a little more difference, not too much, I guess, on the bare.

The Witness: On the bare, yes, sir.

The Court: All right.

Q. You might turn to Table 2 and just briefly indicate——

A. Well, there we are taking the secondary wires. The primary wires bring the high voltage. You connect the transformer, which I am sure you see on poles, and you step down the voltage to what is a utilization voltage, 120 volts from post to ground. And there we made a study with [fol. 1350] two extensions, one for three hundred and one for six hundred. Which one would you like me to follow?

Q. If you could briefly indicate the factors on here.

A. Starting with, for example, with the 300 foot extension, then you have similar items of insulated costs, keeping the sag right and all that sort of thing, and you notice again under the column subtotal that the copper costs on that item are $129.35 and aluminum $162.02. However, now, when you take the cable cost of the conductor, the copper is higher, $257.53 and $196.58. When you put the two together, copper is $386.88, as compared to $3— this printing is not very good. May I use my original copy?

Q. Sure.

A. I can't read whether it is $358 or $338.

The Court: 58.

The Witness: 58?

The Court: Well, now, wait a minute. I had not better testify.

A. (Continuing) $358.60. So again there is about a thirty dollar difference, which is about 10 per cent. Again I think

that is within the accuracy of the study. So again the con-
[fol. 1351] clusion is that the costs don't differ materially, the overall costs.

Q. Turn to Table 3.

A. Now, on Table 3, here we discuss what we call the service drop from the line, from the secondary line you have to run some wires to the house, in that connection is what we call the service drop. Now, in there the first two items, for example, are comparable. In other words, No. 6 copper, this is the same type as No. 4 aluminum. In that occasion you take all the costs together, the comparison is $35.16 for copper as compared with $32.88 for aluminum. In the next largest size of service—by the way, these are the most common sizes, there are some exceptional ones which don't affect the study—here again the copper is higher, $46.37 as compared with $38.69, and we believe here, at least, in the case, second item, the difference is significant. It is some eight dollars and about forty cents, which is a significant difference there. Indicating aluminum as a service drop is a more economical service drop.

Q. Now, turning to Table 4, this is a little complicated, but if you could summarize what it says.

A. Yes. Now, we have studied the individual components. [fol. 1352] Then we said let's take pieces of each one of these components and combine them together in the proportion in which they occur on the job, and then also after you make your installation, some day that installation is going to come down, and in one case you will have so much copper left, in the other case, if you have aluminum, you will have aluminum left. Therefore, the salvage value of the metal is important in this study. So we had to introduce there the present value of the ultimate salvage value of these two additions in order to get the comparative cost.

Now, if we add all that, I think it becomes simpler if we only look at the last group of figures. You have the fourth item in here. Now, you can make your comparisons now. Horizontally, copper to the left, is $1897: $1868 for aluminum. For the other sizes two thousand dollars compared to $1960. And certainly as far as the package is concerned the two costs are very close. So, again, we reach the conclusion that there is no significant difference between the two systems, as far as first cost of installation is concerned.

Q. Prior to the time this study was undertaken, what [fol. 1353] conductor metal were you using in your overhead primary and secondary distribution lines?

A. Well, of course, for a long, long time we have used copper. Then, I believe around 1950 or so, or maybe a little later, we began to use more and more aluminum. And even though we thought we engineered a design of connections properly, both we and certain other companies throughout the country had experienced some practical difficulties with our aluminum installations

Q. And as a result of this study what decision did the Consolidated Edison make with respect to the conductor metal to be used in overhead lines?

A. Well, we decided to discontinue the use of aluminum because after all we were not saving any money and yet we exposed ourselves to certain practical difficulties that gave us trouble, service outlets, and complaints, so we said there is no money that can be saved, let's use the thing that works out practically best.

[fol. 1354] Q. Did you subsequently then modify this decision in any respect?

A. Yes. The success of this kind of an installation depends on the quality and adequacy of the connecting device. Sometime, I believe it was early 1960—I may be off a few months—a connecting device came out on the market by one of the big manufacturers which was, in my opinion, radical in design and was based on an awful lot of research which we were able to follow in the laboratory, and when this device became available, we felt that we could certainly use aluminum service drops only. This is a connection from the line to the house. Because we could put short copper connections at the line; we call them "pig tails." It is a very short copper connection leaving everything as it is and using these particular connectors to convert it to aluminum. This proved to be a very practical device, and there was no reason why we shouldn't now go to aluminum service drops, just that portion, and take advantage of the savings which I have indicated as we went along, which were in favor of service drops.

[fol. 1355] Q. On your primary and secondary main lines you are continuing to use copper?

A. Yes.

Q. On the basis of your description earlier of the area served by Consolidated Edison, would you say that your system is primarily urban in character?

A. Yes. Let's say I believe we are not exactly typical. Our distribution system is not typical of what you would experience in general throughout the country. In other words, New York City is pretty well confined in its limits. There isn't much new territory you can add to it, so it is adding little pieces here and there to an existing system. To that extent, while other large cities may have some of this, I think practically all of ours that is covered in this study—Brooklyn, Queens, and the Bronx, I don't think those are exactly typical of national conditions.

Q. Would the type of economic analysis made in this study, taking into account labor cost factors, material costs required for installation and the like, be applicable to other utility distribution systems?

[fol. 1356] A. Well, I'm sure if you take some utility that has a large city, undoubtedly there are areas in that system which would be fairly well represented by this. But I believe to a much lower extent than New York.

Q. Thank you. No further questions.

Cross-examination.

By Mr. Wertheimer:

Q. Mr. Xenis, about how much of Consolidated Edison system is overhead and how much underground?

A. You mean areawise?

Q. I mean in terms of percentage of your entire lines. What percentage are overhead, what percentage are underground? Give us a rough figure.

A. I'm afraid I do not have the figure available.

Q. But you stated your system is primarily urban, and as I understand it in urban areas most of the lines are underground.

A. Yes.

Q. So your system would be primarily underground?

A. I think, certainly, if you are asking investmentwise, [fol. 1357] most of it is underground—if that will answer you.

Q. Now, I notice that the tables that you had prepared for you in this study are concerned with additions or extensions of 300 feet, 600 feet and 1,000 feet. These are rather short extensions, aren't they?

A. Not for our system.

Q. Not for your system, but in terms of utilities in general?

A. I think you are right.

Q. This does not involve any major new construction?

A. No.

Q. Any new construction of any consequence.

A. We don't have that kind.

Q. You are simply adding to an existing system, or perhaps replacing parts of the system?

A. Yes.

Q. Replacing, perhaps, one phase of a three-phase line, something of that sort?

A. Yes, we have some of that, but also you have short extensions. Now, I don't know if you are familiar with New York, but you may have an area, say, in the vicinity [fol. 1358] of Flushing where there is just land, maybe 12 acres, and they decide to build houses. All right, you may have a thousand foot extension from this side and a 600 foot extension from the other side. This is typical of the work we do.

Q. Would you have any problem in adding, let's say, a single phase of aluminum to a three-phase line which already exists in copper?

A. You mean a single phase of aluminum to a three-phase line?

Q. In other words, you are replacing one phase of a three-phase line.

A. On a great length?

Q. Let's say on a short length.

A. Well, would you like to consider primary or secondary, because my decision could be different.

Q. Secondary.

A. No, I think if you were adding an additional wire for the secondary, which is usually limited in length to the supply provided by one transformer, certainly you could take one new line and put it in by itself without getting into some of the problems. You could make it all aluminum. But when

[fol. 1359] you start adding services and so on, you will run into problems; but I don't think you would get into those very much.

Q. Do you usually add the same type of conductor copper or aluminum when you make replacements on a line?

A. Not necessarily.

Q. I would like to turn, Mr. Xenis, to Table 1 that you referred to in your part three aluminum overhead conductors.

A. Yes.

Q. Now, the date on that table is November 28, 1959. The report is dated February 5th, 1959.

A. Yes.

Q. Was this table done after your report?

A. 11/28/59 is what I have here for Table 1, and I wouldn't be a bit surprised if this particular table was reworked at various times and this addition was put on. I'd have to check that. In other words, when this letter of transmittal was prepared which gives the figures, we had tables to support it, and if the table is revised at any time, if an error was discovered, if some change had to be made, it could be changed there at any time to bring it up to date. [fol. 1360] Q. Then of what date does this table speak?

A. This particular table would speak exactly of the date that is on it. But we apparently did not find it necessary to write another recommendation, because the conclusions did not change much. Must have been very minor changes.

Q. Let me direct your attention to—I guess it is the third vertical column—"Install set of four tension splices." In layman's language, is this putting in the connectors?

A. No. A tension splice is a mechanical device with springs inside of it, and it is a very economical way of extending a line. In other words, you have the connector, you insert this cable and this cable and you let them go and the spring grips them. They are very successful with copper.

Q. This is the joint that connects an existing line with the extension to it?

A. Yes, with the other line. The extension to it.

Q. Is the cost given here the cost of installing an aluminum connection to a copper connection, an aluminum connection to an aluminum connection, or a copper connection [fol. 1361] to a copper connection?

A. On the primary installation, everything is on the same metal.

Q. I see.

A. When you are talking about an extension made directly—I have to qualify your question a little. Let me make this thing clear. Suppose you have a copper line, primary line, and you want to add 600 feet to it. You could take one of these connectors that I have described and you could extend it, and keep on going. Now, if you had a copper line and you wanted to extend it with aluminum, you could not do it that way because we have not found any successful connectors that will treat aluminum on the same basis. There are some. We have tested them. We were never satisfied with them. The same way, if you have copper and change to aluminum, you cannot do it that way. So what you do, you come to a pole and make what we call a dead end connection. In other words, terminate that copper in a loop around a spool. Then you start your aluminum separately, and take the ends of that aluminum after you have clamped it and make a connection. This is not a tension [fol. 1362] splice. It will not stand tension, so you eliminate the tension from that installation.

Q. There would be more expense in adding aluminum to a prior existing copper line?

A. Yes.

Q. I notice from the four examples given here—300, 600, 1,000 and 2,000, that as you increase the length of the extension the economies grow in favor of aluminum.

A. That's right.

Q. For a longer extension that would be even more pronounced?

A. Yes.

Q. Turning to Table 2, Mr. Xenis, again I note the date is November 28, 1959. This was also revised after your covering report?

A. Yes.

Q. But the conclusions you express in your first three pages are not affected by this later revision?

A. That did not have to be changed.

Q. The examples given here, again, are for 300 feet and 600 feet. And here again, at least from these two examples,

[fol. 1363] as you increase the length of the extension the economies grow in favor of aluminum.

A. That's right

Q. Turning to Table 3, Mr. Xenis, I note that the figures given are for one three-wire service. This is the type of service you use now?

A. It is the most common size, yes.

Q. Do you use any others?

A. Well, there are locations where there is an existing two-wire service, and let's say it breaks and you have to replace it. The customer has no need for three-wire, and as a matter of fact his connection along his riser next to the house is only provided with two-wire, so we give him a two-wire installation. But by far the greatest number—most everybody uses appliances and wants three-wire service. There are occasions you replace two-wire, yes.

Q. Do you use the triplex?

A. Yes. The service drop.

Q. Now, the figures given on Table 3 are as of January 28, 1959, is that correct?

A. Yes.

[fol. 1364] Q. And the costs expressed then, you state, are accurate today?

A. Oh, I wouldn't say that they are exactly the same, but——

Q. No, but within a reasonable range.

A. Let's say within a sufficient range that we have not found it necessary to remake the study and make another table and put it in.

Q. I see. I wonder if you recall a meeting of the Con Edison, 4KV committee, is that the way it is called, sometime in July, July 23 or 1959, at which time the question of service drop was raised? I believe a new connector was discussed at that time; do you recall that?

A. Well, I don't think I was at the meeting, as I recall.

Q. You are listed as present.

A. Then I was there.

Q. According to this report the use of this new connector would realize an annual saving of one hundred thousand to one hundred and fifty thousand dollars. Was this reflected in this table?

A. No.

Q. It wasn't?

[fol. 1365] A. When this table was made that connector was not available, or at least when the study was made that connector was not available. That came a month after the initial study was made. However, when you look at Table 3 these figures are not dependent. You see, we assumed that you have made the connection at the line.

Q. Then the cost would be in one of the earlier tables?

A. No, no.

Q. Where would the cost appear then on these four tables?

A. When we went back to aluminum the costs that resulted are exactly the same as shown here, but very slightly reduces the saving with aluminum, very slightly reduces because of the addition of this little connector, which is something like 25 cents per service, something like that. It is a very small item. So if I were making this table over again and everything else remained the same, I would probably say that the aluminum in comparison to the copper would be slightly higher. But very slightly.

Q. You also spoke on your direct examination of a con-

[fol. 1366] nector which was developed in 1960 which would have been subsequent to the meeting just called to your attention. Would that have affected the economies in any way?

A. Only to the extent that I indicated. Well, when this study was made the conclusion was if you study the overall package the company doesn't save money, so let's stay with copper completely. That was the first move.

Q. Yes.

A. Then later on when this connector became available and we investigated it, we said, all right, let's depart from that. Let's take the saving on the service drop as indicated in Table 3, because this connector is made available and permits us to do a good job. So when that connector became available we said all right, we will depart from this study with the extent of one component; we are going to change from copper to aluminum and take the saving because now we don't expect any other saving. I can go into detail how that was accomplished, but that is the case.

Q. And these two developments in technology, the first

in July, 1959 and the second in 1960 were the only changes [fol. 1367] in either technological developments or costs?

A. When you say two developments, I can only think of one development. The availability of this connector was the only one I can think of.

Q. This was the same connector?

A. Yes.

Q. And that was the only change that has been made?

A. The only one I know of.

Mr. Wertheimer: Thank you.

Mr. Adler: No questions.

(Witness excused.)

Mr. Adler: Mr. Isenhart.

ROBERT F. ISENHART, called as a witness on behalf of the defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Adler:

Q. Would you state your full name, please?

A. Robert F. Isenhart.

Q. What is your position?

A. Manager of services division for the Dayton Power [fol. 1368] and Light Company.

Q. How long have you held that position?

A. I have been manager of services division for approximately two and a half years.

Q. What was your position prior to that?

A. Manager of purchasing and stores division.

Q. Have you indicated the name of your employer?

A. The Dayton Power and Light Company, yes.

Q. In the two positions you described did your responsibility include the purchase of wire and cable products?

A. I have been in charge with the responsibility for procurement since 1941 and the items of wire and cable are part of that responsibility.

Q. Have you been active in associations of buyers?

A. I have been active in the Dayton association for twenty or more odd years. Past president of that association. I have been affiliated with the Public Utility Buyers Group of NAPA.

Q. What is NAPA?

A. National Purchasing Association, for fifteen years. [fol. 1369] Past chairman in 1956 of the Utility Buyers Group.

Q. Of the——

A. Of the NAPA.

Q. Where is the Dayton Power and Light Company located?

A. At Dayton, Ohio.

Q. To what area does it serve?

A. Dayton Power and Light services an area of twenty-four counties in Ohio.

Q. What were its gross revenues in 1960?

A. The 1961 annual report just released reflects approximately $101 million gross revenue.

Q. How many miles of electric power lines do you have?

A. We have approximately 14,000 miles of overhead line.

Q. On what basis do you purchase wire and cable products for use in your system?

A. Generally we receive competitive bids for aluminum conductor.

Q. Do you also receive competitive bids for copper wire and cable?

A. Copper or any other items that we might buy.

[fol. 1370] Q. In general you purchase wire and cable on competitive bids?

A. On competitive bids.

Q. Are there exceptions to that?

A. Depending on volume, there could be exceptions occasionally.

Q. Now, referring to overhead distribution products, wire and cable products used in the overhead distribution phase of your system, which companies were invited to submit bids on those products prior to April, 1959?

A. Prior to 1959 our principal suppliers were Anaconda Wire and Cable; Aluminum Company of America; Central Cable Corporation; Rome Cable; Essex.

Q. Now, were there other companies who might have provided a satisfactory product who did not submit bids?

A. There are other companies such as Kaiser, Reynolds, General Cable, Olin, presently.

Q. Pardon?

A. Presently.

Q. What was your reason and what is your reason for not soliciting bids from some of these other companies that [fol. 1371] you named?

A. Our company is a service organization supplying electricity and gas to our area. Our responsibility is service to our customers. We chose to have dependable suppliers, I call them dependable, or a small number so that we have service from our suppliers, as our customers expect service from us, and it is an expensive proposition to ask everyone in the business for answers. Quotations take time and it is costly.

Q. Do you consider it important to be a relatively large customer of a few rather than a small customer of many; is that it?

A. I think that it is important that three or four companies share in the biggest portion of our business so that they feel that they have a large portion of our business and we then could expect good service from them and dependable service.

Q. In operating the utility system do you ever encounter emergency situations?

A. Occasionally we encounter emergency storm troubles where we are able to call on those suppliers that have served us and expect service from them, which they are always glad to give.

[fol. 1372] Q. Mr. Isenhart, on the basis of your twenty years experience as a buyer of wire and cable products for a utility and on the basis of your activities and position of responsibility in the utility buyers organization, is it your opinion that other utilities follow similar buying practices to yours?

A. I think this is generally true.

Q. Now, you referred earlier in your testimony to the fact that Rome prior to its acquisition by Alcoa was one of your

suppliers. Did Rome submit competitive bids to your company?

A. Rome solicited business from us and they were asked to bid on occasion and were given some business.

Q. Did you consider Rome to be one of the more competitive companies in a price sense, in competitive bidding situations?

A. They were very seldom awarded business on competitive bidding.

Q. Is it your feeling that Alcoa by virtue of having acquired the broader line of products manufactured by the Rome Cable Company has any advantage in securing your business?

[fol. 1373] A. They have not gained any advantage by acquiring these additional products.

Q. Is it your feeling or opinion that Alcoa's acquisition of Rome Cable has injured you in any way as a purchaser of wire and cable products for overhead lines?

A. No, sir, because we feel that there was plenty of competition from all the companies that are considered suppliers of these products.

Mr. Adler: No further questions.

Cross-examination.

By Mr. Mahaffie:

Q. Mr. Isenhart, has your company at any time bought from the Southern Electrical Corporation?

A. Not to my knowledge, sir.

Q. Now, you listed as among potential suppliers from whom you did not solicit bids Reynolds, General Cable and Olin. Did you regard them as unreliable?

A. No, sir, I do not regard them as unreliable, because we have made purchases from them.

Q. You have made purchases from them?

A. Yes.

[fol. 1374] Q. But you are not today soliciting bids from them; is that it?

A. Not always.

Q. Well, how does this bidding work, Mr. Isenhart? Do you send out an inquiry for bids on a particular job?

A. You solicit your suppliers when you want to receive quotations.

Q. Do you have a printed bidding list?

A. Yes, sir.

Q. A constant list for all jobs or does it vary with the job, does it vary from job to job?

A. Not necessarily, sir.

Q. Well, then, what you do, whenever you have a job coming up you send out inquiries, I take it, to each company that you want to have bid on that job?

A. That's right.

Q. And is it the purport of your testimony on direct that at least as of today you sent these inquiries out—I am sorry, we are talking about prior to 1959—that you sent these inquiries out to Anaconda, Alcoa, Central, Rome and Essex?

A. That's right, sir.

[fol. 1375] Q. Now let's take the year 1959, would this have been true on every job that was up for bidding during the year 1958?

A. No, sir.

Q. Well, did you send any inquiries to any companies other than Anaconda, Alcoa, Central, Rome and Essex in 1958?

A. I don't remember, sir.

Q. But you might have?

A. I might have.

Q. Well, who are you sending inquiries to now? Who on these large aluminum jobs are you soliciting business from today?

A. Aluminum Company of America, Anaconda are the largest in the field.

Q. Well, anyone else?

A. They are suppliers.

Q. Are these the only two companies from whom you solicit bids today?

A. On what products, sir?

Q. Well, the products that you were talking about on direct examination, Mr. Isenhart, and I believe that was, and correct me if I am wrong, I believe you were talking about orders of aluminum cable; weren't you?

[fol. 1376] A. Yes.

Q. And you listed Anaconda, Alcoa, Central and Essex

as the companies you,—they were the companies you mentioned with respect to business prior to April, 1959. Now, on similar orders today do you limit yourself to Anaconda and Alcoa?

A. There are other central cable facilities.

[fol. 1377] Q. Anyone else?

A. Occasionally could be the other suppliers that were mentioned.

Q. Well, you solicit bids from substantially everyone, then, don't you?

A. No, sir.

Q. Well, who among your suppliers do you not solicit bids from? That doesn't make much sense, does it? What I am trying to get at, Mr. Iisenhardt—I gathered on direct examination, you said you had a limited group of five suppliers in 1958. Now, I want to know if that group is the same today, ~~or~~ if it is bigger or smaller. What has happened to it?

A. It's the same today.

Q. But you do solicit bids from other companies on occasions?

A. Depending upon how much interested they are in our business. How much they solicit us.

Q. So if I was a manufacturer of this product, and I solicited you, you would allow me to bid on it?

A. Yes, sir.

Q. Mr. Isenhart, you stated that in so far as you knew, your views on this supply situation were shared by other [fol. 1378] utilities. How do you know this?

A. By conversations with men in the same position that I am.

Q. Strictly by conversations?

A. That's right.

Q. Did you buy heavy electrical equipment for Dayton or have you bought heavy electrical equipment?

Mr. Adler: Would you specify what you mean by "heavy electrical"?

Mr. Mahaffie: Heavy transformers.

The Court: Transformers?

Mr. Mahaffie: I am talking about the general field of heavy electrical equipment other than cable.

Mr. Adler: I object to that, Your Honor. It doesn't seem to have any relevance.

The Court: Overruled. I am not acquainted with it too well.

(To Mr. Mahaffie) You mean the transformers, the machinery part of the business?

Mr. Mahaffie: Yes, sir.

The Court: All right. The question is, I think——

Mr. Mahaffie: I'll rephrase it, sir.

[fol. 1379] By Mr. Mahaffie:

Q. Do you have responsibility for the purchase of heavy electrical equipment for the system?

A. Is this for distribution sizes up to a certain KVA, or over a certain KVA?

Q. Well, I'm thinking about both. Let's take them one at a time. The larger sizes—do you have a responsibility for them?

A. I have the responsibility with the cooperation and recommendation of our engineering division.

Q. That's true with respect to wire and cable, also, isn't it?

A. Not necessarily.

Q. What about the smaller sizes of transformers?

A. I have responsibility for the purchase of smaller transformers.

Q. About how many suppliers do you have in the field of large transformers?

A. It depends on the size, sir, and the type, and the manufacturers that might be able to produce the equipment needed.

Q. Would you say your supply situation generally is the same or different than your supply situation with wire and cable—in terms of numbers of suppliers?

[fol. 1380] A. Well, on the large transformers, the field is rather limited.

Q. Do you regard the number of suppliers of the large transformers as constituting enough suppliers for your purpose, or would you rather have more?

A. It is competitive.

Q. So you think there are enough?

A. Yes.

Q. I have no further questions.

Mr. Adler: No questions.

The Court: All right, Mr. Isenhart.

GLENN KOGER, called as a witness in behalf of the Defendants, being first duly sworn, testified as follows:

Mr. Bergson: Your Honor, before examining Mr. Koger, I would like to hand to you a recent decision from the United States District Court, Southern District of California, which will have some bearing on Mr. Koger's testimony. The Government has a copy of this decision. One of the areas that I want to discuss with Mr. Koger is the so-called eleven Western States Market. This is an opinion that [fol. 1381] came down on the 29th of January, dealing with a four Western States market, and the factors that should be considered in connection with the determination of that market.

Direct examination.

By Mr. Bergson:

Q. Mr. Koger, will you please state your name and address.

A. Glenn Koger, Barneveld, New York, R.D. 2.

Q. By what company are you employed?

A. Rome Cable Corporation, Division of Alcoa.

Q. How long have you been employed by Rome Cable Corporation, Division of Alcoa, or its predecessor company, the Rome Cable Corporation.

A. Since 1954.

Q. What positions have you held in the Rome Cable organization?

A. Well, mainly, my assignment has been as manager of the West Coast Plant located at Torrance, California, where they manufacture conduit and industrial tubing, steel tubing; and also vice-president of the company.

Q. Now, when did you cease to be manager of the Torrance Plant, and come to Rome?

[fol. 1382] A. In August, 1960.

Q. And what is your position today with the Rome Cable Corporation?

A. Vice-President and Director of Manufacturing at the Rome Plant.

Q. Director of manufacturing?

A. Yes.

Q. What does that encompass?

A. How much does that encompass?

Q. What area do your duties encompass?

A. Encompass manufacturing operations at our home plant, and also home office direction of the Torrance Plant and the other small operation in the Los Angeles area, making cable assemblies.

Q. Now, when you were stationed at Torrance—and I think you said that Torrance was engaged primarily in the production of steel conduit—did you give consideration to the manufacture of aluminum conduit?

A. Yes, we did.

Q. When was that?

A. Our studies stemmed from activity being shown by our competition in aluminum conduit. We, being a manufacturer of steel conduit, could see the competitive situation [fol. 1383] developing, and our natural interest was to try to find a possible way we might also be able to produce aluminum conduit.

We started this study actively, I would say, in the fall of 1958.

Q. Now, what steps did you take in connection with your study of aluminum conduit?

A. We looked into various possibilities as a means of producing material. We had given some thought to the possibility of producing it in a manner similar to the way we were making, basically, our steel pipe, where we buy sheet, slit, weld, make it into pipe. We never did go very deeply into that, not even to the extent of making any careful financial studies. We learned of the possibility——

Q. (Interrupting) Why didn't you pursue that?

A. Partially because it didn't look as though it was going to be an economic process on the surface. We had to buy sheet, and the cost of sheet on the market, the price of sheet, didn't leave the necessary margin beyond—didn't appear

to be economic on the surface of it. We then looked for a source of supply of pipe, and we learned of some activity being conducted by Hunter Engineering, which is in the [fol. 1384] same area of Los Angeles, and we entered into some superficial studies with Hunter Engineering to see if we could obtain pipe from them. They gave us considerable encouragement in the fall and early winter of—in November or so of 1958—and we finally learned from them a rough estimate of what their costs might be. We then took the difference between what their cost was, and what we thought we would then have to add to it as a manufacturing cost, to determine what the total profit might have be to be split between us. In other words, what margin there was for us to operate. At the current prices then in existence on aluminum conduit, we thought there was a possibility of being able to eke out the necessary margin. It developed that they would have to make, for them, a substantial investment. It also developed they were in some negotiations and such with, I think, their parent company at the time, or at least a substantial owner in the company, we were informed, being, I believe, Olin Mathieson, and they indicated to us that—well, their problems would have to be solved or reconciled before they could go further with this operation, that time, I believe, being the time in early December—the exact [fol. 1385] date I could not attest to. But we followed them up by phone conversations and found they were not being very aggressive in their approach, and it was becoming evident by the end of the year that this was probably a dead horse.

Q. So you abandoned your approach to get into the aluminum conduit business using Hunter Engineering as a source of your aluminum pipe?

A. That would be true.

Q. Now, did the Torrance Plant of Rome have any equipment for extruding aluminum pipe of its own?

A. We did not.

Q. Did you give any consideration to acquiring an extrusion press of your own?

A. Not seriously. It was evident that our volume would not justify it without even going into a study on it.

Q. So that by the end of 1958, did you have any plans

under consideration for going into the aluminum conduit business?

A. The correct answer would be no. There were no plans. We were interested in trying to find some solution, but we had none.

[fol. 1386] Q. Well, I show you Government's Exhibit 323 and ask you if you can tell us what that is.

A. This is headed "Cost Estimates Finishing 10-foot Pieces of Aluminum Conduit."

Q. Did this have any bearing on your discussions with Hunter Engineering?

A. I don't see the context of this. I don't recall the context of it. It appears to be—I am reasonably sure it's—I see in here quoted "Estimated pipe costs, 35 cents a pound," which was their estimated cost of manufacturing, without any margin of profit for them.

Q. That would not have been the cost of the pipe to you?

A. No, they would have had to have some margin.

Q. Do you know whether or not they had made any extensive study to ascertain exactly what the cost of the pipe to them would have been?

A. I would have no real way of knowing. These figures were given to us without supporting data.

Q. Are those figures in your handwriting?

A. No.

Q. But the 35 cents referred to is the cost of the pipe to Hunter Engineering, and not the cost of the pipe to Rome [fol. 1387] Cable Torrance Plant?

A. Hunter gave this as their estimated cost of manufacturing, recognizing there would have to be a margin for them on top of that.

Mr. Melchior: Would you identify the 35-cent figure you are referring to?

The Witness: On this second sheet, on line 19, "Estimated pipe cost per pound 35 cents."

Mr. Melchior: Thank you.

Q. Now, is this an accurate statement of fact, Mr. Koger? Rome was at the time of the acquisition very close to being an actual competitor of Alcoa in the aluminum field.

Mr. Melchior: I think we should object to the question as leading.

Mr. Bergson: I don't see how I can be leading the witness. I asked him whether this was an accurate statement of fact.

The Court: I don't think it is leading, particularly.

Mr. Bergson: I am reading from the Government's brief, your Honor.

The Court: Of course, the Government's brief is a pre-
[fol. 1388] trial brief, and I assume it is based on a little expectation; some hope. I think I will sustain it in that form. I think he has already said that as far as he knew, Rome, at least the Torrance Plant of Rome, did not have any plans of entering the conduit business.

Q. Do you know of any plans by Rome Cable prior to the acquisition of entering into the aluminum conduit business anywhere?

A. We had no plans for entering. We were seeking a means by which we might be able to enter the field. Having in mind there was a possibility that aluminum conduit might become a substantial item, and we, being interested in the conduit field, we were naturally looking for a means of protecting our interests.

The Court: Up to that date you hadn't found anything satisfactory to you?

The Witness: That is it exactly.

The Court: What you do as to hope for the future.

The Witness: Naturally, our hope for the future at the time of the acquisition, was much in the scrap pile.

[fol. 1389] By Mr. Bergson:

Q. It was in the scrap pile?

A. Yes. In other words, we had no particular venture in front of us at the moment. We saw some opportunities. Some of our competitors had started to move in too, and we probably looked at them, that is, where they bought from any other suppliers.

Q. Let me ask you, what did some of your competitors do?

A. We were informed that some of our competitors had made arrangements with some other producers of conduit to obtain pipe, to obtain conduit and resell it to their customers, primarily as a courtesy item.

Q. As a courtesy item?

A. Yes.

And therefore you would have been primarily a distributor of conduit rather than a manufacturer of conduit.

A. We entered into very similar program with plastic pipe, which is not an unusual practice in our industry.

Q. Now, Mr. Koger, where did—all of Rome's conduit manufacture was centered in the Torrance Plant; was it [fol. 1390] not?

A. It was.

Q. Now, where did Rome sell this conduit?

A. When you talk conduit it can be interpreted as an over-all term meaning E.M.T. and rigid. E.M.T. was sold nationally; rigid conduit was sold in the Western States, and if we take a certain time it was sold in different areas at different times.

Q. Will you tell us what areas they were sold in?

A. We generally started distributing it essentially in California, Oregon, Washington, Utah, Nevada. I think there were six originally.

Q. And the reason for limiting your sales to those areas was what?

A. It was a freight problem. The East Coast manufacturers which are your basic competition, they can deliver——

Q. Let's just——

A. Basically it is freight problem. You were dealing with rather heavy material and as soon as you start shipping it from your plant you start encountering a freight problem, and on rigid conduit it is sold f.o.b. plant plus freight. Your cost to the customer includes freight.

Q. Now, did there come a time when you were able to [fol. 1391] expand the area in which Rome sold its steel conduit?

A. That's right. We found that—we felt that we had reached the point in our economics where we could expand our operations, and then I think we went to 14 states, sold in 14 states. We expanded into Colorado, Texas, and I think Wyoming. I would have to look it up before I could tell you. It was about 14 states.

Q. Why were you able to reach those markets at that time when you formerly had not been able to reach those markets?

A. It is fundamentally a question of your economics of manufacture. In our manufacturing operation volume is extremely important to us in determining our unit costs. You have a certain investment and you can produce a considerable more volume for reasonable increase in cost. Therefore, in order to extend, in order to increase our volume, we expanded our sales area and this was brought about —well, keep in mind originally we had difficulty making rigid conduit at a profit. And as we improved our methods we reached the point where we felt that we could then ship [fol. 1392] into greater areas. And keep in mind we are absorbing freight as we ship out. In other words, we met the competition. The competition set the price for us. So we had to sell in these individual areas at the price of, or the cost of pipe plus freight out to these points. And then absorbing freight as soon as we left our plant, we started, we had to start absorbing freight. When we left the Los Angeles area or Torrance Plant, we would meet competition.

Q. Now, your plant was located in Torrance, California?

A. Right.

Q. Who were your competitors?

A. Our competitors, as far as the rigid conduit is concerned, is practically the entire industry. The East Coast manufacturers were in excellent position to distribute on the West Coast.

Q. Were there any other manufacturers of conduit who had their factories west of the Mississippi?

A. There was a manufacturer, of a large concern, that had a conduit plant quite comparable to ours right in Torrance.

Q. What happened to that plant?

A. They ceased operations out there in early 1957 and [fol. 1393] abandoned the area and went back East, to produce back east.

Q. When they went back East did they stop selling in the West?

A. They did not. They continued to distribute on the West Coast.

Q. Now, your competition you stated in the areas where you sold, which were west of the Mississippi, came solely after 1957 from competitors whose plants were located east of the Mississippi?

A. That is correct.

Q. Now, will you tell me and tell the Court how it was possible for these plants east of the Mississippi to compete with you, where your plant was located in the area in which the product was being sold?

A. This is a basic problem that every manufacturer has on the West Coast. Basically our steel from which our raw materials are made, the price is established by East Coast prices plus freight to the West Coast. As soon as we started manufacturing out there and started shipping back East, we encounter higher freight rates for the same material than the East shipping West. In other words, there is a [fol. 1394] substantially higher rate for the same distance from Los Angeles back East than there is from the East out West. Freight rates are higher. Also East Coast manufacturers enjoy other low freight rates by water, delivered any place on the West Coast, at the same price. It costs them no more to deliver pipe to Seattle than it does to deliver to Los Angeles.

Q. When you say pipe, you mean conduit?

A. Well, yes, conduit, steel pipe conduit, or E.M.T. Therefore, in order to compete with the East Coast manufacturer we have to meet their prices up and down the coast. Therefore, we have to, and we refer to it as absorbing the difference in price and the freight rate.

Q. Is it my understanding from your testimony that you are at a freight disadvantage with East Coast producers selling in the West even though your plant is located in the West and their plants are located in the East?

A. That is true.

Q. Now, you mentioned the fact that an East Coast manufacturer could ship to Seattle for the same price he could ship to Los Angeles. Is the East Coast manufacturer's [fol. 1395] price laid down at Los Angeles, the same as it is at Seattle?

A. Delivered to the customer, you mean?

Q. No, delivered to his warehouse.

A. To the dock. Delivered to his warehouse.

Q. Warehouse.

A. Essentially the same within pennies. The difference in freight rate from dock to warehouse, but essentially it is the same.

Q. Now, when you compete with an East Coast manufacturer in Seattle do you have to meet the East Coast manufacturer's price in Seattle?

A. Right.

Q. Now, how do you do that?

A. We arrive at what our competitor's price would be, based on his published sheets at his mill, and then add the cost of freight to the customer from his mill and that becomes our competition. It is a standard practice in this industry.

Q. Does this necessitate your absorbing part or all of the freight from Los Angeles to Seattle?

A. That is correct, because our price is established in Los Angeles to meet East Coast competition in Los Angeles.

[fol. 1396] Q. Now, in Los Angeles, which is where your plant is located, do you have any price advantage over the East Coast manufacturer?

A. What consists of a price advantage on that? The answer would be no, I think would be the the proper term.

Q. Let me put it this way, is your price plus delivery charges, comparable or better than the East Coast manufacturer's price delivery charges?

A. The answer is we sell at the same price that the East Coast does delivered there in Los Angeles, which means there is no difference.

Q. And again I ask you does your plant by virtue of its location in Los Angeles have any price advantage over the East Coast plant, cost advantage, over the East Coast plant which ships from the east coast or the East to Los Angeles?

A. No. We are at a disadvantage, because of the difference in the raw material costs.

Q. You pay higher raw material costs?

A. That's right.

Q. And your higher raw material costs are due to the fact that you are in the West and they are in the East?

A. That's right.

[fol. 1397] Q. Now, who are your suppliers of raw material?

A. Our basic raw material is supplied by the two western mills plus Bethlehem Steel from their eastern mill.

Q. And do you pay the western mills the same price that you pay Bethlehem for your raw material?

A. That's right. They compete with each other and generally sell—we meet the sales competition, whichever one is lowest. Sometimes it is Bethlehem, sometimes it is the West Coast.

The Court: Take a recess.

The Clerk: Court is in recess.

(At this point a recess was taken after which the trial was resumed.)

[fol. 1398] Q. Mr. Koger, while you were at Torrance were certain studies made of Rome's sales of conduit in the eleven western state area?

A. There were comparison studies made, and the eleven western states were used only because the data that was available for comparison were the eleven western states. We sold in that area either less or more, but the data available was for the eleven western states.

Q. Are there certain trade publications that talk about the eleven western state area?

A. That's right.

Q. Now, are steel and aluminum conduit used for the same purposes?

A. Yes, quite interchangeably in many applications.

Q. Is there price competition between steel and aluminum conduit?

A. Yes, very critical. Very strong competition between the two.

Q. Does the price of steel conduit have any effect on the price of aluminum conduit?

A. Well, if I am to judge from the way our steel prices were affected by the change in the prices by the aluminum [fol. 1399] people, I would say it certainly did.

Q. Now, just a couple more questions, Mr. Koger. Prior to your employment by the Rome Cable Corporation for whom did you work?

A. Walker Brothers at Conshohocken, Pennsylvania.

Q. What business were they engaged in?

A. The manufacture of conduit, under floor duct and insulated wires.

Q. Did they make insulated wires with aluminum and copper as the conductor metal?

A. We did. We were in copper for many years, and then as aluminum began to come into the picture we bid and accepted orders for aluminum conductors.

Q. And was the aluminum conductor drawn, stranded and insulated on the same machinery that the copper conductors were drawn, stranded and insulated on?

A. Yes. Used different drawing solution and machine, but the same dies, same machine, same stranding facilities.

Q. And you drew copper on some occasions and aluminum [fol. 1400] on other occasions?

A. Yes.

Q. No further questions. Your witness.

Cross-examination.

By Mr. Melchior:

Q. Mr. Koger, in your direct testimony you spoke at length of problems involving freight and cost of shipping conduit. Were your remarks on that subject related solely to steel conduit, or did they apply to both steel and aluminum?

A. Primarily to steel. The price of aluminum being a little different from the pricing of steel.

Q. Yes. There is a difference in pricing.

[fol. 1401] The Witness: A freight problem exists as far as the manufacturer is concerned.

Q. I don't know what you mean by that.

A. Well, you have the delivered price in the cost of aluminum so that you have your freight that has to be taken into consideration as far as your manufacturing cost.

Q. Do you have a delivered price in the cost of steel?

A. You meet competition in the cost of steel. You arrive at the price you will charge the customer based on your competition and the cost of delivery of pipe conduit from the source of manufacture to the customer.

Q. There is a difference in pricing steel conduit and aluminum conduit?

A. Yes, that's right.

Q. Now, I would like to go over your direct testimony with respect to where Rome sold its conduit prior to the

merger. Also I believe you testified that Rome sold only steel conduit prior to the merger.

A. That is correct.

[fol. 1402] Q. That is correct. And I believe you stated that originally Rome sold its steel conduit, I believe you said, in a four or five-state area.

A. I think I said six.

Q. Six?

A. I believe I named them, but I didn't name six.

Q. You named California, Oregon, Utah, Washington and Nevada.

A. And Arizona. I checked on it.

Q. And then you stated at a later date you began shipping into what you described as a fourteen state area, but you couldn't recall the names of all the states.

A. I have since checked them. I have all the names.

Q. Are those fourteen states generally the fourteen states, the fourteen westernmost states?

A. The states involved are Wyoming, Montana, New Mexico, Texas, Colorado, Western Louisiana and North and South Dakota. So you see we are reaching across the southern part. It was a question of the economics of transportation.

Q. Yes. Now, I believe you stated that as you increased [fol. 1403] your volume you could extend your sales area.

A. That's right.

Q. Now, what did you mean by that?

A. When a product that has a rather high investment and some manufacturing costs—well, I will put it this way, put it a little different way. In our product line to produce any conduit you have to have certain investment, certain facilities, certain operation. There are furnaces involved; there is zinc pots, things that have high standby and operating costs. Therefore, if you could use these facilities for long hours, keep them running, your unit costs are not so high.

Q. I see. And if you can produce more units——

A. That's right.

Q. —and keep your unit cost lower you can absorb more freight and ship a little farther?

A. That's right.

Q. As a matter of fact, some of your competitors ship at quite great distances; don't they?

A. That is exactly right.

Q. Now, you also spoke of an eleven-state area on direct testimony. What was this eleven-state area, how did it [fol. 1404] differ from the fourteen-state area?

A. Essentially the eleven states are those states west of the Continental Divide. It is rather common in the western part of the country to refer to the eleven western states. Many trade magazines and data collection agencies have a tendency to use eleven western states as a study area.

Q. This is a practice in the trade in that area?

A. It is not our trade primarily, but it is a practice quite common up and down the western coast for any of the western operations that have east coast manufacturers. It is established essentially for the east coast manufacturers. It is our survey by shipping by water from the east coast you reach the line of maximum freight rate essentially down the Continental Divide. There is variations from that, but it is essentially the Continental Divide.

Q. At some time during the period that you were extending your market from the six-state area to the fourteen-state area, did you pass through the stage where there [fol. 1405] might have been an eleven-state area?

A. Actually the records don't indicate there were. When we made our study to determine how much further we would reach, we jumped from six to fourteen. We took in eight additional states, the second group I mentioned, which were the results of the second study we made on which we based our decision to go into that area.

Q. But you did refer to an eleven-state area in a number of your internal memoranda.

A. Yes, we did, and one of the reasons was we were always trying to find a means of measuring our volume against competition. That is always a problem that you have.

Q. Yes.

A. And we could only get national figures. The figures we obtained for the west coast operations were very broad and while they were overall building figures which we have always tried to liken our volume to, frankly we would always have to admit they were very much in question too.

Q. You found it difficult to measure your position in the fourteen-state area because of the absence of this type of [fol. 1406] information?

A. Yes.

Q. And the six-state area too?

A. That is exactly right.

Q. But the eleven-state area seemed to be the area where you could secure statistics and thereby measure your approximate position in the area?

A. We attempted to do that.

[fol. 1407] Q. Yes. Do you——

A. We could measure the amount of sales we had in the eleven states. Give some comparison. If there was any relationship between them. We always had a lot of argument between the home office and us out there as to how realistic our figures were.

Q. Yes, but you did use an eleven-state area nevertheless.

A. Because that was the only information available to us.

Q. Exactly. Did you find it difficult to make a profit in steel conduit prior to the merger with Alcoa?

A. We found it difficult to make a profit in it from the beginning. In rigid conduit.

Q. Yes, in rigid conduit. I believe you described rigid conduit as a courtesy item.

A. No.

Q. Didn't you use that term?

A. No, I commented that we found some of our competition had taken on aluminum conduit by purchasing it from other suppliers and reselling it as a courtesy item to their customers. They were basically in the steel business, but [fol. 1408] they were buying and reselling aluminum.

Q. Would you tell the Court what your understanding of the term "courtesy item" is?

A. Well, you have certain customers that have—see, this trade generally has a tendency to sell to jobbers and to develop a certain number of jobbers that handle your product line, and if you could supply them, when they have occasional need for another product, if you could supply them with it, why you felt you would be doing them a good turn, and help yourself if possible.

Q. Do you consider this an inducement to purchase on the part of your customers from you?

A. Oh, it is questionable how valuable it is from that standpoint. Another object being that if by any chance the trade should go that way, if the volume should go that way, you would have an in; you would have your foot in the door; where otherwise you wouldn't have your foot in the door. We have taken that same approach on the plastic conduit.

Q. Is this a courtesy item?

A. Essentially. It is not a profitable item, it is a break [fol. 1409] even item. If the volume reached a point where it would justify our entering it, we would have a foot in the door as far as sales were concerned.

Q. I believe on direct examination you discussed at some length Rome's early interest in aluminum conduit. Would you state to me in a word what Rome's—the first time to your knowledge that Rome became interested in aluminum conduit, what its interest in going into this field was.

A. Well, keep in mind any of us interested in the conduit business were aware of any potential items, and aluminum conduit has been available for many years, and it was not a particular interest in the industry as long as the prices were considerably above the going prices of the steel conduit. But as the economics of aluminum conduit became such that the pricing of that became more comparable to steel, those of us in the steel industry have been very much aware of the possibility that aluminum might enter the field. Therefore, I think it was natural, as a good businessman, from a good business standpoint, for us to make a study of aluminum at any time it has seemed to justify the effort, and as in [fol. 1410] 1958 Kaiser had entered the field very aggressively and were promoting the sale of aluminum conduit. And then we made studies, primarily in the fall of 1958, to try to see whether we had any opportunity to enter this field.

Q. You considered adding it as an additional item to steel conduit?

A. I think our thought was more from the standpoint that if at any time the aluminum conduit should reach the point

where it could be sold for less than steel, it might become the predominant item, and we, being interested in the conduit field, were interested in getting in there.

Q. You wanted to get in on the ground floor.

A. That would be essentially true, although I think, as one of the witnesses stated the other day, we, not being in the extrusion business, we were very much at a handicap because it all stemmed from the extrusion of aluminum pipe and we were not in that field.

Q. Why did you consider that a handicap?

A. Because that is an essential piece of equipment by the methods by which aluminum pipe is made today. That [fol. 1411] was an essential piece of equipment in the operation, and brought you closer to the base metal. You work then from billet or ingot.

Q. Extrusion press—is that what you are referring to?

A. Yes. Not only that we could see our real competition was from those people who did have extrusion presses, of which there is many of them around the country.

Q. Who would that have been in this area?

A. Well, of course, Channel Master had been one of the leading ones.

Q. In what year was this?

A. That would have been in 1960, they came into it, but——

Q. We are talking about 1958.

A. Go back to Hazelwood, was one of the originals that promoted it before Kaiser, and Kaiser came into the picture. But I was using Channel Master as an example of the type of people that got into that business.

Q. We are talking about the year 1958 now. Can you recall who the companies in the field were?

[fol. 1412] A. Hazelwood being one of the main ones, and Kaiser were the two main companies at that time.

Q. Was Alcoa promoting it at that time?

A. I think, yes. In the fall of 1958 Alcoa and Reynolds were also promoting it. But up until the time Kaiser went into the field, we hadn't heard much of Alcoa or Reynolds, either one.

Q. Are they the only companies you can think of that were extruding aluminum pipe in those days, in 1958?

Mr. Bergson: Extruding aluminum pipe for conduit purposes.

Q. Extruding aluminum pipe for conduit purposes.

A. Making conduit. Offering conduit for sale. I think Hazelwood, Kaiser, Alcoa, and Reynolds were essentially the companies that were. There was any number that all they had to do was thread it and put couplings on it, get the Underwriters' approval and they would be in business, as has happened.

Q. You felt in order to go into this business properly you would have to have an extrusion press?

A. That's right, or have access to those facilities.

[fol. 1413] Q. From your knowledge of extrusion presses, do you have any idea what the cost of an extrusion press is?

A. I haven't the least idea. It is a considerable investment though.

Q. Now, you said during the fall of 1958 you were giving consideration to going into the field of aluminum conduit; you were surveying competitors, what you would need and so forth, and you had some negotiations I believe with Hunter Engineering, who was also giving some consideration to working out an arrangement with you; is that correct?

A. That's right.

Q. When did Rome Cable formally abandon plans to go into the field of aluminum conduit, if they did?

A. Well, I would say that this thing more or less vanished from lack of interest being shown by Hunter around the first of the year. Right in late December, 1st of January, of 1958-59.

Q. You say that's the time that Rome abandoned their plan?

[fol. 1414] A. That's right.

Q. What steps were taken? Who gave an indication of this?

A. Hunter Engineering indicated they were showing very little interest in the program.

Q. Oh. This is with respect to the arrangement with Hunter Engineering?

A. That's right.

Q. I am thinking of a broader base. Did you still have interest in the aluminum conduit field, even though Hunter Engineering negotiations had broken down? Did you still have an interest?

A. Any of the steel manufacturers were continuing to look at aluminum, to see whether they could economically enter the field or not.

Q. Were you still interested in it then?

A. Interested in watching it all the time, to see what its growth was going to be; if its growth became substantial, naturally we were interested in entering the aluminum conduit business.

Q. In other words, your interest was maintained up until the time of the Alcoa-Rome merger, wasn't it?

A. I suppose any of our interests, no more than any other [fol. 1415] competitor was interested in getting into the aluminum.

Q. I didn't hear your answer.

A. To the extent that any of our competitors were interested.

Q. You were still interested?

A. That's right. That is, assuming that the aluminum conduit would become economical.

Q. Oh, yes. If there were good business reasons, you were still——

A. We felt if it got below steel in price, it probably would become profitable. I think it is worthy of note that the steel people were also finding ways of making theirs lower too. So were we. To stay below the price. That's an important factor in the overall study, looking both ways.

Q. You say the steel people were interested in making theirs over?

A. Making theirs less expensive. In other words, reducing their cost, to stay below the cost of aluminum. So it was economical, or as economical to use steel as aluminum.

Q. From your knowledge of the conduit industry, would you say aluminum has made inroads into the steel conduit [fol. 1416] market over the last several years?

A. Oh, I don't think there is any question about it. It has entered the field.

Q. Are there any reasons for this?

A. Well, economics. It has been sold at a less price than steel.

Q. Is that all?

A. Well, there is various schools of thought. There are those that promote aluminum, that feel aluminum has some very definite advantages over steel. The people promoting steel will point out the advantages of steel over aluminum. And it leaves it for the customers to decide which one they want. There are certain places we think aluminum is better than steel and certain places steel is better than aluminum.

Q. Which do you promote, in your present position?

A. We try to sell the customer what we think is best for him. In the position now of offering both.

Q. In other words, in some cases for a particular customer aluminum would be better than steel, and in others [fol. 1417] steel would be better than aluminum, is that correct?

A. Exactly right.

Q. I believe you stated that prior to your becoming manager of the Torrence plant, or prior to your employment with Rome Cable, you were employed by Walker Brothers in Pennsylvania.

A. That's right.

Q. What business were they engaged in?

A. Manufacture of insulated electric wires and conduit manufacture, and under floor duct.

[fol. 1418] Q. Now, in your present position are you generally familiar with companies engaged in the manufacture and sale of conduit?

A. Reasonably so.

Q. Do you know whether Walker Brothers is still engaged in the manufacture and sale of conduit?

A. Yes.

Q. Are they?

A. Yes.

Q. What type of conduit?

A. Up until the last few months, anyway. Making rigid steel conduit and aluminum conduit—I am sorry—rigid steel conduit and E.M.T. Steel E.M.T.

Q. Do they make aluminum conduit?

A. No. I think they sell it. I think they have an arrangement where they buy it and sell it.

Q. Purchase it for re-sale?

A. Yes, similar to some other manufacturers in that same business.

Q. There are other manufacturers who produce aluminum conduit for re-sale?

A. Yes.

Q. Do you know how many there are that do that?

A. No.

[fol. 1419] Q. Can you identify any that do that?

A. Well, Walker Brothers is one. Triangle being another. They are the ones, I believe, I am acquainted with.

Q. Any others?

A. General Electric, and I have heard of others, but those are the ones I have direct knowledge of.

Q. Those are all the names that you can recall?

A. Those are all that I know of at the moment.

Mr. Melchior: No further questions.

Mr. Bergson: No redirect, your Honor.

The Court: All right.

(Witness excused.)

The Court: Do you want to go for a few minutes longer?

Mr. Bergson: Mr. Rolston.

Glenn Rolston, called as a witness in behalf of the Defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Bergson:

Q. Mr. Rolston, will you please state your name and address for the record?

[fol. 1420] A. Glenn Rolston, Golf Course Road, Rome, New York.

Q. By whom are you employed?

A. Rome Cable Division of Alcoa.

Q. Were you also employed by the predecessor company of the Rome Cable Division of Alcoa?

A. Yes, I was.

Q. For how long a time have you been employed by the Rome Cable Corporation and its successor?

A. From October, 1936.

Q. Prior to your employment by Rome Cable Corporation did you have any experience in the wire and cable industry?

A. Yes, I did.

Q. Would you please state for the record what that was, beginning at the earliest date and moving on up?

A. I went to work for the Rome Wire Division of General Cable Corporation in 1929, in the Philadelphia Sales District, and from 1930 until I left in the fall of '36 I was employed by General Cable at Rome, New York and at their New York headquarters.

Q. In what capacity?

A. The capacity that I was engaged in, for about four years at the Rome Plant of General Cable, I was in charge of cable engineering and inspection and standards of [fol. 1421] wire product in the plant. After I moved to New York I was first in charge of the cable engineering department and then later merchandise manager of the company.

Q. Now, what were your duties at Rome Cable Corporation from the beginning?

A. When I was first employed I was chief engineer and was responsible for the preparation of all standards and specifications, operating procedures. And the inspection department reported to my office, also. In addition I handled field sales contract on sales engineering problems.

Q. Now, what is your present position?

A. My present position is director of marketing of the Rome Cable Division.

Q. And how long have you had that position?

A. In the division since the merger in April, 1959.

Q. And what was your position immediately prior to, April, 1959.

A. I was vice-president and manager of marketing of Rome Cable Corporation.

Q. And for how long were you vice-president in charge of marketing for Rome Cable?

A. Since 1945.

[fol. 1422] Q. Have you served on any governmental bodies during this period?

A: Well, during World War II I was on several of the what they call technical advisory committees of various branches of the service and specialized in problems.

Q. Involving the wire and cable industry?

A. All involved in wire and cable, yes, and at the time of Korea, 1951, I served in Washington as Chief of the Wire Mill Branch of the Copper Division, which was then NBA, and then BDSA, for a period of six months.

Q. What is BDSA?

A. BDSA is Business Defense Service Administration.

Q. What are the functions of BDSA?

A. As it is presently set up, I believe it constitutes a service, it is part, first of all, the Department of Commerce, and it serves——

(Discussion was held off the record which the reporter was directed not to take.)

Q. Speak up a little louder at least while the plow is out here.

A. Among other things, I can't say I could answer all [fol. 1423] of its functions because it has been somewhat reorganized of late, but among other things, it is an organization of the Department whereby various types, not of all industries, but copper, aluminum and steel report volume of shipments; act as an agency for the collection of data in these, let's call them, raw materials sales and shipments. They provide information to various segments of the industry on, let's call them, quotations, business opportunities. They send out leaflets and information of that type. They act as an agency where you may arrange meetings with other departments of the Government on an industry basis.

Q. You said you were in the copper division of BDSA. What was the function of the copper division?

A. The copper division was divided into three parts. One was the supply situation with copper producers. Then they had a wire mill branch of the copper division which was involved in wire mills. They had a brass mill branch which was involved in the brass mill, and I neglected to mention a fourth one, which was foundries and casting.

Q. The purpose of the division, as I gather from what

you said, was to ascertain the supply of copper and to see [fol. 1424] where the supply of copper went?

A. That is correct.

Q. And I suppose that the aluminum division performed the same function with respect to aluminum as the copper performed with respect to copper?

A. Yes, they did.

The Court: It is time to quit, anyway. Recess until two o'clock.

(Whereupon, at 12:40 p.m. o'clock an adjournment was taken until two o'clock p.m. of the same day.)

[fol. 1425] Mr. Adler: Your Honor, if it is agreeable to you, we would like to interrupt the testimony of this witness and put on a utility witness.

The Court: Yes, it is all right.

LELAND D. MCCORMAC, called as a witness on behalf of the defendants, being first duly sworn, testified as follows:

Direct examination

By Mr. Adler:

Q. Would you state your full name, please?

A. Leland D. McCormac.

Q. What is your position?

A. Vice president in charge of purchasing, Niagara-Mohawk Power Corporation.

Q. How long have you held that position?

A. Since January 1, 1953.

Q. And how long have you been in the public utility business?

A. Well, with Niagara-Mohawk or its predecessors since 1926.

Q. Have you read the testimony given by Mr. Pratt of the Niagara-Mohawk Company earlier in this proceeding? [fol. 1426] A. I have.

Q. Are you in agreement with his description of the size and extent of the Niagara-Mohawk system?

A. Yes.

Q. In your position as vice president in charge of purchases have you been responsible for the purchases for Niagara-Mohawk of the products shown on that board over there, a photographic copy of which has been introduced in evidence as Defendant's Exhibit AR-20?

A. I have.

Q. With respect to those products, who were your suppliers prior to April, 1959, when Alcoa acquired the Rome Cable Company?

A. Pretty generally our supplies came from Alcoa, from Anaconda, from General Cable and from Rome Cable.

Q. In what manner did you purchase these products?

A. Well, there are two groups of purchases. The first are those that are made on blanket orders which are issued to these four suppliers over a period of time. Generally, to get us the quantity discounts which may prevail. Then there [fol. 1427] are another group of purchases that are made by the bidding of these companies.

Q. Now, with respect to the latter group, did you invite the companies to bid?

A. Yes.

Q. To submit a competitive bid?

A. Yes.

Q. Were any companies invited to bit other than the four you named?

A. No. Those were the only suppliers we used.

[fol. 1428] Q. Now, referring to the class of purchases done on a competitive bidding basis, to your knowledge, did the Rome Cable Company receive any business from your company on such competitive bids?

A. No, it was our experience that one of the other three bidders was generally submitting low bid, so that most of that business would go to Alcoa or to Anaconda or to General Cable.

Q. Since the time of the Rome Cable acquisition, have you added another supplier to your group in order to take the place of Rome Cable?

A. No, we have not found it necessary.

Q. So that your suppliers in these products today are Anaconda, Alcoa and General Cable?

A. We are still talking about these products?

Q. Yes.

A. That's right.

Q. What are your reasons for limiting your supplier group to these three companies?

A. We have done business with them for many years, with all three of them. We have been satisfied with the service and with the product we received and the service we had from them, and we see no reason to add anything further. We feel, generally, that we might better be an im-[fol. 1429] portant part of a supplier of business than to scatter our business so that no supplier is interested in supplying us and giving us the service that we want.

Q. Is such service an important factor in a public utility business?

A. That's right.

Q. Are there other suppliers of these products available who might, if you choose, be added to your group of suppliers?

A. Yes. There are other manufaeturers of these products.

Q. Could you name some of them, please?

A. Yes, Southwire; Southern Electric; Reynolds Aluminum; Kaiser Aluminum. Those are four. There are probably others.

Q. Do these companies come around to see you soliciting your business?

A. Yes, we talk with them. They tell us how good their factories are and what services they can render, and we always listen to them, but we have not felt it was necessary to add any of them to the list of suppliers.

Q. In your opinion, Mr. McCormac, does the fact that [fol. 1430] Alcoa by acquiring Rome Cable and adding to its line of products formerly manufactured by Rome, give it an advantage in selling to you?

A. No. We see no difference in the position of Alcoa now and the position of Alcoa and Rome before.

Q. Do you feel from the standpoint of a purchaser of these wire and cable products about which we have been speaking that Alcoa's position of Rome Cable has adversely affected you?

A. No.

Q. Do you anticipate that it might?
A. No. But if it did, we could correct it.
Q. How might you do that?
A. Well, we would take the business away from them.
Q. To one of these other suppliers?
A. That's right.

Mr. Adler: No further questions.
The Court: Cross-examine.

Cross-examination.

By Mr. Wertheimer:

Q. Mr. McCormac, you said that prior to April, 1959, your suppliers were Alcoa, Anaconda, General Cable and Rome Cable. Were any of these companies customers of Niagara Mohawk?
[fol. 1431] Yes.
Q. Which ones?
A. General Cable; Rome Cable; Anaconda through a subsidiary which it owns, and Alcoa had a very close connection through its factory up at Massena.
Q. Did that in any way influence your decision to confine your business to these companies?
A. Yes, it does.
Q. Would you say that the utility would be disposed towards the customer of its—let me rephrase it, would a utility prefer to buy from a manufacturer who is a power customer?
A. Yes, we would.
Q. So the more plants that a manufacturer would have the greater would be its advantage in securing business from power companies.
A. I wouldn't use the word "advantage." I would say we would be more disposed to buy from him if he had more plants in the area.
Q. I see. You mentioned that there are other companies supplying the products that you purchase. Suppose one of them was to change its price, for example, ACSR. Would you normally expect that the companies who do compete for your business would follow suit?
A. Yes.

[fol. 1432] Q. So the presence of other companies making the product directly influences the kind of a deal that you can make.

A. That's right.

Q. Thank you.

Redirect examination.

By Mr. Adler:

Q. Mr. McCormac, would you continue to buy from a manufacturer located on your lines if such manufacturer failed to provide you with the service for the price that you could get from other manufacturers located elsewhere?

A. Oh, no. He would have to meet the specifications of the product we want, and the time deliveries when we want his product, and he would have to be equal in all other respects.

Mr. Adler: No further questions.

The Court: I suppose that the prices the utility pays, at least in New York State, are scrutinized by the Public Service Commission.

The Witness: That's right.

The Court: Anything else?

[fol. 1433] Mr. Wertheimer: No further questions.

GLENN ROLSTON, resumed the stand and testified further as follows:

Direct examination. (Continued)

By Mr. Bergson:

Q. Mr. Rolston, what product does Rome Cable, or did Rome Cable make prior to the merger with Alcoa? The major product classifications.

A. The major product classifications, bare copper and aluminum, insulated products of copper and aluminum, and holding to major product classes, a line of building wire, construction materials, power cable, control cable—what we

call instrumentation wires and cables that go into radios and televisions. Magnet wire in a limited line—what we call square and rectangular, which is primarily used in transformer windings. Mining types of cable, flexible cords. I would say that was a general statement of the products.

Q. Would you say that the major portion of the sales of Rome Cable, from a dollar standpoint, in wire and cable was in insulated wire and cable?

A. Yes, I would say so.

[fol. 1434] Q. Substantially so?

A. Yes.

Q. Now, some of these insulated wire and cable products were insulated with aluminum as the conductor and some with copper as the conductor.

A. That's right.

Q. Now, taking a weatherproof wire, for example—was that made with aluminum as a conductor and copper as a conductor?

A. Yes, it was.

Q. I show you Defendant's Exhibit AR-30 for identification and ask you if you can tell me what that is?

A. This is one of our publications covering a neoprene covered weatherproof wire, in which the conductor can be furnished with either aluminum or copper.

Q. And is this known as a product bulletin?

A. Yes, we class it as a product bulletin. Contains essential data as to weights and thicknesses of coverings and—essential information.

Q. Is it offered to the trade as an indication of the product that you have to sell?

A. That's correct.

[fol. 1435] OFFERS IN EVIDENCE

Mr. Bergson: I offer Defendant's Exhibit AR-30 for identification.

Mr. Mahaffie. Is that WP2A?

Mr. Bergson: Yes, WP2A.

Mr. Mahaffie: No objection.

The Court: Received.

(Defendant's Exhibit 30 for identification received in evidence.)

Q. Now, I show you a document, bulletin RCP 361 which has been marked for identification as Defendant's Exhibit AR-31, and ask you if you will tell the Court what that is.

A. This is a bulletin having similar information to that contained in the other reference, only covering a product which we refer to as secondary and service drop cable. And it is produced with either copper or aluminum conductors and may be insulated with either neoprene or polyethelene or combinations of rubber type insulations, and it is classed as a—let's call it a trade bulletin, giving essential information concerning the product.

Mr. Bergson: I offer Defendant's Exhibit AR-31 for identification.

[fol. 1436] Mr. Mahaffie: No objection.

The Court: Received.

(Defendant's Exhibit 31 for identification received in evidence.)

Q. I show you a document marked AR-32 for identification, which is bulletin RCP 200, and ask you if you will tell us what that is.

A. Well, I would classify this as a trade bulletin in which we have selected from our product line a varying group of products, among them being, for example, the bare and weatherproof wire which I have referred to, magnet wire, various types of building wire, either rubber or plastic insulated, service entrance cable, machine tool wire—I'm just picking at random a group of products, some of which are represented by I'd say samples on the middle board there.

Q. Would you look on the second page at the top lefthand corner, where it says "Bare and weatherproof wire."

A. Yes.

Q. And would you read the legends that appear under both illustrations in that upper lefthand corner.

[fol. 1436a] A. "Bare copper wire, aluminum, or ACSR in all tempers—sizes up to 1,500,000 mcm."

[fol. 1437] Q. And the next one?

A. The next one reads "Weatherproof wire" and our trade name "Roprene."

Q. Which is neoprene?

A. Which is neoprene. "Rolene," which is polyethylene "or URC types."

Q. What is URC?

A. That is a designation established many years ago to describe the wire and is commonly used for fibrous cover types of weather proof wire. Then "the conductors may be copper, aluminum or ACSR. Roprene and URC types are also available in handy 500-foot coils packed in individual cartons—sizes 14 through 4 AWG soft copper."

Q. Now, would you look in the lower right-hand corner of the same page, to the illustration under which is the legend "self-supporting drop and secondary cable" and will you read into the record what it says there?

A. "Self-supporting service drop and secondary cable. Embodies the time-proven construction of insulated power conductors spiraled around a bare neutral for mechanical support. Power conductors are Roprene (neoprene) or Rolene (Polyethylene) insulated. Power conductors and [fol. 1438] neutral messengers may be copper, aluminum, or ACSR. Copperweld neutrals are also available. Rome Cable manufactures a special self-supporting cable for overhead distribution where tree conditions are a problem."

Q. Now, you testified a few moments ago from a dollar volume standpoint the major portion of Rome's business was in insulated products. Were these insulated products primarily copper products or aluminum products?

A. Primarily copper products.

Q. Now, who were Rome's major competitors in its wire and cable business?

A. Oh, I would say without order of preference, Collyer Insulated Wire Company, Crescent Insulated Wire and Cable Company, Narragansett Wire Company, Hatfield Wire and Cable Company, General Electric Company, General Cable Corporation, Anaconda Wire and Cable, Phelps-Dodge Copper Products, Simplex Wire and Cable, and I think I could go on for another—we considered in the various product lines each one was a competitor where they were trying to get that particular product of business. But [fol. 1439] I have just named ten or a dozen names in general.

Q. And in the aluminum?

A. In the aluminum field you have Alcoa, Kaiser, Reyn-

olds, General Cable, Anaconda Wire & Copper, Nehring Electrical Works, Central Cable, what was Southern Electric, now Olin, Southwire. I would say they constituted representative competition in that particular field.

Q. Now, going first to the copper phase of the business, did you encounter price competition in the copper products?

A. Yes, sir, we did.

Q. And when you encountered that competition what company or companies would lead the downward trend?

A. Well, I think that I would have to clarify that. I would say because of what we call the building wires or construction materials, there are a number of companies engaged in that field, so I would like to answer in that particular field as distinguishing for the moment from power cables or control cables.

Q. Go ahead.

A. I would say in the building wire or construction, Collyer, Crescent Insulated, Peranite Division of Essex Wire Corporation, American Insulated Wire Company and [fol. 1440] General Cable, and Phelps-Dodge and Anaconda. I think that the only way that I can honestly answer that is that these things go in cycles until the market situation begins to collapse and when it does, you might say one follows the other, when you get into severe competition.

Q. Of the companies that you mentioned, which of them were integrated copper companies?

A. Well, Phelps-Dodge Copper Products and Anaconda Wire and Cable would be the only ones in this.

Q. So that on occasion the company that led the price cut-down might have been a non-integrated company?

A. Yes, it might.

Q. Was it frequently the case?

A. I would say yes.

Q. More frequently than not?

A. Well, if I were to use roughly a period of recollection say in the last ten years, which I think is a cross section, I believe I would say so, yes.

Q. Now, let me ask you this, so far as wire and cable with aluminum as a conductor is concerned, do you find that there is competition between the so-called integrated companies?

A. Yes.

[fol. 1441] Q. How does that competition manifest itself?

A. I would say between lowering prices where the levels sometimes get down to what we call severe competition.

Q. And would you characterize the competition in this field as competition between the integrated companies on the one hand and non-integrated companies on the other hand?

A. I don't believe I would, no. There may be some instances of it, but I wouldn't necessarily say so.

Q. When the non-integraters compete and the integraters compete?

A. That's right.

Q. Each with each other and each against the other?

A. That is correct.

Q. Now, when, prior to the acquisition, did Rome Cable compete with Alcoa in any wire and cable products?

A. Only in what has been referred to here as the line wire and triplex, or let's call it multiplex constructions, and to a very minor degree we made a limited size range of ACSR bare. That would be the only case where we competed one with another.

Q. Now, on this ACSR bare, which you said was a limited size range, I assume from previous testimony that it was [fol. 1442] 4/0 and below?

A. That is correct.

Q. And did you compete price-wise with this product?

A. Well, I don't know as I exactly get your question. We only had this product line to tie in in some instances with the overhead insulated types of wires. I would say no, basically, we did not progressively compete price-wise on ACSR bare.

Q. Would it be a fair statement to say that your ACSR was carried—strike that.

Maybe you have answered this, but let me put it again. For what purpose or why did you carry this limited line of ACSR?

A. Well, in some cases where either full carloads of what we call overhead conductors were required, there would be an instance where there might be, say, 15,000 pounds of ACSR 4/0 or 1/0 required and 15,000 pounds of one of these covered line wires. And we would use that. For instance, you could not compete if you only had say half a carload of

material. So we used it to round out in some instances full carload quantities.

[fol. 1443] Q. Did Rome bid for the business of publicly owned utilities in ACSR?

A. I would say very, very rarely. I couldn't number very many cases.

Q. How about your covered product, did you bid on those?

A. Yes, we did.

Q. And what was your selling policy in regard to those bids?

A. Well, if you mean if we received the inquiry, we would quote generally on published price schedules where they may be. But in some cases, particularly on what we call the smaller municipal operations, where the tendency was to buy through electrical distributors or wholesalers, our quotation would be made to them by one of these electrical wholesalers or distributors.

Q. Did you, in pricing your product, price your product to beat competition or to meet competition?

A. No, in general we felt very strongly that we didn't want to go beyond competition, so I would answer you that we priced it to meet competition.

[fol. 1444] Q. Now, since Rome Cable Division has been acquired by Alcoa—since the acquisition—in your opinion as director of marketing for Rome Cable Division of Alcoa, do you have the ability to fix or establish a price and make it stick?

A. No, we do not.

Q. What would prevent you from doing that?

A. Well, I would say the failure of competition to come to the level—if we were attempting to fix it by the publication of our own price schedules.

Q. So that your prices after initial determination by you are ultimately determined by competition?

A. That's correct.

The Court: You did not offer 32?

Mr. Bergson: I didn't? Oh, thank you, your Honor. I offer Defendant's Exhibit AR-32 for identification.

Mr. Mahaffie: No objection.

The Court: Received.

Mr. Bergson: Thank you, your Honor.

(Defendant's Exhibit 32 for identification received in evidence.)

[fol. 1445] Q. Now, Mr. Rolston, I show you Government's Exhibits 134 and 135 and ask you to look at them and tell us whether or not you are generally familiar with the situation concerned therein.

A. Yes, I am generally familiar.

Q. Would you tell the Court the circumstances which gave rise to this correspondence. This correspondence, your Honor, is a request for listing at TVA for certain Rome products.

A. Well, we were advised by our sales representative in the field that in order to be put on the approved list to obtain inquiries from the Knoxville Utilities Board, which is in Knoxville, Tennessee, that it would be necessary to go to the appropriate people in the Tennessee Valley Authority and have them review your facility and—we will call it put you on the approved list of transmission and other types of conductors. TVA has had a requirement that they must send and engineer up to your facility and determine whether or not your machines and other capabilities are satisfactory, and in this case that request was prompted by the fact that such examination and listing by TVA would be necessary in order to get the opportunity to quote and supply to the [fol. 1446] Knoxville Utilities Board.

Q. At the time you made the inquiry to TVA did you have any intention of bidding for any of TVA's business?

A. Oh, yes, we have always bid TVA.

Q. I beg pardon. TVA's transmission business.

A. No, we did not have.

Q. You didn't even make transmission sizes, did you?

A. No, we did not.

Q. Did you intend at that time to go into the business of making transmission sizes?

A. No, not at this time.

Q. Did you have any plans for going in?

A. We had no plans.

Q. Now, so the purpose of this request was solely in order to enable you to bid on distribution products.

Mr. Mahaffie: I object to the form of that question. Cross-examination of the witness.

The Court: It is leading, although I think he has prob-
[fol. 1447] ably testified to it.

Mr. Bergson: I am just trying to summarize, but it is all right.

The Court: Tell us again what its purpose was.

The Witness: The purpose of our request to the TVA for being placed on what we call the approved list was in order to utilize that approval in soliciting inquiries for products from Knoxville Utilities Board, of Knoxville, Tennessee.

Q. When you were acquired by Alcoa you did not pursue that request?

A. No, we did not.

Q. Did you hear anything from the TVA about that?

A. I didn't at our level immediately, but subsequently we heard about it as a result of a conversation between a representative in TVA and I believe a representative of our office in Chattanooga.

Q. Do you recall the date of that inquiry by TVA?

A. Well, no, I can't recall the exact date.

[fol. 1448] Mr. Bergson: I am sorry for this delay, your Honor. There are so many tables here to shuffle, we just unshuffled one. I will come back to that rather than delay.

Q. Now, Mr. Rolston, in the course of your business do you get requests from customers for quotations of wire and cable using both aluminum and copper as the conductor? I should say requests for alternate quotations.

A. Yes, we do.

Q. And how frequently do you get requests of that kind?

A. Well, I can answer that in two ways. At our headquarters the number of cases we would have would be only a fraction of those that are received throughout the country, because many of our products are covered by published price schedules in which our district offices or the salesmen actually traveling on the road could make these alternate quotations. We would be likely only at our headquarters office to get these for major jobs requiring engineering design and information of that type, but we get them in both ways.

[fol. 1449] Q. I show you a document marked AR-34 for identification, which is entitled "Request for quotation from

Boston office," dated January 5th, 1959, and ask you if you received such a request for quotation.

A. Yes, this is our quotation request.

Q. Now does that request for quotation ask for quotation for conductor or for wire and cable with aluminum as the conductor and for a comparable quotation with copper as the conductor?

A. It does.

Q. Now, in this document, Defendant's Exhibit AR-34 for identification, what are the comparable items copper and aluminum?

A. Well, Item No. 1 on here represents the quantity 2,000 pounds of three-conductor 4/0. Do you want me to read all the description?

Q. No.

A. What we call 15,000 volt cable bound to a supporting messenger with an alternate described as 1-A aluminum conductor having a circular area of 336,400.

[fol. 1450] Q. Now, was that a comparable conductor? Are these comparable conductors?

A. In this case, yes, normally, but in this case I think the conductor size was selected by the engineer of the Boston Edison Company. There are two types of determination of what is comparable. This comparable aluminum equivalent was equal—let's see, 336, equal resistance.

Q. Now, does this show, which of the conductor metal is more expensive per thousand feet according to your quotation here?

A. According to our quotation in three conductor 4/0 copper cable we quoted $3,190; on the aluminum cable we quoted $4,185. The aluminum alternate was higher by slightly over $200 per thousand.

Q. Now, Items 1B and 1C, are they comparable?

A. Yes, they follow the same scale except it is a single conductor copper asking for 4/0 copper, which we quoted as $1150, with an alternate of 336,000 aluminum, which we quoted at $1235, the aluminum was slightly higher.

Mr. Bergson: I offer Defendants' Exhibit AR-34 for Identification.

Mr. Mahaffie: I have no objection.

[fol. 1451] The Court: Received.

(Defendants' Exhibit AR-34 for Identification received in evidence.)

Q. May I ask you this about Defendants' Exhibit AR-34. Are the conductors on which you are quoting here for use in overhead construction?

A. Yes. It is a pre-assembled cable.

Q. I now show you a document which has been marked Defendants' Exhibit AR-35 for Identification, which is a request for quotation from the New York office, or inquiry from the Public Service Electrical and Gas Company and ask you if you are familiar with that document?

The Court: What is its number, Mr. Bergson?

Mr. Bergson: 35. I have skipped 33, your Honor. I will get back to that.

A. Yes. This particular company, Public Service Electric and Gas Company, has what we call detail specifications for the various types of insulated wires and cables that they purchase, and in this particular inquiry they ask us to quote on the items, sizes and equipment designated as specification 86 on copper.

[fol. 1452] Q. Yes.

A. And an alternate on specification 87, which is for aluminum. And they describe completely in these two specifications the product and how it is to be made and we simply indicate the relative prices for the cable design that they have selected by their specification.

The Court: What is its date?

The Witness: This particular one is dated December 1, 1958.

Q. Now, on the first item, what is the price quoted for aluminum?

A. The price quoted for aluminum was $902 per thousand feet.

Q. And the price for the copper?

A. $974 per thousand feet.

Q. So copper was higher than aluminum there?

A. That's right.

Q. Now, on the next item, what was the price quoted?

A. The price quoted for the copper was $1650, and the price quoted for the aluminum was $1690.

Q. So that there the aluminum was higher than the copper?

A. That is correct.

[fol. 1453] Mr. Bergson: I offer Defendants' AR-35 for identification.

Mr. Mahaffie: No objection.

The Court: Received.

(Defendants' Exhibit 35 for Identification received in evidence.)

Q. I now show you a document that has been marked for identification as Defendants' Exhibit AR-36, which is a request for a quotation from the New York district dated 12/1/58 on an inquiry from Public Service Electric and Gas Company, and I ask you if you are familiar with that document?

A. Yes, I am. And this is essentially the same principle as I quoted before. It happens to be a different specification.

Q. Is it for an overhead product?

A. Yes. This is for a reverse lay self-supporting cable.

Q. And what is the price quoted for copper, here?

A. Copper was quoted at $3,010 per thousand feet and the aluminum was quoted at $3,755.

Q. And what was the date of this inquiry?

A. 12/1/58.

Mr. Bergson: I offer Defendants' Exhibit AR-36 for identification.

[fol. 1454] Mr. Mahaffie: No objection.

The Court: Received.

(Defendants' Exhibit 36 for Identification received in evidence.)

Q. I now show you a document marked Defendants' Exhibit AR-37 for identification, which is a request for quota-

tion from the New York district on an inquiry from Public Service Electric and Gas Company, dated 11/25/58, and ask you if you are familiar with that document?

A. Yes, I am familiar with it. This is the same type of an inquiry in which they have another cable specification with the appropriate number in which they ask specifically for quotations to specification 84-1 for copper, and 85-1 for aluminum.

Q. And on the first alternate group of products the quotation for copper was what?

A. The quotation for copper was $1,086.

Q. And the quotation for aluminum was how much?

A. $1,204 per thousand.

Q. So that copper was cheaper than aluminum?

A. That is correct.

Q. And the second group, the quotation for copper was what?

[fol. 1455] A. $502 per thousand feet.

Q. And the quotation for aluminum?

A. $792 per thousand feet.

Q. So again the quotation for copper was lower?

A. That is correct.

Mr. Bergson: I offer Defendants' Exhibit AR-37.

Mr. Mahaffie: No objection.

The Court: Received.

(Defendants' Exhibit AR-37 for identification received in evidence.)

Q. Now, I show you Defendants' Exhibit AR-38 for identification, which is a request for a quotation from the New York office dated 11/5/58 on inquiry from the Public Service Electric and Gas Company, and ask you if you are familiar with this document?

A. Yes, I am familiar with it.

Q. And the products about which inquiry was made are overhead products?

A. Yes, they are, and there are a considerable number of items, and this again is 4 specification and others, in which they ask for quotations on copper and aluminum on the appropriate specifications, and we have quoted these prices as shown.

[fol. 1456] Q. And in some instances—would you give the comparable figures for comparable aluminum and copper products?

A. I will try to. This happens to be one of those cases where they make the selection of the alternate size of conductor that may not follow the normal pattern. The way it is worded, I am not sure which is the alternate. Let's see. They refer to this specification of aluminum as being 14-2; the alternate for copper being 22-4.

Q. Well, let me ask you this, on the first item which is for——

A. There is no alternate. I think what happened is on Item No. 1 on the inquiry, it has a quantity of 30,000 feet. I find no, for that particular item, I find no aluminum alternate.

Q. That is just a request for copper?

A. That's right.

Q. In the second item?

A. In the second item it would appear to me that the copper is $1,665, and the aluminum $1,488.

Q. Right.

A. And then moving down to the next item, the aluminum is $1,986 per thousand and the copper $2,260. And then the [fol. 1457] next item, the copper, $3,010 per thousand feet and the aluminum, $3,755. And then you come into two items in which there is not a direct comparison in size, that they have selected the alternates and they work out this way, 350,000 circular mil in copper which we quoted at $4,290; and 600,000 circular mil aluminum $4,280.

Q. Ten dollars difference?

A. Ten dollars difference. But on the last item, 730,000 circular mil copper at $5,710, with an alternate of 3-conductor 800,000 circular mil aluminum of $5,110.

Q. So there aluminum is cheaper than copper?

A. That is correct.

Mr. Bergson: I offer Defendants' Exhibit AR-38.

Mr. Mahaffie: No objection.

The Court: Received.

(Defendants' Exhibit AR-38 for identification received in evidence.)

[fol. 1458] Q. I now show you Defendants' Exhibit AR-39 for identification, which is a request for quotation from your New York office of an inquiry from Consolidated Edison dated 12/7/58, and ask you if you are familiar with that document.

A. Yes, I am.

Q. Are the product you are asked to quote on there overhead products?

A. Yes, they are.

Q. Now, is one quotation requested for copper and the other quotation requested for aluminum?

A. Yes, it is.

Q. Can you read——

A. That's just what I was hesitating about. The printing, I can't read it on this copy.

Q. Well, it looks like 28 something. Looks like copper is the more expensive.

A. That's what it looks like. Maybe one of the copies—yes, you can tell from this copy.

Q. Would you read it.

A. This inquiry from Consolidated Edison requests prices on three-conductor 4/0 copper, self-supporting aérial cable, [fol. 1459] and we quoted twenty-eight fifty per thousand feet. They requested an alternate of three-conductor 300,000 circular mil aluminum of the same construction, and we quoted a price of $25.10 per thousand feet.

Mr. Bergson: I offer Defendant's Exhibit AR-39.

Mr. Mahaffie: No objection.

The Court: Received.

(Defendant's Exhibit 39 for identification received in evidence.)

Q. I now show you a document marked Defendant's Exhibit AR-40 for identification, which is a request for quotation from the New York office on an inquiry from the Long Island Lighting Company, dated February 21st, 1958, and ask you if you are familiar with that document.

A. Yes, I am.

Q. Does that document request a quotation on overhead products?

A. Yes.

Q. Now, can you match the comparable copper and aluminum product here?

A. I can try. This is further involved by the fact that some of the alternates have copper weld messengers. Let's [fol. 1460] see. I am afraid without quite a considerable study of this I can't match them up.

Mr. Bergson: I will offer it in evidence, your Honor, solely for the purpose of showing that alternate requests were asked on both aluminum and copper.

The Court: All right.

Mr. Mahaffie: The only trouble I have with this is that I can't tell from the face of it if alternate requests are asked. If you say they are, I suppose they are, Mr. Bergson, but I can't make any sense of it.

Mr. Bergson: There are nine items here, your Honor, and of course you can't have alternate requests on nine items. One is for copper alone and the other four match up. It is just difficult in matching the four up.

The Court: Why don't I defer and then if Mr. Rolston can straighten it out——

Mr. Bergson: Maybe he can do it at recess time.

[fol. 1461] The Witness: Yes, I think I can.

Mr. Bergson: Right.

The Court: I will defer ruling on the admissibility at this time.

Q. Now, Mr. Rolston, the government introduced in evidence in its case government Exhibits 270, 271, 272 and 273 which were also requests for alternate quotations. Did you cause to be made a search of your records to determine what happened on those requests for alternate quotations?

A. Yes, I did, a certain number.

Q. And there were four as I recall it. What did you find in respect to the four--or five. There were five. Did you find that you didn't get the order for some of them?——

A. Yes, that's my recollection.

Mr. Mahaffie: Object again to the form of the question, your Honor.

The Court: Overruled.

Q. That you didn't get the order for some of them?

A. Yes.

Q. Now, upon search did you ascertain that you were the [fol. 1462] successful bidder on two of them?

A. Yes.

Q. Now I show you Government Exhibit 271, which is a request for quotation from the Boston district on an inquiry from the Boston Edison Company, dated November 7th, 1960, and ask you whether that request asks for quotations on overhead products.

A. Yes, it does.

Q. And what prices did you quote?

A. The request describes the copper conductor as a—by number AWG with neoprene covering on which we quoted $99 per thousand feet. They did not describe the unit for aluminum, but we quoted what we call the aluminum equivalent, which is size 1/0 7-strand with neoprene at $61 per thousand feet; which is the alternate aluminum conductor.

Q. $99 to $61?

A. 99 to 61.

Q. Did you get an order for any part of this business?

A. My recollection is that we got an order from Boston Edison Company for not the entire amount shown, but a [fol. 1463] portion of the quantity that was on the inquiry.

Q. I show you defense Exhibit AR-41 for identification, which is Rome Cable sales order dated 11/23/60, and ask you whether that is the sales order on that request for quotation.

A. This is the sales order resulting from that quotation.

Q. What does that sales order show?

A. Sales order shows quantity 200,000 feet of No. 2 7-strand copper with neoprene covering at a price of $99 per thousand feet.

Q. So that you received an order for half of the requirements in copper?

A. That's correct.

Mr. Bergson: I offer Defendant's Exhibit AR-41 for identification.

Mr. Mahaffie: No objection.

The Court: Received.

(Defendant's Exhibit 41 for identification received in evidence.)

Q. Now I show you Government exhibit GX-72 and ask you to describe that.

A. Well, this is rather involved. This is an inquiry for [fol. 1464] plant expansion project on the Dow Chemical Corporation in Baton Rouge, Louisiana, and it includes at least ten or a dozen items with the appropriate alternates—some of them what we call custom built types of cable specifications.

Q. Did you get the order for part of that?

A. My recollection is that the only item we got off of this was what was originally Item No. 9 on this quotation. Represented approximately 45,000 to 700,000 circular mil aluminum with 6/64ths polyethelene covering.

Q. I show you a copy of Rome Cable Corporation——

A. Well, this is the advance order that comes in from the district. This is the order that resulted from this quotation, 45,000.

Q. And that is Defendant's Exhibit AR-42 for identification. Now, the price on that was $405 per thousand feet?

A. That is correct.

Q. What was the comparable copper price you quoted?

A. Well, the copper product comparable is sold on a [fol. 1465] poundage basis. We quoted 55.07 cents per pound. I haven't got paper—in order to convert that to per thousand feet—I know it will be considerably greater, but I'd have to——

Q. I don't think it is necessary.

A. The copper price is higher.

Q. Now, was this for overhead purposes?

A. Yes.

Mr. Bergson: I offer Defendant's Exhibit AR-42.

Mr. Mahaffie: No objection.

The Court: Received.

(Defendant's Exhibit 42 for identification received in evidence.)

Q. Now, Mr. Rolston, to get back to this Knoxville Utility Board situation, I show you Government Exhibit GX-185 and ask you if that refreshes your recollection as to when you had an inquiry from the Tennessee Valley Authority

as to whether or not you were still interested in being on the approved list?

A. Yes, it does. The date of this telegram indicates April 14th, 1960.

Q. Do you know when the government brought its law-
[fol. 1466] suit against Rome and Alcoa for the acquisition of Rome Cable?

A. My recollection is it is a matter of a few days of that date.

Q. Before?

A. Before.

Q. Prior to the time you made your original inquiry, up to that time you had heard nothing from TVA?

A. To the best of my knowledge, no.

Q. Mr. Rolston, you are familiar with the term "service drop"?

A. Yes, I think I am.

Q. Do you know what constructions of wire and cable are used for service drop purposes?

A. You mean all of them or the most common ones?

Q. Well, the most common ones first.

A. Well, I would start off by describing the—did your use the word cable, or service drop?

Q. Service drop, I said.

A. The weatherproof or covered line wire is one form of conductor used for service drop. I prefer to use the term multiplex or duplex, triplex or quadruplex as a service drop
[fol. 1466a] conductor. The type SD cable which is I believe on the exhibits. The type K cable which is commonly referred to as the flat ribbon type of service drop cable. And I'd say that was—with all modifications.

[fol. 1467] Q. Which are the two most prevalent uses?

A. Two most prevalent uses would be the triplex or multiplex type or single conductor line wire, weatherproof.

Q. And the single conductor line wire, weatherproof, how is that strung?

A. It has two or three open wires running from the secondary line to the service connection.

Q. Now, as director of marketing for Rome, when you sell weatherproof line wire to a utility or when you sell triplex or multiplex cable to a utility, do you have any way of knowing to what use that wire is put by the utility?

A. Well, in the first case of the weatherproof or covered wire there is very little chance, I will say your local people would know the standard practice, but to put it quantitatively you would not know. With regard to the multiplex type there may be based on the conductor size being used as a secondary cable line service drop cable.

Q. So that you wouldn't know whether when you sold the certain size of triplex, whether it was being used as a secondary distribution cable or a service drop cable?

A. You would not positively, no.

[fol. 1468] Mr. Bergson: At this time, your Honor, I would like to offer in evidence Defendants' Exhibit AR-33 for identification.

This exhibit is a letter from Olin Mathieson Chemical Corporation to the Anti-Trust Division in response to an inquiry from the Anti-Trust Division for information for use in this case. The information is given by Olin Mathieson, and in reporting figures for drop service cable, which I assume is the service drop cable, there is a footnote to the letter, "Drop-service cable and neoprene and polyethylene covered line wire and cable may be used as drop service cable. Line wire and cable has arbitrarily been calculated at 20 per cent of the total."

I offer this letter from Olin Mathieson, to the Department of Justice, dated August 4, 1960, as Defendants' Exhibit AR-33.

Mr. Mahaffie: We object to it, your Honor. If this document is offered to show, as I believe it is, that Olin Mathieson, in responding to our request had or found it necessary to make an arbitrary calculation of the amount of these products going into service drop cable, and if that is the [fol. 1469] purpose for which Mr. Bergson is offering it, and I believe it is, we object on the ground of——

Mr. Bergson: I am offering it for the purpose of showing that line wire and service drop cable are used for other than service drop purposes, and to that extent it has probative value. You elicited the information and we didn't, and they said that they estimated it at 20 per cent, and to the extent that it has probative value I am offering it for that purpose as well.

Mr. Mahaffie: The only point I want to make with respect

to this, your Honor, the Government here asked Olin Mathieson to state how much their insulated or covered aluminum production in given years was service drop cable. Now, the fact that Olin in responding to this had to calculate arbitrarily a 20 per cent figure indicates, to be sure, that *that* Olin did not know how much of the aluminum insulated products it made was service drop. It does not prove and isn't relevant to show whether Olin could tell how much of [fol. 1470] its total insulated wire and cable went into service drop.

Mr. Bergson: Your Honor, I submit it also goes to the question of the validity of the Census Universe.

Mr. Mahaffie: That is just what I am getting at. The Census Universe on service drop is aluminum and copper. This is aluminum only.

Mr. Bergson: It is part of it.

The Court: I don't quite see—I don't know if I am following you or not. Perhaps to make the picture complete the request made by the Government to Olin, the Olin firm, ought to be a part of the exhibit. That is, if it is explanatory in any way. If one goes in, why, probably the other ought to go in. But I assume that you asked the Olin for facts, with the intention of using it. Now, I would assume that the defendant has the right to use it.

Mr. Mahaffie: Oh, certainly, your Honor. I am objecting to the relevancy of this to prove what Mr. Bergson thinks it proves.

[fol. 1471] The Court: Isn't that argumentative rather than anything else. Maybe it proves it or maybe it doesn't. You say it doesn't and he says it does, and probably some fine day, maybe in July, I guess I have to figure out whether it does or not. Actually, I am not impressed with the whole thing, because service drop may be composed of different metals or different merchandise. Isn't that a fact?

Mr. Mahaffie: Service—the use of service drop may be composed of this open wire or the multiplex. Service drop cable is an identifiable product, we submit.

The Court: Of course, it is identifiable. You mean it can only be used for service drop?

Mr. Mahaffie: No, it can be used for some parts of secondary distribution as well.

The Court: That is what I thought. I can't find after

listening to both of you gentlemen, to put it frankly, I don't know what you are talking about, and I don't see any dispute here.

[fol. 1472] Mr. Bergson: We contend service drop is not a line of commerce.

The Court: Yes, I understand that.

Mr. Bergson: But against the possibility that it might be held to be a line of commerce, I feel that we must adduce evidence at this time. It doesn't indicate at all that we are supporting that line of commerce, of which I am sure your Honor is aware.

Mr. Mahaffie: My objection is to the materiality of this document to assault the Census Universe, which is what it is offered to show.

The Court: I will receive it, and if you wish, it may be wise to offer the request with it so that it may be of some value.

Mr. Mahaffie: Very well, your Honor. Would the Court like us to do it now?

The Court: Suppose I take a short recess.

(Defendants' Exhibit AR-33 for identification received in evidence.)

The Court: Take a short recess.

The Clerk: Court is in recess.

(Whereupon, a short recess was taken after which the trial was resumed.)

[fol. 1473] The Court: All right, gentlemen, we will start again.

Q. Mr. Rolston, I show you Defendant's Exhibit AR-40 for identification and ask you whether during the recess you were able to line up any comparable aluminum and copper products.

A. Yes, I have identified Item 2 which is a two-conductor 4/0 copper pre-assembled cable with Item No. 6 which is an alternate of 336,400 circular mil aluminum, and the copper price on Item 2 is $888 per thousand feet, and the aluminum price, alternate, is $729 per thousand feet. I also found that Item No. 4 which is a three-conductor 4/0 copper cable with a copper weld messenger, that the alternate item is

No. 9, requiring an alternate of 336,400 circular mils and the respective prices are $1148 for the copper item and $975 per thousand feet for the aluminum item.

Mr. Bergson: I offer Defendant's Exhibit AR-40.

The Court: With that explanation, I will receive it. Mr. Mahaffie, do you want at this time to offer the government's request to Olin?

[fol. 1474] Mr. Mahaffie: Yes, your Honor. I will also renew my objection to the defendant's exhibit and offer government Exhibit 497 for identification, which is a letter dated July 6th, 1960, from the acting assistant attorney general to the vice president and general counsel of Olin-Mathison.

The Court: I will receive both exhibits.

Mr. Mahaffie: All right, sir.

By Mr. Bergson:

Q. Now, Mr. Rolston, many of these requests for alternative quotations that I showed you today were dated in 1958. Do you still receive requests for alternate quotations?

A. Yes, we do.

Q. Now, since the acquisition of Rome by Alcoa where you now are in a position to offer overhead transmission cable as well as the distribution products which you made before, do you find that Alcoa-Rome has any advantage in being able to offer to utilities a full line of products?

A. No.

[fol. 1475] Q. Would you explain why.

A. Well, these products are you might say separate unto themselves. Particularly if a transmission line design is required by the utility, the ability to quote and supply a conductor for that transmission line is—in fact, in some of the utilities it is even in a different department. The general distribution requirements as purchased by utilities may be handled on a basis of what they call their ninety day or six months requirements of distribution size and type, and consequently they are just as separate as maybe two different automobiles as far as utilities is concerned. I don't consider it of any significance.

[fol. 1476] Q. We have spoken before of the Phelps-Dodge

Company. Does that company manufacture wire and cable products?

A. Yes, they do.

Q. What conductor metal do they use?

A. Certainly primary copper.

Q. Has Rome Cable or Alcoa-Rome ever received a request from Phelps-Dodge to furnish stranded aluminum conductor for insulation by Phelps-Dodge?

A. We have.

Q. And has Alcoa ever received a request for quotation from Phelps Dodge for the furnishing of E.C. aluminum redraw rod?

A. We have.

Q. If you know, do you know for what purpose Phelps-Dodge purchased or requested such a quotation on E.C. redraw rod?

A. I think associated with timing that we have indication that they required it for an ACSR quotation if they were successful.

Q. Do you associate that with any particular project?

A. Yes, I would say that due to timing I could associate that with a project.

Q. What project?

[fol. 1477] A. Project of the Consolidated Edison Company for 345 k.v. transmission hookup.

Q. Involving how many pounds of aluminum?

A. I would say the net aluminum weighed in the neighborhood of three and a half to three and three-quarter million pounds.

Q. In your capacity as vice-president in charge of marketing do you have anything to do with conduit?

A. I do.

Q. Does the Rome Cable Division of Alcoa offer both steel and aluminum conduit for sale?

A. We do.

Q. Do you find that in offering these products that steel and aluminum are in competition with one another?

A. Yes, we do.

Q. Does the pricing of steel conduit have any effect upon the price of aluminum conduit?

A. Yes, I think it does.

Q. And if the price—what would happen to the price of

aluminum conduit if the price of steel conduit were to go down?

A. I believe that the price of aluminum would go down, too.

[fol. 1478] Q. Are steel and aluminum conduit used for the same purposes?

A. Essentially for the same purposes.

Q. And that is for——

A. The raceway through which you pull insulated wire.

Q. And whom do you consider to be your competitors in the sale of conduit?

A. Which, steel conduit?

Q. All conduit.

A. Well, in steel conduit, Triangle Conduit and Cable; Pittsburgh Standard, General Electric Company; Clayton Mark; Republic Steel; Youngstown Sheet and Tube; Clifton Conduit Division of General Cable Corporation. Wheatland—I forget the last name—Wheatland Products. H. K. Porter; Walker Brothers. Those that I have named are all principal steel conduit manufacturers.

In aluminum, Kaiser, Reynolds, Channel Master, Hazelwood. What I am hesitating for is those companies we have do not manufacture the product but have an arrangement whereby they sell under what is called a general label. This consists of General Cable and Pittsburgh Standard. They are all that I can think of at the moment.

[fol. 1479] The Court: Do any of them sell both steel and aluminum?

The Witness: Yes, for instance Triangle Conduit and Cable did sell both of them. Clifton Division of General Cable did sell both. One that I hadn't mentioned, National Supply of Armco, they have both steel and aluminum. Walker Brothers has both available. Those are about the only ones I would think of at the moment.

Q. Now, does the Rome Cable division consign aluminum conduit?

A. Yes, we do.

Q. Why do you do that?

A. I think we do it because of competitive conditions where aluminum conduit is offered on a consignment basis, and we also have a similar policy.

Q. You did it to meet competition?

A. That's correct.

Q. Now, you heard Mr. Koger testify this morning about the competition that your Torrence plant faced from the manufacture of conduit on the east coast or east of the Mis-
[fol. 1480] sissippi. Do you generally subscribe to that testimony?

A. Yes, I do.

Q. Now, Mr. Koger was asked on cross-examination why Rome Cable made certain market studies on the basis of the so-called eleven western state area. Can you tell us why such studies were made on that basis?

A. I would say only because rather than call it a market area, it is a trading area, and the only place where we have ever been able to get any indication made by other we will say outside sources of what the estimated market is or happens to be for eleven states. And consequently we have applied our sales for a period in comparison with those estimates. We, however, have not considered it as necessarily being a market area. I think for years and years everybody in the business has been trying to find out what the markets are in any state or any trading area, and the term eleven west coast states is practically synonymous. Anytime you go to California, meet the chamber of commerce or anyone else, all the figures they are talking about on population and growth they call the eleven west coast states, so we
[fol. 1481] use that as one source of some other person's estimate of market potential on it and compare it with our own figures in that area.

Q. The competition you faced in this area—where did that come from?

A. From all other manufacturers. Principally east coast and near middle west manufacturing sources. I would say when steel conduit we are referring to, they are all selling in that market.

The Court: Is that competition any different in the eleven western states than it is in the fourteen states served by the Torrence plant?

The Witness: No.

Q. Now, Mr. Rolston, yesterday there was introduced in evidence through Mr. Hemeter Defendant's Exhibit AR-29,

which is a tabulation of potential business reports which Mr. Hemeter testified that he compiled and prepared on a day-to-day basis in the course of the performance of his duties at Alcoa. In his tabulation, Mr. Hemeter had a chapter entitled "Business lost to unknown." Were you furnished a copy of that portion of the report which was entitled "Business lost to unknown"?

[fol. 1482] A. We were.

Q. Did you make a check against the records of the Rome Cable Corporation to find out if Rome Cable got any of this unknown business?

A. We did.

Q. And did you find that Rome Cable did get any of this unknown business?

A. Yes.

Q. And what business did you find that Rome Cable got?

A. My recollection was——

Q. Maybe this will help refresh your recollection.

A. Out of all the items, I think we got four that were reported in this "unknown" list.

Q. I have shown him, your Honor, a copy of a letter to me stating what they had found, and I am just handing it to him for the purpose of refreshing his recollection.

A. Do you want me to summarize it? Read it?

Q. Yes; summarize it. Let me show a copy to the Government. Does this refresh your recollection as to what business tabulated in the unknown business lost reports Rome Cable secured?

A. Yes, it does.

[fol. 1483] Q. Will you please state for the record what that was?

A. It is pretty voluminous. Do you want to go by the PBR reference?

Q. State it by the job number and the amount of pounds involved.

A. The first one is Philadelphia Electric Company which was taken from the lost business report of PBR 3560 testified by Mr. Hemeter, and we found we got an order for 21,900 feet of this item, having a total weight, as I see on here of about—well, the only way to get this accurately in the record is to read exactly what it says:

"Our order 3707 entered on March 21, 1957, called for 50,000 feet of three-conductor aluminum triplex."

Also on this same order shows an item of No. 4 ACSR neutral for shipment August 27, '57, and on the bottom of this item it contains a note,

"In view of the dates of order and shipment it is doubtful if either of these particular items refer to PBR 3560." In other words, I made an attempt to identify it but they don't spell out.

Q. Which ones were you able to find out and identify as being the ones referred to here?

[fol. 1484] A. We were definitely able to identify one from the Public Service Electric and Gas Company which was taken from their PBR, amounting to 44,000 pounds of aluminum. We got Toledo Edison in the amount of 3,740 pounds reported on PBR 2013, and a second one from Toledo Edison in the amount of 11,800 aluminum pounds, which was taken from their PBR 2017. And I read from note on Item of Public Service Electric and Gas statement:

"We are unable to determine whether either of these are related to the Alcoa report, because of the lack of specific details concerning the covered wire."

Q. So that the only two—there were only two that you could actually identify?

A. Exact duplicate quantities.

Q. And that was both to the Toledo Edison?

A. That is correct.

Q. And the amounts of those were—would you state that again for the record?

A. On the first one it shows 3,740 aluminum pounds. On the second it shows 11,800 aluminum pounds.

Mr. Bergson: You may cross-examine.

[fol. 1485] Cross-examination.

By Mr. Mahaffie:

Q. Mr. Rolston, with respect to this last matter that Mr. Bergson examined you about, the table that had been prepared by Mr. Hemeter, and your own working connection with that, I believe you testified that you are able to identify from Mr. Hemeter's unknown category two jobs which were definitely obtained by Rome Cable Corporation?

A. Yes, sir.

Q. One in the amount of 3,740 pounds and one in the amount of 11,800 pounds?

A. That is correct.

Q. Now, you also testified that you had some difficulty, did you not, in matching the potential business reports with business obtained by Rome; is that correct, sir?

A. Yes. In the ones I read off that you could not tie in directly.

Q. Were there others in that group that you could or could not tie in directly?

A. None other than are shown there.

Q. Well, what I am getting at is this: Might there not be other business in that unknown category which was lost [fol. 1486] to Rome but which you could not identify from the description on the tape?

A. I think it would be rather doubtful, for this reason. You see you at least have a customer named like Public Service Electric and Gas. Now, in order to ascertain anything therefor in the records whether or not one of these items that appeared on the, let's call it the PBR report that Mr. Hemeter prepared, you first had to go through any orders that we did receive.

Q. From that customer?

A. From that customer. Well, like what happened in the case of the Public Service Electric and Gas, we did get an order of these types of products. Incidentally, you are getting orders from the Public Service Electric and Gas but we could not tie in the dates for them specifically. In other words, you would have a lost business report, say as of March. Well, you might have items coming in, orders coming

into us the following June, and that is what we meant. I would say that the changes are pretty slim.

[fol. 1487] Q. But it is possible?

A. It could be possible.

Q. This is due to the fact that the description of the business in the Hemeter table simply was not adequate for you to determine whether it is business that you got?

A. Actual time and date and everything else. That's right.

Q. I see. Now, Mr. Rolston, with respect to conduit. It is correct, is it not, sir, that following the merger of Alcoa and Rome aluminum conduit was manufactured at the Torrance plant of Rome?

A. The finishing operations were, yes. It was manufactured at the Torrance plant. Threading and coupling.

Q. Am I also correct, sir, that that aluminum conduit was, again following the acquisition—am I correct that that aluminum conduit was shipped from the Torrance plant to consumers within the so-called eleven western states area?

A. Not necessarily to the eleven, but west coast consumers, yes. That was the area we would service out of Torrance.

[fol. 1488] Q. And the remainder of the United States was serviced from what point, sir?

A. Lafayette is the other manufacturing point.

Q. So then Alcoa-Rome had two manufacturing plants for conduit; one at Lafayette which is in Indiana?

A. That's right, Lafayette, Indiana.

Q. And one at Torrance?

A. That's right.

Q. And the Torrance plant served the western area; the Lafayette plant served the balance of the country?

A. That's correct.

Q. Now, where is the line drawn between the areas served by the Torrance plant and the area served by the Lafayette plant?

A. Well, actually for every transaction you couldn't define it as much as a line drawn. You have got cases that the job was solid carloads, you could well ship it from Lafayette, we'll say, on to the eastern portion. There wasn't any sharp line of demarcation, but I would say most transactions were in that area, let's call it, from the—as Mr. Koger described

[fol. 1489] it—Continental Divide in the west was serviced from Torrance, California.

Q. The area sometimes referred to as the eleven western states was served from Torrance. The rest of the country from Lafayette.

A. Yes, that's right.

The Court: Read that question.

(Last question was read by the reporter.)

Q. Is that correct, sir?

A. I'd say that is essentially correct.

The Court: I thought you said a minute ago there was fourteen states served from the Torrance plant.

The Witness: Well, that was specifically on steel conduit, your Honor. The distribution of the aluminum conduit was essentially—wasn't exactly eleven states, but we serviced what we call the western areas on aluminum conduit out of Torrance, and we serviced the rest of the country—now that's the point. I say you couldn't say every shipment, because if you happened to have some steel conduit—take for example you had some going to Colorado, which is not one [fol. 1490] of the so-called eleven western states, in which they wanted a half carload of steel conduit and half a carload of aluminum conduit. In that case, on these combined cars it would come from Torrance. So if we went over every—let's take literally every shipping transaction made over the last two years, there isn't any question but what you would vary from a strict limitation of eleven states in that type of thing. It is a combination situation in many cases where the tools—just how many shipments in a period of time in that case I don't know.

Q. These were exceptions to the rule, were they not?

A. If more load quantities were wanted in two materials.

Q. Mr. Rolston, you testified that prior to the merger Rome attempted to ascertain its market share in its steel conduit sales and that it attempted to do it on the basis of the eleven western states.

A. No, I don't think I testified that.

[fol. 1491] Q. I'm sorry, sir.

A. We have always attempted to determine our market

share in every state. We used in I think one case or two at the most an eleven-state figure because of the fact that the Electrical West Magazine put out an estimate on their part of the market for—I forget what year it was—1957—and we simply said that—we went back and checked our sales against the projection made by Electrical West by our studies, and always attempted to in every way to find out what percent, but the difficulty has been and still is that there are no well established—let's call it market area statistics any place in the country.

Q. Well, Mr. Rolston, what would you estimate would be Rome's percentage of the eleven western state area of the steel conduit sold in that eleven western state area as of the last time you tried to make an estimate?

A. My recollection is that the last figures were in the neighborhood of 16 or 17 percent. That's my recollection.

Q. As of approximately what date, sir?

A. Oh, I think it is about four years. My guess would be [fol. 1492] it was 1957 or '58.

Q. Now, do you have in front of you a copy of AR-40, document marked as AR-40?

A. Yes, I do.

Q. Would you just explain to me, sir, with respect to just one example. Would you explain how you determined that Item 2 and Item 6 were alternates?

A. Yes. I looked at No. 2 and they specified a 4/0 copper conductor which was to be twisted with a copper weld messenger with what we call a binding strap which is a preassembled aerial cable. Then I went down to an item which turned out to be No. 6 which is the full aluminum alternate. In other words, the 336 aluminum is an alternate size for equal resistance to 4/0 copper.

Q. I see.

A. And then I did the same thing on the 4 and 9. It was done by taking the equivalent aluminum size.

Q. I understand. Now, with respect to the documents which were marked as AR-34 through AR-40, all of which you testified about on your direct examination, would you state the type of product, if there is one common type to all [fol. 1493] of these products, which is involved here.

A. There isn't. I mean—the fact that—I can go over them individually, but you will find that if you are speaking

of principally the group of the Public Service Electric Gas, I think those are two commons.

Q. Well, there are some from Boston.

A. I can do that——

Q. I don't want you to.

A. Basically the Public Service Electric Gas, which I think are five of those numbers, if you notice at the top they specify a specification number. For example, if you take Exhibit 38 you notice under the third line it says "To our specification 14-2 aluminum and 22-4 for copper. And that is a specification that is probably, oh, ten or a dozen pages or maybe not that much.

[fol. 1494] Q. Yes, I understand that. Let me ask you this way, Mr. Rolston. You described, in the case of two or three of these documents, you described it as pre-assembled aerial cable?

A. That's right.

Q. I ask you now if that is not true in the case of all these documents, that the product under consideration be pre-assembled aerial cable?

A. No. My recollection is in one of the Public Service order twisted cable and not a cable bound to the messenger. I think I identified that——

Q. Could you identify that for me, sir?

A. I believe so. Now, after I reviewed them all, all the specifications are of the description of what we call pre-assembled aerial cable.

Q. Now, that is pretty high voltage cable?

A. Not necessarily. In fact, in their products they buy it at the 600 volt or 15 k.v. It is the design rather than the voltage factor.

Q. Are the products which are covered by these documents, wherever I am able to find a voltage specification on here, I see one for 4 k.v., that is 4,000 volts?

A. That's right.

Q. There is another one of 5,000 volts?

[fol. 1495] A. Yes. I think there is one here of 600 volts. Let's see a minute. I can tell by the insulation thickness which is, which. Yes, for instance, AR-37 is 600 volts. Regular 600 volt insulation.

Q. 600 volt pre-assembled aerial cable?

A. That's right. And these other products, they buy

what they call secondary cable of this type for less than 600 volts. And then they have a 4 k.v. and some 5 k.v. and in some cases, I think there is another represented here at some 15 k.v.

Q. None of these exhibits, AR-34 through 40 deal with weatherproof wire?

A. No, there is no weatherproof wire in here.

Q. They all deal with the product which you referred to as pre-assembled aerial cable?

A. That is correct.

Q. Now, Mr. Rolston, you testified that several products could be used for a service drop function?

A. Yes.

Q. And Mr. Bergson also asked you which were the most prevalent. You said that the triplex construction and the single conductor or open wire construction were the most prevalent. Of those two, which today, is the most prevalent in new construction?

[fol. 1496] A. I think the multiplex construction.

Q. Now, going back to Government's Exhibits 134, 135 and 185, which Mr. Bergson discussed with you, they are, to save you time, they are the documents dealing with the Knoxville Utilities Board, Tennessee Valley Authority, what products did you have in mind selling to the Knoxville Utilities Board, if you became an approved supplier?

A. The distribution products which could be either aluminum, line wire, aluminum line wire or——

Q. ACSR?

A. Yes, in distribution sizes.

Q. You had in mind if you could obtain this TVA approval you would be able to sell ACSR and bare aluminum cable in distribution sizes?

A. I would say it differently. We would have had the opportunity to quote on it.

Q. Yes. You had not been attempting to sell these products to fill out carloads, would you say? In other words, you were really attempting to sell these and make some money?

A. You could on occasion if the Knoxville Board has public bidding. If they came up with an inquiry in which we would say there is a total of 30,000 pounds and you have 15,000, say, of line wire and 15,000 1/0 ACSR, and we chose

[fol. 1497] to bid on that basis, we would use it there. And, I think there are some cases where that would happen.

Q. But you also have in mind that you might sell these products to some utilities other than the Knoxville Utilities Board, in the same area?

A. I think we have quoted—you got Memphis, you got several of those operations down there, which we have quoted on. This is the only one that I happen to know of that ties in there with the approvals that the TVA approves.

Q. Well, you testified that prior to the acquisition you handled or sold ACSR. I don't recall whether you described it as an accommodation item or not. I don't think you did, but I think you said, and correct me, if I am wrong, that you sold it to fill up carload lots?

A. I would say that was the primary reason. There would be other cases—I wouldn't call it, I never considered the sale as accommodation sale. Some would want two thousand of distribution sizes and two thousand pounds of line wire and we might just choose to sell it to them.

Q. But not as any sort of accommodation item?

[fol. 1498] A. I don't class it strictly as accommodation, no.

Q. In the aluminum wire and cable field, generally, you listed various competitors?

A. Yes.

Q. And I believe you were talking as of the present date, were you not, when Mr. Bergson asked you to list competitors in aluminum wire and cable?

A. I would say so, in aluminum, particularly.

Q. Now, Mr. Rolston, you listed—I have to correct myself, I think you were talking in terms of 1958?

A. Yes, as far as I am concerned in aluminum there was no change.

Q. You listed Alcoa, Kaiser, Reynolds, General Cable, Anaconda, Nehring, Central, Southern Electric-Olin, and Southwire. Now, can you add any to that list or does that substantially represent your competition?

A. I would just as soon list them all. At any given time they are all competition.

Q. What I am talking about, is there any special competitors who are not on that list in aluminum wire and cable?

A. Yes, Essex Wire. Did I have that in the original go-around?

[fol. 1499] Q. No, sir, I don't have it in my notes.

A. I would say that represents the majority of them.

Mr. Mahaffie: No further questions.

Redirect examination.

By Mr. Bergson:

Q. I have just a few on redirect. I would like to clear up any confusion on this potential business report.

Mr. Rolston, I show you this letter to me again and ask you to identify the business listed on the potential business reports that you were able to establish that you got and that you got and was considered lost by Alcoa?

A. Toledo Edison.

Q. How many pounds of aluminum?

A. 3,740 pounds of aluminum.

Q. What is the next one?

A. The next one is an order from Long Island Lighting Company in the amount of 1,519 pounds of aluminum.

Q. And the next one?

A. And the third one is Toledo Edison in the amount of 11,800 pounds of aluminum.

Q. Now, Mr. Mahaffie talked to you about aluminum [fol. 1500] conduit manufactured at the Torrance Plant. What work is performed in the manufacture of aluminum conduit at the Torrance Plant?

A. The application of threads on each end of the aluminum pipe. The application of coupling on one end and thread on the other and the necessary lubricant.

Q. So when you get the aluminum pipe and you put threads on the end and a cap on the end?

A. That's right.

Q. And in threading the aluminum pipe did you use the same application that you used in threading steel pipe conduit at Torrance?

A. I am not a manufacturing man. I believe—maybe they changed type of threads. I couldn't answer whether it is the identical equipment.

Q. But the manufacturing consisted of threading?

A. Yes, they might have had to change the coating or oil or something, as far as I know it was the identical threading machine which we had.

Mr. Bergson: All right. Thank you.

Mr. Mahaffie: Just one question, Mr. Rolston. At that Torrance operation today, if you know, where does the aluminum pipe come from which is threaded?

[fol. 1501] The Witness: It comes from the Vernon Plant of the Aluminum Company of America.

Mr. Mahaffie: It is produced there?

The Witness: It is produced there. That's right.

Mr. Mahaffie: No further questions.

(Witness excused.)

Mr. Bergson: Mr. Healy.

JOSEPH L. HEALY, called as a witness in behalf of the Defendants, being first duly sworn, testified as follows:

Mr. Bergson: Your Honor, I know you have been waiting for these. These are statistical charts. Some I will put through Mr. Healy and some through a Mr. Day, a subsequent witness.

Direct examination.

By Mr. Bergson:

Q. Mr. Healy, will you please state your name and address for the record?

A. Joseph L. Healy, 992 Homer Avenue, Pittsburgh, Pennsylvania.

Q. By whom are you employed?

A. Aluminum Company of America.

[fol. 1502] Q. In what capacity?

A. Senior accountant.

Q. How long have you been employed by the Aluminum Company of America?

A. Twenty-four years.

Q. And how long have you been employed in your capacity as senior accountant?

A. About seven years.

Q. And prior to that were you also in the accounting department?

A. Yes, sir, as chief cost accountant, Vancouver works.

Q. Mr. Healy, in the course of preparing to defend this lawsuit brought by the government against the Aluminum Company and Rome Cable Corporation did you at my request prepare certain charts?

A. Yes, sir.

Q. And were these charts prepared by you personally or under your direction and supervision?

A. Under my direction and supervision.

Q. Now, I invite your attention to Defendant's Exhibit AR-7 for identification which is the first chart in this book and which is entitled "Primary aluminum capacity production and supply." This chart was prepared under your [fol. 1503] direct supervision?

A. Yes, sir.

Q. Will you state in terms of Alcoa's percentage of United States capacity, of primary aluminum capacity, Alcoa's percentage in the year 1948 as indicated on that chart.

A. Alcoa's percentage of primary aluminum capacity in the United States was 50 percent in the year 1948.

Q. Between 1948 and 1957, Alcoa's capacity ranged between what figures?

A. Between 50 percent and 43 percent.

Q. And what was Alcoa's percentage of primary aluminum capacity in 1960?

A. 35 percent.

Q. When we talk about primary aluminum capacity, are we talking about domestic primary aluminum capacity?

A. Yes.

Q. Now the next column I notice headed "Primary aluminum production."

Mr. Bergson: Your Honor, counsel for the government would prefer to have me offer these before I examine the witness about them, and I have no objection to doing so.

[fol. 1504] I offer Defendant's Exhibit AR-7 for identification.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-7 for identification received in evidence.)

Q. Will you state what the chart shows to be Alcoa's percentage of primary aluminum production in 1948?

A. In 1948 it was 52 percent.

Q. And in 1960 it was how much?

A. 36 percent.

Q. Now, there is another column entitled "United States primary aluminum supply." How does this differ from primary aluminum production?

A. It differs in that the imports of crude aluminum are included. That is, imports in the United States.

Q. In 1948 Alcoa's percentage of such supply was——?

A. 46 percent.

Q. And in 1960?

A. 34 percent.

[fol. 1505] Q. Now, I invite your attention——

The Court: Are you going to leave that?

Mr. Bergson: Yes, sir.

The Court: What does the column in your primary aluminum capacity and primary aluminum production—what does the Canada column mean?

The Witness: That represents the primary aluminum capacity and production respectively in Canada for all the Canadian companies that are involved.

The Court: All right.

Q. But the percentage is percentage of domestic product?

A. That's right.

The Court: That figure is not included when you determine the percentage for instance of Alcoa's percentage of United States in 1960. 35 percent. That Canadian figure is not included.

The Witness: That's right.

Mr. Bergson: And if the Canadian figure were included, Alcoa's percentage would be substantially less.

[fol. 1506] The Witness: Yes, that's right.

The Court: Just one more question. In the last table, it refers to aluminum supply. You have a column, "United States imports, crude aluminum." Does that include imports from foreign countries and Canada?

The Witness: Yes, it includes Canada as well as any other foreign country.

The Court: In other words, it is everything except domestic.

The Witness: Yes.

Mr. Bergson: But of crude aluminum. This is not any of this semi-finished or finished product.

The Witness: That's right.

The Court: All right. I guess I understand.

OFFERS IN EVIDENCE

By Mr. Bergson:

Q. Now I invite your attention to Defendant's Exhibit AR-43 for identification and ask you whether that chart was prepared under your direction and supervision.

[fol. 1507] A. Yes, it was.

Mr. Bergson: I offer Defendant's Exhibit AR-43 for identification.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-43 for identification received in evidence.)

Q. Now, Mr. Healy, will you please explain to the Court what this chart portrays.

A. This chart shows for the United States in total and for Alcoa's portion the unused primary aluminum capacity. It shows that in the year 1948, four percent of the total United States primary aluminum capacity was unused. It shows in the year 1960 that 18 percent of the United States primary aluminum capacity was unused. For Alcoa in 1948 it shows that Alcoa's entire capacity was used, and in 1960 that Alcoa's unused capacity was 15 percent of its total primary aluminum capacity.

Q. What do you mean by unused capacity?

A. That refers to primary smelting capacity that is not operating. Re ers to idle pot lines.

Q. So that if there were a demand for more aluminum, [fol. 1508] this capacity which was unused could be used?

A. Yes.

Q. Now, I notice here you have some figures in parentheses. Would you explain what that means?

A. Alcoa's capacity was defined for certain periods on a basis which included consideration of power availability. In certain years the amount of power generated, due to better than medium water conditions on which the capacity had originally been calculated resulted in production in excess of the capacity that had been calculated. In other words, capacity based on average water conditions—capacity was based on average water conditions. As the rainfall was exceptionally heavy, more power would be generated and more aluminum produced.

Q. Now, directing your attention to Defendant's Exhibit AR-44 for identification, I ask whether that graph was prepared under your direction and supervision.

A. Yes, it was.

Mr. Bergson: I offer Defendant's Exhibit AR-44 for identification.

Mr. Melchior: The government objects to this tabulation, [fol. 1509] your Honor. It is not clear to us the relationship existing between the graph and the worksheet which accompanies it. As you notice, it is in two parts, and it is impossible to tell from the legend which indicates sales to domestic non-integrated companies in light grey—it is impossible for us to tell how that area was determined, from looking at the worksheet. Secondly, there is indicated on the worksheet that certain pig and ingot sales were made to Alcoa International, Inc. I am not sure, but I believe this concern is probably an affiliate of defendant, and it is not clear from the tabulation where that may be included in the graph. Whether it is included in the domestic non-integrated part or the part used by Alcoa, and the reason for the separation.

Mr. Bergson: Well, if you will let me follow the procedures I was following before, when you asked me to offer the exhibit in evidence, maybe I can clear this up.

[fol. 1510] Mr. Melchior: We wanted to express our objection before—

The Court: All right, I will let you go ahead and explain the chart.

By Mr. Bergson:

Q. Now, Mr. Healy, would you please explain how this chart was prepared.

A. Yes, sir. The dotted line which in the legend is captioned "Capacity" was plotted on the basis of the Alcoa primary aluminum capacity figures in the chart we were discussing a few moments ago.

Q. That is Defendant's Exhibit AR-47, the first chart.

A. That's right.

The solid black line which is captioned "Production" was plotted from Alcoa's primary aluminum production figures also from Chart AR-7. The light shaded area which is captioned "Sales to domestic non-integrated companies" is plotted in part from Exhibit AR-46. That chart covers the years 1947 through 1955. The information was updated. It is not shown in these tables. It was updated from 1956 through 1960.

[fol. 1511] Q. And these figures were updated from company records, were they?

A. That's right, sir.

Mr. Bergson: We have a stipulation with the government, your Honor, that figures obtained from company records will be satisfactory, unless the opposing party challenges it, and the government's objections to this chart did not challenge those figures.

Mr. Melchior: The government had no way of knowing where these figures came from until the witness stated it just now.

The Court: Go on with the lawsuit.

A. The dark shaded area which is captioned "Used by Alcoa" shows the total amount of Alcoa's primary aluminum production which it used itself in its own operations. The figures from which this chart was plotted appear on the worksheet which accompanies the chart. And they are the figures captioned "Alcoa primary aluminum used by

Alcoa" and the various other figures here show the basis of the calculation.

[fol. 1512] The Court: So that the sales to Alcoa International are included in the graph representing primary production?

The Witness: No sir.

The Court: Where are they used?

The Witness: The sales shown here to Alcoa International are export sales and they are therefore excluded from this graph. For example the light shaded area represents sales to domestic non-integrated companies. Therefore these export sales are excluded from that caption by definition. Likewise this metal was not used by Alcoa. It was exported. Therefore it is excluded from that section.

The Court: I see.

By Mr. Bergson:

Q. Now, Mr. Healy the difference between the dark shaded area and the solid line represents Alcoa production —what Alcoa production?

A. The space between the dark shaded area and the solid line represents Alcoa production that was sold to non-integrated companies plus Alcoa production that was shipped, exported, sold overseas plus Alcoa production which was shipped to the U. S. stockpile.

Q. And Alcoa production that may have been retained in [fol. 1513] inventory?

A. That is correct. Also any incidental sales that may have been made to other primary producers which may have been of inconsequential amount.

Q. Now on this chart, taking the dotted line at the top from the year 1956 on, the difference between the very black and the dotted line represents what?

A. The difference between the black portion of the chart?

Q. Yes.

A. And the dotted line represents the categories which I just mentioned, which are sales to non-integrated companies, export sales, shipments to government stockpile, additions to inventories plus idle capacity that is available and would be brought to use if the demand were there.

Mr. Bergson: I don't know whether—I offered this but I don't know whether it has been received in evidence.

The Court: No, it has not been.

Mr. Bergson: I re-offer it at this time.

The Court: All right. Let's see what objection counsel has.

Mr. Melchior: The government renews its objection, Your Honor, because the graph is obviously—on its face does [fol. 1514] not indicate precisely what the witness has said. I think the graph needs re-drafting to make clear what it says. The graph draws information not only from the work sheet which is attached to it but from several other exhibits, and they are not indicated on there at all. Now we don't challenge the accuracy of the information but we didn't have an opportunity to check it. We don't know where the information came from. I think this chart can be reconstructed. I don't think it is a valid chart at the present time. It needs re-drafting.

Mr. Bergson: I think the chart is perfectly valid, Your Honor. I think the witness' explanation makes it quite clear. I think it is entirely competent. I think the objection is unwarranted.

The Court: Well certainly I couldn't explain it without at least going back over the witness' testimony. I don't know that there is anything wrong with the graph, as I understand it, in what it shows. In other words the broken line shows the increase or decreases in capacity over this [fol. 1515] period. Now there is nothing wrong with that, is there, Mr. Melchior?

Mr. Melchior: Probably not. We don't know, Your Honor. I assume that the arithmetic is worked correctly.

The Court: He says it is taken right from AR-7. I don't see any particular objection. I don't know whether it is worked right either. But that is the way he has worked it. He is the accountant and I suppose he can draw this graph better than I. And I can understand that.

The next one is the solid line that is taken from AR-7 also; isn't that right, Mr. Healy?

The Witness: Yes it is.

The Court: And you say it is correctly plotted on this graph?

The Witness: Yes it is.

The Court: All right. I don't see anything to be done with the chart as to those two. Now the next one is sales to domestic non-integrated companies. You say that is taken at least in part from another graph, from another chart to be offered later on?

The Witness: AR-46.

[fol. 1516] The Court: AR-46.

Mr. Melchior: Which is not yet in evidence.

The Court: Which is not yet in evidence. Perhaps technically this should be withheld until we establish that AR-46 is correct.

Mr. Bergson: AR-46, Your Honor, is a chart that was taken from Judge Cashin's opinion in the Alcoa case based on a stipulation between the government and Alcoa.

The Court: Well the stipulation may be all right. But I wouldn't say anything about my brother, Judge Cashin.

Mr. Bergson: It was a good opinion.

The Court: Well so I imagine. So that objection so far as 46 is concerned is perhaps theoretically more than practical.

Mr. Melchior: Perhaps, Your Honor.

The Court: Especially if there is a stipulation about it.

Mr. Melchior: Your Honor I am also informed that AR-46—do you have that before you—only goes up to the date—only goes up to the first nine months of '56.

[fol. 1517] The Court: That's right.

Mr. Melchior: And this purports to go up to 1960.

The Court: Yes. But the witness says it came in part from this. Now I am trying to find out where the rest of it came from.

Mr. Melchior: All right.

The Court: Where did the rest of this graph showing the sales to domestic non-integrated companies come from, Mr. Healy?

The Witness: I do not believe that that shows anything in these exhibits. The information was up-dated but it is not a part of this booklet.

Mr. Bergson: It came from company records.

The Witness: It came from company records.

The Court: So that the foundation——

Mr. Bergson: We have the stipulation on this, Your Honor.

The Court: Oh! Have you a stipulation on this?

Mr. Melchior: You don't have to produce the stipulation. We agreed that we would not go behind company [fol. 1518] records produced or which could be made available to us unless we questioned the matter.

Mr. Bergson: Do you question the accuracy of this?

Mr. Melchior: I am not questioning the accuracy of this because I don't have the basis for questioning the accuracy. But I do question the matter of presenting it. I don't think it is complete.

The Court: We are by two of them. Two I think are all right.

Mr. Melchior: Yes.

The Court: Now this is the third one. Now what are we lacking in the third one—that is the light gray color? What are we lacking in that to make it complete?

Mr. Melchior: Well we would like to know what company records at least were utilized and we have no way of knowing.

The Court: Well that could probably be made available, couldn't it?

Mr. Bergson: Your Honor, this is going back into the books and ledgers of the company and this is what we tried [fol. 1519] to avoid in entering into this stipulation.

Mr. Melchior: I think you merely have to set off the annual totals. That is all. So we can see the figures. We have no way of taking off totals even. I am not asking you to go back and get individual sales. If you give us annual totals we can check and see that the graph was made correctly.

I am having a difficult time trying to determine what percentage the light shaded area is of the whole shaded area. You see it on a slant or on a bias. You might ask the witness if he has computed that, what percentage is the light shaded area in the year 1960, how does it compare with the dark shaded area—what percentage of the whole.

Mr. Bergson: He has not computed it, I am sure. I have not asked him to compute it. This chart is being used to show in the entire framework of the Alcoa primary aluminum production the absolute amounts that were used in Alcoa's primary—used in Alcoa's non-fabrication which were used in sales to non-integrated producers, which are

[fol. 1520] represented in expansion sales or sales to stockpile, or aluminum in inventory and also to show capacity. Now the capacity figures, the production figures are in a chart to which you didn't object. The sales to non-integraters are in a chart which was stipulated to by the government in the 1957 litigation. It was up-dated by recourse to company records. And the total used by Alcoa is set forth, and the manner in which that was obtained is set forth in the work sheet.

Mr. Melchior: Now can you tell counsel by looking at this representation here first who these non-integrating companies are that sales were made to? Do we have any way of knowing who they are or who you identify them as? And secondly, do we have any way of knowing——

Mr. Bergson: I am not offering it to show who they were made to.

Mr. Melchior: But it shows something like this, counsel. You have offered it for one purpose but it might show other things that we have an interest in. And there is no [fol. 1521] designation as to who these non-integrated companies are.

Mr. Bergson: They are every producer of aluminum product who bought aluminum from Alcoa, and they could be hundreds of thousands of them. Have you ever tried to make a list on them? It would be impossible.

The Court: I guess I don't understand it so this will be a good time for me to adjourn. Recess until ten o'clock tomorrow morning.

The Clerk: ~~Court is in recess~~ until ten o'clock tomorrow morning.

(Whereupon at 5.05 p.m. o'clock an adjournment was taken to Wednesday, February 21st, 1962, at 10 o'clock a.m.)

[fols. 1522-1523] [Title omitted]

Transcript of hearing—February 21, 1962

* * * * * * *

[fol. 1524] The Court: All right.

Mr. Bergson: May it please the Court, with the Court's permission, we would like to interrupt Mr. Healy's testimony to put on some utility witnesses and another short witness before we resume with Mr. Healy.

The Court: All right.

Mr. Latimer: Mr. Brandow.

CHARLES A. BRANDOW, called as a witness in behalf of the Defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Latimer:

Q. Mr. Brandow, would you state your full name and your address?

A. Charles A. Brandow, Assistant Purchasing Agent of the New York State Electric and Gas Corporation.

The Court: A little louder, Mr. Brandow.

Assistant Purchasing Agent of the New York State Electric and what?

The Witness: New York State Electric and Gas Corporation.

Q. Does your present position encompass the responsibility for buying wire and cable products?

[fol. 1525] A. Yes, it does.

Q. And how long have you been responsible for the purchase of wire and cable products?

A. Oh, something more than 15 years.

Q. Would you state the approximate area of New York State which your company covers?

A. About 17,000 square miles. This is about 35 per cent of the area of the State.

Q. Would you state the number of electric customers your company has, approximately?

A. About 470,000.

Q. Mr. Brandow, directing your attention to the covered overhead products which are represented on the board behind you, would you state who your regular suppliers of these products were prior to April 1, 1959?

A. The Anaconda Wire and Cable Company, the Aluminum Company of America, Rome Cable Corporation, and General Cable Corporation.

Q. Now, turning to the bare overhead products, was Rome Cable much of a factor?

A. No, they were not. It seemed to be that they were not particularly interested in that business.

[fol. 1526] Q. Turning now to the so-called service drop, what does your company use for service drop?

A. We use open wiring.

Q. And by open wire——

A. It is three individual covered wires from the pole to the customer's home.

Q. You use that at the present time?

A. That's right.

Q. And do you expect any change in that?

A. No.

Q. Would you state on what basis you purchased the covered overhead products?

A. We buy it on the basis of quotations, which are received from our regular suppliers and we buy rather regularly, although at no stated intervals.

Q. Now, on occasion, does one of your regular suppliers offer a discount on their products?

A. Yes.

Q. Now, prior to April, 1959, do you recall whether Rome ever offered a discount on these products?

A. I can't recall that they ever were the first to offer a discount.

Q. Who of the suppliers generally would?

A. Anaconda or possibly Alcoa.

[fol. 1527] Q. And then the others would follow?

A. That's right.

Q. Now do other suppliers, both prior to the merger and since, had other suppliers solicited your company for covered overhead business?

A. Yes. We have solicitations from people who do not supply us now. Reynolds, Olin Conductors, Kaiser. Those are some.

Q. Would those be satisfactory suppliers, if you choose to do business with them?

A. That's right.

Q. Mr. Brandow, why do you limit your group of suppliers on the product we have been talking about?

A. Well, first of all, we feel that we should have more than one supplier for a product as important as this. And then, secondly, we feel that we, if we limited our purchase to a few suppliers, we will be an important enough customer of theirs so that if we want some special consideration, some quick delivery or maybe some engineering advice, we would feel free to obtain it from them than if we were not too good a customer we would be a little bit reluctant to ask them.

The Court: And they would probably be reluctant to give [fol. 1528] it to you.

The Witness: I think that's right.

Q. Has there been any change in your supplier group on the covered overhead product since the Alcoa-Rome merger?

A. No.

Q. Mr. Brandow, does the fact that Alcoa, since the acquisition, can now offer a broader line of wire cable products in addition to the ones they were making before—— has that helped them on their sales to you of the covered overhead product?

A. No.

Q. And the Alcoa-Rome merger, tell us, has that had any adverse effect on you as a purchaser of overhead wire and cable products?

A. No, I can't say that it has.

Q. Do you expect that it will have in the future?

A. Well, it's pretty hard to look into the future, but as of now I can't see any reason why it should.

Q. Thank you.

Cross-Examination.

By Mr. Mahaffie:

Q. Mr. Brandow, are you an engineer?

A. No.

[fol. 1529] Q. Who within the company determines the type of product, or type of conductor which will be used in a particular application?

A. It would be our engineering people, with whatever advice they might need from our management people. Engineers would have the main say, of course.

Q. So any determination as to whether open wire or let's say triplex would be used for service drops would be made by your engineering staff?

A. That's right.

Q. Now, I believe you testified that your suppliers of covered overhead conductor products today are Anaconda, Alcoa and General Cable; is that correct?

A. That's correct.

Q. Rome was a supplier prior to its acquisition by Alcoa?

A. That's right.

Q. You also testified that you liked to have more than one supplier, is that correct?

A. That's right.

Q. Would you state why?

A. Well, it's always possible that one supplier might be affected by a strike or a fire or some Act of God, or some other reason why they would be out of the product and if [fol. 1530] we were tied with them alone, we might find it difficult to get deliveries.

Q. All right, sir. Other than the fact that Rome was a supplier in 1958 and is not today a supplier, have there been any other changes in your list of regular suppliers since, let's say, 1957?

A. No.

Q. Have you ever solicited a bid from anyone other than those three companies?

A. In the case of large amounts of wire, most of which are bare wires and used for transmission purposes, we have solicited bids from Kaiser and Reynolds, as well, and in those bids there may have been some amount of covered wire, more or less as an accessory to the bare wire.

Q. So your limitation to this group of three today is applicable in the case of relatively small orders?

A. That's right.

Q. In large orders, you will spread out and solicit business from others?

A. That's right.

Q. Now, have you ever received a bid from any company other than this group of three which was lower than the [fol. 1531] bids furnished by the three regular suppliers?

A. No.

Q. Is that true in the case of both bare transmission and bare and covered distribution cable?

A. As far as I can recall, that is so, yes, because we have a policy of accepting the lowest bid.

Q. So if you had received a lower bid, let's say, from Kaiser Company, you would have accepted it?

A. That's right.

Q. Do your regular suppliers, that is, Anaconda, Alcoa and the General Cable compete with other suppliers in the sale of wire and cable? That is, speaking generally.

A. Well, they definitely are in competition. I don't know that I quite understand your question.

Q. Well, I'm sorry. They are in competition, are they not, with Kaiser, Reynolds, and a few others, in sales of wire and cable throughout the country?

A. I believe so, yes.

Q. Do your regular suppliers generally charge lower prices than the other suppliers that would be available to you?

A. I don't know that they are any lower. They would [fol. 1532] be as low as others, I am sure.

Q. Would they be any higher?

A. I would say not.

Q. So their prices would be about the same as the—

A. I think that would generally be the case, yes.

Q. So would it be correct, then, that even though your supply situation is limited to a group of three today, in a general way you receive the benefit of the price competition that does exist among all suppliers of these products?

A. I should think so, yes.

Q. Thank you.

Redirect examination.

By Mr. Latimer:

Q. Mr. Brandow, on the so-called small orders you mentioned on both your direct and cross-examination, in connection with the covered products, do you buy covered overhead products any other way?

A. Very seldom.

Q. So this would be the major——

A. That's right.

Q. Thank you.

The Court: Just one question, Mr. Brandow. I notice you say that you use open wire for service drop. That is [fol. 1533] a present method, of present merchandise used for that purpose?

The Witness: Yes.

The Court: How long have you used open wire for service drop? Is it a matter of years?

The Witness: Yes, oh, I think that's probably almost the only method that we have used. Now, we have on occasion, used a very limited amount of triplex, but our engineers have ruled against it.

The Court: Where is your territory, or the territory of your company?

The Witness: The major part of it is in what I believe you might call South Central New York. It's around Binghamton, Elmira, Geneva, Auburn, Oneonta, although we do have properties down in Dutchess County and we have others within nine miles of Buffalo.

The Court: Has there been any expansion of your system in the last two or three years?

I assume it is expanding all the time to some degree, but what I mean is any notable expansion of your system.

[fol. 1533a] The Witness: I would say that we have grown at about the same rate as all the other utility companies. There has been expansion. It has been reasonably steady. And I'm not sure, I would say perhaps 10 per cent a year; something of that sort.

[fol. 1534] The Court: Is there any particular type of open wire that you use for service drop?

The Witness: We use nothing smaller than No. 2 alu-

minum and that is probably the most popular: No. 2 covered aluminum. If you want the technical name, it is ECH 26.

The Court: All right.

(Witness excused.)

Mr. Adler: Mr. Coleman.

JAMES J. COLEMAN, called as a witness in behalf of the defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Adler:

Q. Will you state your name and position?

A. James J. Coleman, supervising buyer of Public Service Electric Gas and Power Company of Newark, New Jersey.

Q. Will you describe briefly the area served by your company?

A. Well, they call it the corridor, from Jersey City to [fol. 1535] Camden. It covers about 80 percent of the territory and 2200 square miles.

Q. In your position do you have responsibility for the purchase of electric wire and cable?

A. All electric wire, specification wire and cables is under my jurisdiction.

Q. Do you use in your system a triplex service drop cable such as shown at the bottom of that board which has been introduced, a photographic copy of which has been put in evidence here as Defendant's Exhibit AR-20?

A. It is similar to that. Two insulated conductors with one bare.

Q. Prior to April, 1959, when Alcoa acquired Rome Cable, were Alcoa and Rome large suppliers of that product?

A. Yes, they were.

Q. To your company. Now, turning to the period since the acquisition, could you state for the Court which companies have submitted bids on your service drop cable requirements for the first quarter of 1962?

A. Can I read the list that I have just so I don't miss a name?

[fol. 1536] Q. Yes.

A. Reynolds, Kaiser, General Cable, Hatfield, Okonite, General Electric, Coliyer, Olin, Rome.

Q. Do you consider this a broad enough group of bidders for your purposes in——

A. It is. There was one name added that we were solicited in the next quarter. That is Simplex. They have just been put on the approved list. That is sufficient.

Q. That was without that addition?

A. It is comprehensive. They have been put on the list.

Q. And do you consider this an adequate group of suppliers for this product?

A. Yes, there is plenty of competition there.

Q. Now, is there any other company on your approved list which was not included in the list of bidding companies which you just read to me?

A. Well, there are others who would be acceptable if they made the wire. They are included as an acceptable manufacturer of rubber insulated wire and cable.

Q. Now, are you familiar with the South Wire Company?

[fol. 1537] A. Yes.

Q. Are they among your acceptable suppliers?

A. No. They have not been put on the list. They have solicited, but we didn't care to add any more at this time.

Q. And are you familiar with the Central Cable Company?

A. Yes. Some years ago they had furnished us with weatherproof wire.

Q. Are they on your list of suppliers of this product?

A. Not at the moment for triplex.

Q. If you wanted an even broader group of suppliers, might you solicit them?

A. There would have to be a visitation by our engineers in the distribution department to check their facilities and methods.

Q. You have not felt it necessary?

A. We have not felt it necessary because we have quite good distribution now on companies.

Q. Is it your opinion as a purchaser of this product and other products that Alcoa is in a stronger position to get

your business by virtue of having acquired the Rome Cable Company than it was previous?

[fol. 1538] A. It should be, yes.

Q. They have gotten a larger portion of this business?

A. No, they have not.

Q. Is it your opinion as a purchaser of wire and cable products that Alcoa's acquisition of the Rome Company has had any adverse effect on your position?

A. Not at all.

Mr. Adler: No further questions.

The Court: Cross-examine.

Cross-examination.

By Mr. Melchior:

Q. Mr. Coleman, do you buy quite a bit of triplex cable?

A. I would say about ten million feet a year, assorted sizes at least.

Q. What do you use it for?

A. For service to customers, from the pole to the house.

Q. Service drop purposes?

A. When you say service drop, we just go to the service head on the house. The owner of the residence supplies [fol. 1539] from the service head to the meter. We don't go through to the meter.

Q. You go from the pole——

A. To the service head.

Q. —to the service head?

A. That's right.

Q. I see. Do you use triplex for any other purpose?

A. You mean three-conductor twisted cable?

Q. Yes. The kind of cable that was pointed out to you.

A. Not for service cable. That is another construction It is not service cable.

Q. I asked if you used it for any other purpose.

A. We don't use service cable for any other purpose.

The Court: Do you use triplex or multiplex?

The Witness: There is a three-conductor twisted cable which is used for secondary distribution. It is a different type of cable.

The Court: I think that is what counsel is trying to get [fol. 1540] from you.

The Witness: It is distribution rather than service cable.

Q. How much do you say you purchase on an annual basis of triplex?

A. Upwards of ten million feet.

Q. Can you approximate what share you use for service purposes?

A. Are you still talking about this service cable?

Q. From the pole to the house.

A. Every foot of it.

Q. Every foot of it?

A. The aluminum service cable, every bit of it is used for service purposes. The other is a distribution cable.

Q. If I understand your testimony, you purchase upwards, did you say ten million feet?

A. That's right.

Q. Of triplex a year.

A. In assorted sizes.

Q. In assorted sizes?

A. From No. 4 up to 2/0.

Q. Now, what part of that do you use for service pur- [fol. 1541] poses?

A. All of it is used for service. It is a service cable.

Q. What part do you use for secondary distribution?

A. That is a different type specification.

Q. A different type entirely?

A. That's right. It is a three-conductor type, but a different construction.

Q. Now, I note that in 1962 you listed quite a large number of suppliers.

A. Correct.

Q. Why do you have such a large list of suppliers and bidders? Any particular reason?

A. For competitive reasons and most of these companies as you know, practically the center of wire and cable manufacturers are in New Jersey.

Q. What do you mean by that?

A. Most of these are representatives of New Jersey companies.

Q. And you like to deal with New Jersey customers?

A. Not necessarily, all things being equal.

Q. Do you deal on a price basis, or service basis?

[fol. 1542] A. Everything is on a competitive quotation.

Mr. Melchior: No further questions.

Mr. Latimer: No redirect.

MAURICE C. BUCKLEY, called as a witness on behalf of the defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Adler:

Q. Will you state your full name and position, please?

A. Maurice C. Buckley, director of purchasing and stores, Long Island Lighting Company.

Q. How long have you held that position?

A. Since October, 1957.

Q. Do your responsibilities include the purchase of wire and cable products?

A. They do.

Q. Referring to the period of time between the time when you became responsible for purchases and June of 1958, in what manner did you purchase the so-called overhead transmission and distribution products?

[fol. 1543] A. The bulk of such business was awarded to Anaconda and Alcoa, with minor participation by other companies.

Q. Was Rome Cable Company ever a supplier of yours of the bare cable products?

A. No.

Q. With respect to the covered overhead products, did Rome at any time—this is prior to 1958—participate in your business?

A. Yes.

Q. So that prior to June of 1958 Alcoa, Rome, Anaconda and General Cable were your suppliers of the covered overhead products?

A. They were.

Q. Were there other suppliers known to you at that time who could have supplied these products?

A. Yes.

Q. For what reason didn't you solicit bids from these other suppliers?

A. We felt that by concentrating our business with two major suppliers that we would receive better treatment in time of emergency or critical needs.

Q. Now, in June of 1958 did you change your purchas-
[fol. 1544] ing policy with respect to these overhead products we have been talking about?

A. Yes. We opened up to all the suppliers complete participation in our requirements on a competitive basis.

Q. Did you have any trouble finding additional suppliers?

A. No.

(Defendant's Exhibit AR-81 marked for identification.)

Q. Under the policy adopted in June of 1958, how is your business placed? Could you describe a little bit more fully how that is done?

A. Well, at intervals we estimate our requirements for a key period, whether it be six months, a year, or eighteen months, make up packages of our needs and invite competitive bids from our suppliers. The business is awarded on the basis of the lowest price submitted for each of the items.

Q. So that if one company has the lowest price on bare cable it would get that business, and if another company had the lowest price on triplex it would get that business?
[fol. 1545] A. That's right.

Q. I show you now Defendant's Exhibit AR-81 for identification and ask whether that was prepared under your direction and supervision?

A. Yes.

Q. And would you describe for the Court what this is?

A. This is a tabulation showing the distribution of our aluminum overhead conductor business from the year 1957 through 1961, and showing the dollar amount awarded to each of our suppliers.

Mr. Adler: I offer in evidence Defendant's Exhibit AR-81 for identification.

Mr. Wertheimer: Your Honor, we would like to know who prepared this chart. The initials are C.J.D.

The Court: He says it was prepared under his direction. That's what I understood him to testify.

Mr. Adler: That's correct. Whose initials are C.J.D.?

The Witness: Charles J. Davis, manager of purchasing, Long Island Lighting Company.

[fol. 1546] Mr. Wertheimer: I believe you testified that the title "aluminum wires" includes actually aluminum cable and any other part of aluminum requirements for overhead.

The Witness: Yes, all the overhead conductors.

Mr. Wertheimer: We have no objection.

The Court: Received.

(Defendant's Exhibit AR-81 for identification received in evidence.)

By Mr. Adler:

Q. Now, referring to defense exhibit AR-81 and to the year 1957, would you state how your business represented on that chart was allocated?

A. Alcoa received 36 percent, Anaconda 41 percent, Kaiser 7 percent, General Cable 4 percent, Circle Wire and Cable less than one percent, Essex Wire and Cable 4 percent, Southern 4 percent, and Phelps-Dodge 4 percent.

Q. Mr. Buckley, how do you reconcile the fact that Kaiser, Essex, Southern and P. D. stands for Phelps-Dodge?

[fol. 1547] A. Yes.

Q. —and Phelps-Dodge received portions of your business, with your earlier testimony that prior to June of 1958 your business was divided mainly among these two or three suppliers?

A. For selected minor items, we invited the other suppliers to participate in the competitive bidding.

Q. All right. Now, turning to the year 1958, who were the three largest suppliers and what were their——

A. Anaconda with 46 percent, Rome 21 percent, and Alcoa 20 percent.

Q. Now, 1959 would be the first year, I believe, after your new policy went into effect; and did that effect the manner in which your business was distributed?

A. Yes. In that year Anaconda received 35 percent, Kaiser 25 percent, Circle 22 percent, Rome 10 percent, and Alcoa 7 percent.

Q. Now, going to the very bottom total which is a composite of 1960 and 1961, will you describe the manner in which your business was allocated in that period?

[fol. 1548] A. Kaiser received 46 percent, General Cable 12 percent, Essex Wire 10 percent, Olin 7 percent, Reynolds 6 percent, Alcoa 9 percent. That's Alcoa-Rome 9 percent.

Q. That is the combination of Alcoa and Rome together?

A. That's right. And Anaconda 7 percent.

Q. Is it your feeling, Mr. Buckley, that you are getting an adequate degree of competition in the purchase of these products about which we have been talking?

A. Yes.

Q. Under the method used by you in purchasing these products—currently used by you—is it any advantage to Alcoa to include in its line insulated copper products as well as the bare and covered aluminum?

A. Indications are that there is no advantage.

Q. And is it your opinion as the person responsible for purchasing overhead wire and cable products that the acquisition of Rome by Alcoa has adversely affected you?

A. No.

[fol. 1549] Cross-examination.

By Mr. Wertheimer:

Q. Mr. Buckley, you stated that in June of 1958 you changed your policy from concentrating your business in the hands of a relatively small number of suppliers to invite competition from all suppliers. What were your reasons for this change of policy?

A. The main reason was to seek more competitive prices or lower prices.

Q. Could you get lower prices when you have more suppliers than when you have a few?

A. Yes.

Q. And the larger the number of suppliers the more price competition you would expect?

A. Yes.

Q. Does this chart marked as AR-81 indicate all the companies who currently make the products you are interest in buying?

A. No.

Q. If a company that presently makes these products were to satisfy your engineering and quality standards, would there be anything to prevent them from bidding on your business?

[fol. 1550] A. No.

Q. So you would take bids from anyone who wanted to sell your product who you thought was capable of supplying it?

A. Yes.

Q. And you would be interested in price, quality, service?

A. Yes.

Q. Who else makes the products covered by this exhibit, who are not listed hereon?

A. Well, I know of one, Central, and I suppose there are others.

Q. Then this would be a pretty comprehensive list of the companies in the field?

A. Yes.

Mr. Wertheimer: That is all.

Mr. Adler: No redirect.

The Court: All right.

(Witness excused.)

Mr. Bergson: Mr. Hood.

[fol. 1551] JOHN W. HOOD, called as a witness in behalf of the Defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Bergson:

Q. Mr. Hood, will you please state your name and address?

A. John W. Hood, 5420 Plainfield Street, Pittsburgh, Pennsylvania.

Q. By whom are you employed?

A. Aluminum Company of America.

Q. For how long have you been employed by the Aluminum Company?

A. Continuously since 1922.

Q. What is your present position with the Aluminum Company?

A. Chief Metallurgist.

Q. How long have you held the position of chief metallurgist?

A. Since October, 1958.

Q. And prior to that time what was your position?

A. I was assistant chief metallurgist in charge of quality standards and specifications.

Q. What is your educational background, Mr. Hood?

[fol. 1552] A. I am a graduate electro metallurgist from Lehigh University.

Q. Mr. Hood, will you describe for the Court the processes or the process by which aluminum is made from alumina. Don't go back any further than the alumina.

A. Alumina is dissolved, an electrolyte consisting primarily of cryolite and through the electrolytic process the alumina or aluminum oxide is broken down into aluminum and oxygen. The aluminum at the temperature at which the process operates is in the molten state and settles to the bottom of the electrolytic cell or pot. The cryolite bath being of lower specific gravity floats on top of the aluminum. As production progresses, the molten aluminum is siphoned from the bottom of the electrolytic cell into crucibles.

Q. And after it is siphoned into the crucibles, what happens to it?

A. The metal is then poured into molds or other furnaces depending upon the end use to which the metal is applied.

Q. When the metal is poured into the molds, in what form is it? What is it called?

[fol. 1553] A. Well, I have to think. I have always called it pig, but now we call it unalloyed ingot.

Q. Now, what is done with the unalloyed ingot after it is cast or put into the melting furnace?

A. The unalloyed ingot is either sold in the unalloyed state or it is shipped to one of our plants or at some point, put into a melting furnace to which other elements are added to obtain a composition required for particular end uses involving a number of alloys.

Q. These end uses are called alloys?

A. No. The alloys are designed to satisfy the particular end use.

Q. And when an unalloyed ingot is sold, for what purpose is it generally sold?

A. It is sold for subsequent re-melting and again alloyed or used in the composition to which it may meet requirements without other alloying.

Q. Now, how many alloys are there?

A. With the Aluminum Aluminum Association there are registered in the current list, I believe, 173 or in that order. These are recognized alloys in the industry.

OFFER IN EVIDENCE

Mr. Bergson: Would you please mark for identification as Defendants' Exhibit AR-69 a document, entitled "Regis-[fol. 1554] tration Record of Aluminum Association alloy designations and chemical composition limits for wrought alloys."

(Registration above-identified marked as Defendants' Exhibit AR-69 for identification.)

By. Mr. Bergson:

Q. Mr. Hood, I show you a document which has been marked Defendants' Exhibit AR-69 and ask you if you can tell us what that is.

A. That is a registration record of Aluminum Association alloy designations and chemical composition limits for wrought aluminum alloys revised May 1, 1961, and issued by the Aluminum Association, 420 Lexington Avenue, New York 17, New York.

Q. Is that the current list of the Aluminum Association?

A. Yes.

Mr. Bergson: I offer Defendants' Exhibit AR-69 for Identification.

Mr. Melchior: No objection.

The Court: Received.

(Defendants' Exhibit 69 for Identification received in evidence.)

[fol. 1555] Q. Mr. Hood, in taking the unalloyed ingot and making an alloyed ingot, what steps are involved?

A. The unalloyed ingot is charged into a melting furnace, and to that charge is added the other elements which may be required to bring the alloy within the composition limits specified. These alloying elements may include such elements as copper, manganese, magnesium, chromium, nickel or others. After the alloying elements, which in some cases are added as pure metal and in other cases as a rich alloy, are added, the molten metal is stirred so as to get uniform distribution of the elements, and it is then cast into another form, depending again upon the requirements of the end use.

Q. Now, how is the determination made as to what type of alloy should be produced?

A. By the orders that we receive.

Q. And if you receive a large number of orders for one type of alloy, and a small number of orders for another type of alloys, you make more of the type for which you receive the large order, and less of the type for which you receive the small order?

A. Correct.

Q. How is E.C. ingot made?

[fol. 1556] A. E.C. ingot, which is the abbreviation for electrical conductor, is essentially pure metal. That means containing 99.45 per cent minimum aluminum, but in order to improve the electrical conductivity characteristics, the

element boron is added for the purpose of precipitating small amounts of titanium and vanadium which occur as impurities. Otherwise we call unalloyed ingot or pure metal.

Q. Now, you said, I believe you took pure aluminum and added boron. Is that what you said?

I want to be sure I'm right.

A. I did say that, yes.

Q. What proportion of Alcoa's production of unalloyed ingot would meet the requirement of your term "pure ingot"?

A. Well, based on the present analysis, and for that matter for the past several years, our average purity of ingot produced in our smelting operation has exceeded the minimum purity required for E.C. metal.

Q. So that all of your unalloyed aluminum could be used for E.C. metal?

A. That's right. It may require blending, in some cases, but the average would exceed it.

[fol. 1557] Q. Now, when you produce E.C. ingot what are the factors that determine how much E.C. ingot you will produce?

A. The orders we receive.

Q. And if you received more orders for E.C. ingot, could you produce more E.C. ingot?

A. Yes, sir.

Q. And if you received orders for E.C. ingot up to 100 per cent of the capacity of Alcoa plants, and you wanted to forget all of your other business could you furnish that amount of E.C. ingot?

A. Yes, I'm sure if the management elected to do that, we could do it.

Q. Now, in this process of alloying the pure ingot into an E.C. metal, E.C. grade ingot, are there any mechanical problems involved or created?

A. We have a choice of where we add the boron. We can add it in the smelting pot, or we can operate the smelting pots so as to produce unalloyed ingot, and then add the boron later in a re-melting operation. Or we can take the unalloyed ingot molten from the smelting pots, and transfer it directly to holding furnaces and add the boron at that time.

[fol. 1558] Q. Do those create any problems?

A. We have had problems in the addition of boron in the smelting pots, because the pots are operated on a continuous basis, 24 hours a day, and once we get boron in the pots, it stays on and on and on, whether we continue to add it or not, we get the benefit, or the effect of it, in the form of slight amounts of boron which continually show up in the analysis of that particular pot.

Q. Do you prefer to do it in the smelting furnace, or in the remelt furnace—?

A. Well, it gives us a better opportunity for control if we add the unalloyed ingot and the boron separately in the brick lined furnace which we can charge and then drain and clean. Our experience is that we have better control over the boron content not only of the E.C. metal but on the other alloys which we may be manufacturing in the same plant.

Q. And is there any real problem presented by doing that?

A. By doing what?

Q. What you just described.

A. Adding the boron to the unalloyed ingot in the melting furnace? No, that is not a technical problem.

Q. Is there any chemical problem?

[fol. 1559] A. No.

Q. Any scientific problem?

A. Well, of course, I might make it sound so easy there would be no need for a job, but there are always problems.

Q. There are still those 172 other alloys?

A. That's right.

Q. I gather that your testimony is if management so determined, and the orders were there, Alcoa's total metal supply could be cast as E.C. ingot?

A. That's right.

Q. No further questions.

Cross-examination.

By Mr. Mahaffie:

Q. Just a few questions, Mr. Hood. First, could you make E.C. grade aluminum without boron?

A. You could make a conductor without boron.

Q. But it would not be E.C. grade?

A. It is not what we call E.C. grade.

Q. Any piece of aluminum is an electrical conductor; is it not, sir?

A. That's right.

Q. Now, Mr. Hood, should E.C. grade aluminum be [fol. 1560] correctly described as an alloy?

A. Yes, I think so.

Q. It is sold at a premium over unalloyed aluminum, is it not, sir?

A. I frankly can't answer that question.

Q. Well, there is evidence in the record of this case, sir, that it is sold at a premium over unalloyed pig or ingot aluminum. I wonder if you know, if you could state why; why it is sold at a premium price?

A. Well, I'm sure if our sales department or management indicates that it needs a higher price, there is a good reason for it.

Q. You don't know the answer to my question?

A. That is not in my area of responsibility, and I would rather not try to explain it.

Mr. Mahaffie: No further question.

Mr. Bergson: No further questions.

[fol. 1561] Mr. Bergson: Mr. Healy.

The Court: I don't know, Mr. Bergson, whether—yes, AR-69 was received.

Joseph L. Healy, resumed the stand, having been previously sworn, testified further as follows:

Direct examination. (Continuing)

By Mr. Bergson:

Q. Mr. Healy, when we recessed last night we were discussing Defendant's Exhibit AR-44 for identification, which is the graph entitled "Alcoa primary aluminum" and one of the problems that we were discussing was what or where you obtained the figures for the light shaded area which by

the legend is, on the graph is denominated "Sales to domestic non-integrated companies."

A. Yes, sir.

Q. Now, in preparing this graph did you prepare a tabulation of figures of Alcoa's sales of primary aluminum to non-integrated producers?

A. Yes, I did.

Mr. Bergson: Would you mark this Defendant's Exhibit AR-44-A for identification.

[fol. 1562] (Tabulation marked as Defendant's Exhibit 44-A for identification.)

By Mr. Bergson:

Q. I show you Defendant's Exhibit 44-A for identification and ask you if this is the tabulation of figures that you prepared for use in plotting that graph.

A. Yes, it is.

Q. From what sources did you obtain the information listed on Defendant's Exhibit 44-A for identification?

A. From company records.

Mr. Bergson. Now, your Honor, I re-offer Defendant's Exhibit AR-44 and now together with it Defendant's Exhibit 44-A for identification. I think these together with the witness' testimony yesterday clears up any difficulty that may arise in connection with the interpretation of this chart.

Voir Dire Examination

By Mr. Melchior:

Q. Mr. Witness, AR-44-A for identification is entitled "Alcoa primary aluminum sales," is that correct?

[fol. 1563] A. Yes, sir.

Q. Are these domestic sales?

A. Yes, they are domestic sales as qualified in the note.

Q. And you have excluded from these domestic sales, according to your note, exports, quantities that went to stockpile, quantities that were covered by toll conversion and by exchange, and sales to other primary producers; is that correct?

A. Yes, sir.

Q. Would you state how you went about excluding the exchanges in sales to other primary producers?

A. The detailed records were examined, detailed sales records were examined for sales to other primary producers.

Q. Were sales and exchanges with other producers frequent?

A. No, sir.

Q. Do you recall about what the tonnage or poundage was?

A. No, I do not recall.

Q. You can't give us an indication on a percentage basis [fol. 1564] or any other way?

A. No, I really can't. It was inconsequential.

Q. It was inconsequential?

A. Yes, sir.

Q. One percent or less?

A. Certainly.

Q. Now, what does toll conversion mean?

A. Toll conversion refers to metal which we received from our customers which we processed into another product and re-shipped to the other company.

Q. Who has title?

A. The customer retains title.

Q. I see. Now, what do you mean by stockpile?

A. Those refer to shipments to the government stockpile under General Services Administration contracts.

Q. These are not sold. Once they are transferred to the stockpile you have no further control over them, your company?

A. That is true.

Q. Now, I notice that on the worksheet you have listed at the top of the page "Alcoa primary aluminum production." You don't have indicated on that worksheet anywhere sales, total sales, do you?

[fol. 1565] A. On the worksheet there are two lines, one captioned "Pig and ingot sales to customers" and the second line, "Pig and ingot sales to Alcoa International, Inc." These two lines cover the sales of primary aluminum during this period.

Q. Now, what is the relationship between these two lines

and the figures that follow and the statement in the legend on the graph were you say "Sales to domestic non-integrated companies"?

A. These two lines on the worksheet cover all sales whether they are stockpile or export or sales to other primary producers. Whereas the sales as listed on the other sheet are qualified as shown.

Q. Now, what is the relationship between the legend statement, "Sales to domestic non-integrated companies" and AR-44-A?

A. The figures on AR-44-A were plotted directly on AR-44.

Q. In other words, you can compute mathematically what the sales were to domestic non-integrated companies and what percentage of total sales they comprised? You could do that?

[fol. 1566] A. Well, from AR-44 you can calculate mathematically the sales of Alcoa primary aluminum as qualified in the note of 44-A.

Q. Have you made that computation?

A. Well, sir, the figures on AR-44-A were plotted mathematically on the chart, so it went in the other direction.

Q. I see. So you can calculate it by looking at the chart?

A. Yes.

Q. Now, what do you mean by the legend "Non-integrated companies"?

A. Companies other than primary aluminum producers.

Q. Any company that purchases aluminum from Alcoa that is not itself a primary producer?

A. Yes, sir.

Q. Would this include fabricators of wire and cable products?

A. Yes, sir.

Q. Would it include fabricators of a variety of other aluminum products?

A. Yes, sir.

Q. It would include all aluminum fabricators to the [fol. 1567] extent that they purchased from Alcoa?

A. Yes, sir.

Q. Is that correct?

A. Yes, sir.

Mr. Melchior: No objection.

The Court: I will receive it. 44 and 44-A.

(Defendant's Exhibit AR-44 and AR-44-A for identification received in evidence.)

By Mr. Bergson:

Q. Now, Mr. Healy, referring to Exhibit AR-44, what is represented by the difference between the black portion and the dotted line?

A. The difference between the solid black portion and the dotted line represents sales to domestic non-integrated companies; it represents sales to the stockpile; export sales; sales to other primary producers. It includes metal added to our inventories. It includes capacity which is not now being utilized.

Q. So that the difference between the solid black portion and the dotted line represents the amount of metal that Alcoa would have available to others if it operated at full [fol. 1568] capacity, is that right?

A. Yes, sir.

Q. Talking about operating at full capacity, I notice the government has introduced in evidence a chart showing 1960 capacity of primary aluminum producers in existence and under construction.

A. Yes, sir.

Q. I think this chart is government exhibit 465. Would you please look at that chart. I ask you why in preparing the defendant's chart AR-7 you did not plot capacity under construction.

A. I was requested to prepare a chart showing Alcoa's physical capacity to produce primary aluminum, and that's what my figures represent.

Q. And what is the difference between the two charts?

A. The difference between the two charts consists of capacity that is so-called under construction.

Q. Now, what is—when you say so-called "under construction," what do you mean by that?

A. By that I mean that this capacity has been partially [fol. 1569] constructed, the work is not now under way on this capacity, so the words "under construction" do not literally apply, and the work is not now being performed.

Q. Is there capacity that is planned that is not put under construction for a considerable number of years?

A. I am sure there must be. I am not familiar with what the company's plans might be beyond the capacity that is represented in the government's chart as being under construction.

Q. Now, Mr. Healy, I invite your attention to government exhibit AR-45 for identification.

The Court: AR-45, Mr. Bergson?

Mr. Bergson: AR-45, yes, your Honor. It follows the black graph.

The Court: Okay. You said government exhibit.

Mr. Bergson: I beg your pardon.

The Court: It is defendant's exhibit.

Mr. Bergson: I can't shake the fact that ten years ago I used to work for the government.

The Court: You seem to have recovered from it.

[fol. 1570] By Mr. Bergson:

Q. Would you state the title of that chart.

A. The title of the chart AR-45 is "Aluminum pig ingot or billet to be made available to non-integrated users under provisions of GSA supply contracts."

Q. Was that chart prepared by you or under your direction and supervision?

A. Yes, it was.

Q. Now, I notice thereon that you list the Harvey Aluminum Company, and you have a vast number of unknowns there. Was this because the information was unavailable to you at that time?

A. Yes, sir, that's correct.

Q. That information has become available since the trial of this case. But except for that area of unknown, to the best of your information and belief, this chart is entirely correct and accurate?

A. Yes, it is.

Mr. Bergson: I offer Defendant's Exhibit AR-45 for identification.

Mr. Melchior: No objection.

[fol. 1571] The Court: Received.

(Defendant's Exhibit AR-45 for identification received in evidence.)

Mr. Bergson: Your Honor, you will perhaps recall Mr. Harvey testified that his company had a GSA supply contract which required them to make available to Small Business 35 percent of a 54,000 ton capacity.

The Court: I think so.

Mr. Bergson: Notice these figures there are in millions of pounds, so that when you take the 54,000 tons you have to multiply it by——

The Court: We will take a short recess.

(A short recess was taken.)

[fol. 1572] (After recess)

By Mr. Bergson:

Q. Mr. Healy, before proceeding with the chart that we were discussing just prior to the recess, I would like to go back to Defendants' Exhibit AR-7 and Government's Exhibit 465, in which in our chart we do not show capacity under construction. Does Alcoa have plants for increasing its capacity?

A. Yes, sir.

Q. How long has it had these plants?

A. Well, several years.

Q. And the capacity has not been increased between the time the plan was formulated up to the present time?

A. It hasn't been increased to the full amount of the plant.

Q. And why is that?

A. Because there has been a condition of over capacity and over supply of aluminum in the industry; the metal is not needed.

Q. Now——

The Court: Let me interrupt here. Does the Government exhibit include, that is 465, exclude the expansion of Alcoa that Mr. Healy just mentioned, or does anybody know?

[fol. 1573] Mr. Melchior: Well, the Government, of course, got the information from the year book.

Mr. Bergson: I think Mr. Healy could answer that question.

The Witness: In my checking the Government's figures, it apparently does include this capacity reported under construction, which physically isn't under construction.

The Court: All right.

Mr. Bergson: AR-45 has been received in evidence?

The Court: Yes.

By Mr. Bergson:

Q. Now, Mr. Healy, I invite your attention to Defendants' Exhibit AR-46 for identification and ask you if you can describe that exhibit. First, was this exhibit prepared under your direction and supervision?

A. Yes, sir.

Q. Would you describe it, please?

A. This exhibit is captioned "Supplying the Non-Integrated Fabricators Sales of Primary Aluminum and [fol. 1574] Domestic Integrated Producers." This is a document which relates to United States versus Aluminum Company of America, 1957, and we took the information from that source.

Mr. Bergson: I offer Defendants' Exhibit AR-46 for identification.

Mr. Melchior: Are you bringing us up to date, Counsel?

Mr. Bergson: No, we are not bringing it up to date. We don't have the information available to us.

Mr. Melchior: Well, let me ask you whether AR-44A, which you introduced this morning, is relevant to this tabulation in any way? Would it be a part of this tabulation?

Mr. Bergson: Well, it could be, but this tabulation is showing Alcoa's percentage of supply to non-integrated and the total amount of aluminum supplied to non-integrated. And we have no way of knowing what the figures are of the other primary fabricators, primary producers.

We used the period that was available to us. It goes to the first nine months of 1956. We couldn't bring it up to date.
[fol. 1575] Mr. Melchior: You couldn't bring it up to date for any of the other companies but you could bring it up to date for Alcoa.

Mr. Bergson: We could for Alcoa but couldn't show it as a percentage of the total.

Mr. Melchior: No objection.

The Court: I will receive it.

(Defendants' Exhibit AR-46 for Identification received in evidence.)

By Mr. Bergson:

Q. Now, Mr. Healy, looking at this chart what percentage of sales of aluminum by primary aluminum producers to non-integrated fabricators was enjoyed by Alcoa in 1947?

A. 88 per cent.

Q. And in the first six months of 1956?

The Court: First nine months.

The Witness: First nine months.

Q. First nine months of 1956.

A. 41 per cent.

Q. Now, Mr. Healy, I invite your attention to Defendants' Exhibit AR-47 for identification and ask you if this exhibit was prepared under your direction and supervision?

[fol. 1575a] A. Yes, it was.

Q. Would you please describe it?

A. This exhibit is captioned "Primary purchased by Rome," and it shows the amount of primary aluminum purchased by Rome as related to the sales of primary aluminum to non-integrated fabricators. Two comparisons are made. One to total sales to non-integrated fabricators by U.S. primary producers, and the second comparison in terms of Alcoa sales of primary aluminum to non-integrated fabricators.

[fol. 1576] Mr. Bergson: I offer Defendant's Exhibit AR-47 for identification.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-47 for identification received in evidence.)

Q. Now, Mr. Healy, in preparing this chart I notice that you have no figures under total sales of primary producers for the years 1957 and 1958. Why is that?

A. That information was not available to me.

Q. Was the information for 1954, 1955 and 1956 taken from the previous chart?

A. Yes, it was.

Q. Now, you have the period from 1954 to 1958 for Alcoa, because that period was available to you?

A. Yes, sir.

Q. Why did you cut this chart off at 1958?

A. Because 1958 was the last full year prior to the acquisition.

Q. And this chart shows what Rome's percentage of purchases was, as compared with the rest of the sales to non-integrated, both in terms of total sales by primary pro-[fol. 1577] ducers and in terms of sales by Alcoa Aluminum?

A. Yes, sir.

Q. Would you state what those percentages are.

A. As a percentage of total sales to non-integrated fabricators it was a .4 percent in the year 1954, and .7 percent in the year 1956. As a percentage of Alcoa's sales to non-integrated fabricators, it was 1.2 percent in 1954 and 1.7 percent in 1958.

Q. Now, Mr. Healy, I invite your attention to Defendant's Exhibit No. AR-48 for identification, and ask you whether that chart was prepared under your direction and supervision.

A. Yes, it was.

Q. Would you please describe that chart.

A. That chart is captioned "Primary aluminum purchased by Rome." It covers the same type of information as AR-47, the only difference being that AR-48 is in terms of pounds; AR-47 is in terms of dollars.

Mr. Bergson: I offer Defendant's Exhibit AR-48 for identification.

Mr. Melchior: No objection.

[fol. 1578] The Court: Received.

(Defendant's Exhibit AR-48 for identification received in evidence.)

Q. Now, Mr. Healy, I invite your attention to Defendant's Exhibit AR-49 for identification, and ask you whether that exhibit was prepared under your direction and supervision.

A. Yes, it was.

Q. Would you please describe that exhibit.

A. This exhibit is captioned "Primary aluminum purchased by Rome." It shows the Rome purchases of primary aluminum, the total United States primary aluminum production, and Alcoa's primary aluminum production.

Mr. Bergson: I offer Defendant's Exhibit AR-49 for identification.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-49 for identification received in evidence.)

Q. And again directing your attention to the years 1954 and 1958, what percentage of total United States primary aluminum production did Rome's purchases represent?

[fol. 1579] A. Rome's purchases represented one tenth of one percent in the year 1954, and the same percentage in 1958.

Q. And in one of the intermediate years it was a little larger?

A. Point 2. That is, two tenths of one percent.

As Rome's percentage of Alcoa's primary aluminum production. It ranged from one tenth of one percent to .3 or three tenths of one percent for these years.

Q. Now, Mr. Healy, I invite your attention to Defendant's Exhibit AR-50 for identification, and ask you whether this exhibit was prepared under your direction and supervision.

A. Yes, sir.

Q. And I ask you to state what this exhibit is.

A. This exhibit shows the purchases by Rome of copper and aluminum, and this refers to the Rome plant only.

Mr. Bergson: I offer Exhibit AR-50 for identification.

Mr. Melchior: No objection.

The Court: Received.

[fol. 1580] (Defendant's Exhibit AR-50 for identification received in evidence.)

Q. Now, this exhibit is in terms of dollars, Mr. Healy?

A. Yes, sir.

Q. And it shows what?

A. This exhibit shows that of the total purchases of aluminum and copper, the copper portion ranged from a low of 93.7 percent in the year 1958 to a high of 97.7 percent in the year 1954.

Q. Now, I invite your attention to Defendant's Exhibit AR-51 for identification. That exhibit contains the same information in pounds that was contained in the previous exhibit in dollars, is that correct?

A. Yes, sir.

Mr. Bergson: I offer Defendant's Exhibit AR-51.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-51 for identification received in evidence.)

Q. I now invite your attention to Defendant's Exhibit AR-52 for identification, and ask you if that exhibit was [fol. 1581] prepared under your direction and supervision.

A. Yes, it was.

Q. And would you please describe that exhibit.

A. This exhibit is captioned "Copper and aluminum wire and cable sold by Rome." And it show the copper wire and cable sold in terms of dollars and the aluminum wire and cable also in dollars.

Mr. Bergson: I offer Defendant's Exhibit AR-52 for identification.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-52 for identification received in evidence.)

Q. Now, what is the range of copper percent as shown in that exhibit?

A. This exhibit shows that the copper sales by Rome ranged from 90.3 percent to 93.9 percent in this period.

[fol. 1582] Q. Now, I invite your attention to Defendants' Exhibit AR-53 for identification and ask you whether this exhibit was prepared under your direction and supervision?

A. Yes, it was.

Q. Would you please describe the exhibit?

A. This exhibit is captioned "Aluminum Wire and Cable Overlap Products Sold By Rome." It shows the overlap wire and cable as a percentage to total wire and cable. And this is aluminum. And it shows the percentage of overlap ranges from 5.8 to 8.5 per cent.

Mr. Bergson: I offer Defendants' Exhibit AR-53 for Identification.

Mr. Melchior: Does this tabulation purport to show what percentage of Rome's products were involved in the overlap?

Mr. Bergson: It says wire and cable products.

Mr. Melchior: Wire and cable products involved in the overlap?

The Witness: Yes.

Mr. Melchior: We object to this on the ground of relevancy; on the ground that the particular part of a com-

[fol. 1583] pany's business that may be involved in a merger is not relevant to consideration as to legality.

The Court: I will receive it.

(Defendants' Exhibit AR-53 for identification received in evidence.)

The Court: This means, Mr. Healy, that in 1954 the sales of the so-called overlap wire and cable by Rome in that year represented five and nine-tenths per cent of its total sales of wire and cable; am I right about that?

The Witness: Yes, sir, that's right.

The Court: I see. All right.

Mr. Bergson: Now, your Honor, I am going to pass the next three exhibits because I am going to put those in through another witness. They were not prepared by Mr. Healy.

The Court: All right.

By Mr. Bergson:

Q. Mr. Healy, I now invite your attention to Defendants' Exhibit AR-57 for identification and ask you whether that exhibit was prepared under your direction and supervision?

A. Yes, it was.

[fol. 1584] Q. Would you please describe the exhibit?

A. This exhibit is captioned "Changes in Base Price of Primary Aluminum, E.C. Redraw Rod, selected Cable Sizes, July 22, 1946 to date and Comparison of Spread Between these Products during the same period."

Q. Why did you select the various wire and cable sizes that were selected?

A. These wire and cable sizes were selected as a representative size in each type of stranding, each major type of stranding of cable.

Mr. Bergson: I offer Defendants' Exhibit AR-57 for identification.

Mr. Melchior: I note at the bottom of the tabulation that you say, "The source of data above prices taken were included from yellow price data sheets." Whose yellow price data sheets?

The Witness: Alcoa's.

Mr. Melchior: Alcoa's?

The Witness: Yes, sir.

Mr. Melchior: In other words, those are all taken from Alcoa's company data sheets.

The Witness: Yes, sir.

Mr. Melchior: No objection.

[fol. 1585] The Court: I will receive it.

(Defendants' Exhibit AR-57 for Identification received in evidence.)

The Court: I wish you would explain it, Mr. Bergson. I am not so certain I understand it.

Mr. Bergson: Your Honor, one of the contentions that the Government has advanced in this case is as a producer of pig and ingot, as a producer of redraw rod and as a producer of the finished product, Alcoa is in a position to exert a squeeze on its competitors and therefore has some undue advantage over the competitors.

The purpose of this exhibit is to show that in its pricing

policies Alcoa made a steady effort to maintain a reasonable relationship between the prices of these various products so that the squeeze would not result. Alcoa was in a position of being—long before the acquisition—in the position of being both a supplier and a competitor of some of these independents. We introduced this exhibit to show that Alcoa in pricing has maintained a spread so that this squeeze that you have heard about, if Alcoa's prices have been followed, would not have resulted. Now, these are the [fol. 1586] Alcoa published prices. It is quite true that Alcoa did not necessarily sell at these prices because they couldn't sell at their published prices and they had to sell off the list on occasion to meet competition.

The Court: The only observation, I realize that the Government has urged that in the Crown Zellerbach case, on which the Government pretty near relies, that it doesn't amount to much.

Mr. Bergson: I think it doesn't amount to much, but I think Mr. Melchior better speak for himself on that.

Mr. Melchior: I am not sure what you mean by that, your Honor, that the Crown Zellerbach case doesn't apply?

The Court: The provision where there is reasonable probability of lessening substantial competition not where the merger may result in the company having power to over-price or power to exclude competition. At least that is what the Reporter says that the Crown Zellerbach case holds. I am not so certain that I quite agree with the Reporter about that, but it did occur to me as you went [fol. 1587] along, we spent some time on spread, and we also used the Crown Zellerbach case as a supporter of the Government's position, but I am not certain of that myself.

Mr. Melchior: Well, first I would like to clarify my remarks about Crown Zellerbach had to do primarily with the question of line of commerce.

The Court: I know.

Mr. Bergson: You can't dismiss it.

Mr. Melchior: I am not dismissing it.

The Court: I know, but I felt——

Mr. Melchior: But I want to clarify it.

The Court: Just a minute. Take it slow. I felt that you were urging in your brief that you sort of relied upon it as an authority.

Mr. Melchior: We do.

[fol. 1588] The Court: I am not so certain I agree with the decision. Of course, they were the circuit court and I am not, and I have been told at times I better pay some attention to it.

Mr. Bergson: Your Honor, your own circuit takes it a little different than that circuit anyway.

The Court: I won't get into that.

Mr. Melchior: Would you like me to comment on that, Judge Brennan?

The Court: Yes.

Mr. Melchior: With the prefacing remarks that most of my comments having to do with Crown Zellerbach had to do with lines of commerce, we do urge that Crown Zellerbach is applicable here. We don't say that the percentage figures or the market values in this case are comparable to the Crown Zellerbach situation, nor do we urge in our argument that any control of prices is a necessary element to a proof of a Section 7 case.

The Court: Why do we spend so much time on this?

[fol. 1589] Mr. Melchior. Because we think this is a very important market condition, which will shape the industry in years to come, and against the backdrop of the merger and against the backdrop of the integration in the industry, this is an extremely important market condition. While it is not necessary for us to prove control of price or to prove the fact of a price spread, we do feel that if one exists it is highly relevant. We certainly think one exists here.

Mr. Bergson: Your Honor, I might add just for the sake of completing the diseussion—I hope it will complete the discussion—that to the extent that Alcoa had the power to squeeze, it had the power to squeeze before the acquisition, before it made these same products before the acquisition, and this acquisition couldn't remotely have anything to do with Alcoa's power to squeeze.

The Court: Well, I think I am going to take it because——

[fol. 1590] Mr. Bergson: This is purely a defensive charge.

The Court: I have got to evaluate these things. There may be something in what you say, Mr. Melchior; I sort of

am inclined to think there is. As I read this Crown Zellerbach case, they say no. When you get into the price situation, power over price, that's something else.

Mr. Melchior: Well, now, your Honor, I would like to be understood in this respect. Anything we may show in a Sherman Act proceeding, whether it be Section 1 or Section 2 or any of the others——

The Court: I am talking about the Clayton Act.

Mr. Melchior: Well, I am too, but what I would like to say is anything that could be shown in a Section 1 or a Section 2 can be shown in a Section 7 proceeding, and could be highly relevant, but it isn't a requisite of proof in a Section 7 case to show any of these Sherman Act criteria.

[fol. 1591] Mr. Bergson: This is another illustration, your Honor, of how they are confusing the Sherman Act and the Clayton Act. They say first that the Sherman Act tests of lines of commerce have nothing to do with the Clayton Act. Now they say the Sherman Act tests in other aspects are relevant here.

The Court: I don't think we need to debate it at any great length. I talked and listened to this spread and thought about it at the time, because I am inclined to think there is something to it and that it shouldn't be ignored entirely, but the way I read the Zellerbach case, they don't place much importance on it, if any.

Mr. Melchior: Was one found there? Did the Court say a price squeeze was found there?

The Court: No.

Mr. Melchior: I am not familiar with the language you are talking about.

[fol. 1592] The Court: It just says the problems involved in the Crown Zellerbach case. It is a very definite one and so on. And as suggested in the Bethlehem Steel case when the question is power over price, substitute production may be relevant because they can limit that power. I can understand that. But the issue in the Clayton Act Section 7 is not whether the merger may result in the company having power over price. And of course to interject there we spent quite a little time talking about squeeze.

Mr. Melchior: Yes, sir.

The Court: Which indicates to me is power over price. They say just in plain simple English the issue is not under

Section 7 of the act. It is not whether the merger may result in a company having power over price or the power to exclude competition. The issue under Section 7 is whether there is reasonable probability of lessening competition. That's pretty direct language. That Section 7 case doesn't [fol. 1593] have much to do with power over price. I am not quite prepared to say in my own opinion that language, even though it is of a superior court, is quite right.

Mr. Melchior: May I comment on that language, Judge Brennan?

The Court: Yes.

Mr. Melchior: I think what the Court is saying is this, that power over price is a necessary element to the proof of a Sherman Act case, and it is not a necessary element in a Section 7 case. But if it is present, you can certainly show it in a Section 7 case. Just for example as this. Section 7 talks about tendency to monopoly. Now, Section 2 of the Sherman Act talks about monopoly. Now certainly if we brought a case under Section 7 and could prove monopoly, certainly that would be relevant in a Section 7 proceeding and I think the analogy is precisely on the point. They are saying——

The Court: All I know is the langauge they used, and [fol. 1594] here it is again. The issue under Section 7 is not whether a merger may result in the company having power over price. Now that is the langauge. You can interpret it any way you want to, and I am going to interpret it and I am kind of with you on it. I think we are a little bit rough on you here, but that's the language.

Mr. Melchior: Well, I think the reason——

The Court: I know, but what is the use of you and I guessing about the reason the court did something? All I am talking about is the simple proposition—this is the language of the Zellerbach case.

Mr. Melchior: Yes, sir, we adhere to it.

The Court: And I think that perhaps we have over-emphasized, the government especially, has over-emphasized the question of spread, but I thought we will take this exhibit because having let the government emphasize the question, I certainly can't stop the defendant from mini- [fol. 1595] mizing the question of spread. How much the ultimate question of spread, control over price will become

a turning point in this case is extremely doubtful in my mind.

Go on with the lawsuit, I will receive it.

By Mr. Bergson:

Q. Mr. Healy, I invite your attention to Defendant's Exhibit AR-58.

The Court: Before you go to that——

Mr. Bergson: I beg your pardon, sir.

The Court: —I'd like a little explanation. I first looked at these charts without my glasses on; sometimes I can understand them better without the glasses. I would like to have Mr. Healy tell me just a little bit—we have talked spread and we have talked price as between the selling price of a product and the cost of the primary material from which that product is made. We have devoted quite a little time to that in the government's case. I think this [fol. 1596] table is directed to that, and maybe a little explanation from you would help me; and I will put on my glasses while you explain it.

The Witness: All right, sir. This table was intended to show the spread in price, for example, between primary aluminum and EC redraw rod. The top line shows that as of July 22nd, 1946, primary aluminum was 14 cents a pound. EC redraw rod was 18½ cents a pound. The difference of four and a half cents then shows in the third column from the right. .045.

The Court: Oh, I see. And those figures in the third column from the right, in fact, the last three columns are in cents.

The Witness: Well, dollars.

The Court: Dollars. But the first one, for instance, in 1946 is four and a half cents.

The Witness: Yes, sir.

[fol. 1597] The Court: So that perhaps I should address this to counsel rather than to you. But you seek by this chart to show that the difference between the primary aluminum or redraw rod and not the finished product.

Mr. Bergson: Yes. That is cable.

The Witness: That comes in later, in the second column from the end and third column from the end.

The Court: In other words, you are trying to show that that spread is reasonably constant.

The Witness: Well—and show the trend in the spread. If you look down any one of these columns, it shows the history over this period.

The Court: The price goes up, but the spread remains, at least on this chart, reasonably constant.

The Witness: Well, I'd say, your Honor, that there are substantial changes in the spread. If you would look at the second column from the right on redraw rod to cable, the [fol. 1598] top figure is 10 cents, the bottom figure is 18.6 cents per pound, showing that there has been a substantial widening of the spread.

Mr. Bergson: Yet in a couple of periods the spread did narrow.

The Witness: Yes.

[fol. 1599] The Court: When I used the word "constant" I guess I am using the wrong word. I guess it is "fluctuating".

Mr. Bergson: It is an undulating spread.

The Court: Yes.

Mr. Bergson: But the overall advantage if you were to plot it in a graph would show a constantly rising spread with dips in it. And this is also true as to the spread between pig and cable because pig was 14½ in 1946—I mean the spread was 14½ cents in '46 and the last one, which was November of '61, it was 22 1/10 cents.

Now I think—I don't know whether you want the witness to testify to this or me to make a statement on the record.

The Court: Or you to test y to it.

Mr. Bergson: I make the admission for the record, and that is that Alcoa was not at all times able to maintain that spread because if it had tried to maintain that spread it wouldn't have sold any wire or cable at all because it had to meet competitive prices.

The Court: Yes.

[fol. 1600] By. Mr. Bergson:

Q. Is that correct, Mr. Healy?

A. Yes sir.

The Court. I think this would be a good time to recess. It is a quarter to one. Recess until two o'clock.

The Clerk: Court is in recess until two o'clock.

(Whereupon at 12:45 p.m. o'clock an adjournment was taken to 2:00 o'clock p.m. of the same day.)

[fol. 1601] AFTERNOON SESSION

APPEARANCES: Same as Morning Session.

JOSEPH L. HEALY, resumed the stand, and testified further as follows:

Direct examination. (continuing)

By Mr. Bergson:

Q. Mr. Healy, directing your attention again to Defendants' Exhibit AR-57, I think it would be helpful if you could explain for the record just how that chart should be read.

A. This chart shows Alcoa's published sales prices for certain products. It shows the published prices of primary aluminum which was used for electrical conductor purposes. It shows the published prices of E.C. redraw rod. The difference between those two sets of figures is then shown in the column which is captioned: "Spread in base price pig to redraw rod."

In the center of the chart are several sizes of bare cable. These sizes were chosen as representative sizes of the various stranding of bare cable which Alcoa makes. These [fol. 1602] several items, there are six of them, six individual cable size items, added together and divided by six, provide the arithmetic average shown in the fourth column from the right.

Now, I would like to point out that this arithmetic average is not representative of the actual price at which the cable was sold because of the fact that cable at various times was sold at less than schedule to meet competitive

price. Nor is it representative of Alcoa's pattern of bare cable business.

As I stated, the sizes chosen are merely representative sizes in each stranding. It is not a style or pattern of business.

The difference between the column captioned "E. C. Redraw Rod," and the column captioned "Arithmetic Average" represents the spread in base price of redraw rod to cable, which is the second column from the right.

The last column on the right "Pig to cable," is the difference between the column captioned "Primary Aluminum," and the column captioned "Arithmetic Average," which is the average price of cable for the sizes shown. This chart [fol. 1603] was intended to show over a period of time the change in spread between these products.

Q. Now, on the right—I mean on the left-hand side, you have a column entitled "Date of Price Changes," are those all of the dates on which price changes occurred between July of 1946 and October of 1961?

A. That is true. These are all of the dates on which changes in our published prices of these products occurred.

Q. Now, I notice on this chart that in the column entitled "Spread in Base Price, Pig to Redraw Rod," which is the third column from the right, in 1960 there was a drop in the spread from 8½ cents to 4.2 cents. Do you know the reason for that drop?

A. Yes, I do. Redraw rod had been selling at substantially under our published price to meet a competitive situation. On the date opposite the spread to .042, which is April 12, 1961, on that date, the actual price at which Alcoa at that time was selling redraw rod was incorporated into our published price schedule instead of the price that had theretofore been shown.

Q. And during that period when the price of redraw rod [fol. 1604] or the difference in the spread in redraw rod narrowed, I notice that in the next column the difference in the spread between redraw rod to cable widened. Is that due to the drop in the redraw rod price?

A. Yes, that's due to the same situation.

Q. Now, in a situation of that kind a non-integrated producer who did not make his own rods—would he be in a better position or worse position?

A. A non-integrated producer who did not make his own rod?

Q. Who purchased rod.

A. A non-integrated producer who purchased rod—his position, actually, was unchanged from say the day before this change until the day after, because the price which he paid for rod in the market place was unchanged.

Q. Now, I think you have made it clear that the prices that are shown here are the list prices, and do not necessarily reflect the actual selling prices?

A. That is true and I would like to emphasize it.

Q. Now, I invite your attention to Defendants' Exhibit AR-58 for identification and ask you whether that exhibit was prepared under your direction and supervision?

[fol. 1605] A. Yes, sir.

Q. Would you please describe the exhibit for us?

A. This exhibit is captioned "Alcoa Electrical Conductor Business Reported Lost to All Competitors, April, 1957 through March, 1959," and this shows the business which Alcoa lost, to the extent that we had recorded it, to each of several competitors.

Mr. Bergson: I offer Defendants' Exhibit AR-58 for identification.

Mr. Melchior: The Government objects to the offer of this exhibit, your Honor, on the basis of hearsay and relevancy. This apparently is based on AR-29, which is the document prepared by Mr. Hemeter, and which Mr. Hemeter testified was not complete, but about 75 per cent complete. Mr. Hemeter also indicated that as far as he was concerned, the material contained therein was also hearsay, and I call your attention to the source data indicated at the bottom of this tabulation, which states it is based on summaries of Alcoa's lost business reports which apparently were the documents utilized by Mr. [fol. 1606] Hemeter. They are also based on Rome's sales orders, which we have no way of knowing precisely how they were utilized in conjunction with this.

Mr. Bergson: Do you wish to hear me on this, your Honor?

The Court: Let me make this observation. This, as I see it, is nothing more than a summary, in understandable

form, of the prior exhibit which I received. At least the major portion of it.

Mr. Melchior: The major portion of it, yes.

The Court: So in that sense, why, if I was right in receiving the other exhibit, then I would be right in receiving this one. Rome's sales orders—that's probably true. The sales orders themselves.

Mr. Bergson: We have had Mr. Rolston's testimony as to the search Rome made, and this was all done for the purpose of laying the foundation for this exhibit. He testified a search of Rome's records was made and they can't find—the only three orders they could find were the ones he mentioned which totaled 17,000 pounds, and we have put it [fol. 1607] that way—this was all done in an effort to make this chart as honest and complete as possible.

The Court: Yes, I think there's enough foundation; I will overule the objection and receive the exhibit.

Q. Now, Mr. Healy, in the caption of the exhibit the dates referred to are April, 1957 through March, 1959. Why were those two dates selected?

A. Those were the dates which you requested me to use in preparing this table.

Q. Did I tell you why I wanted those dates used?

A. As to March, 1959, the month of March concluded the period prior to the acquisition, and as to April, 1957, I believe that that was the inception of the record which Mr. Hemeter had made.

Q. I asked you to cut this off at the time Alcoa acquired Rome?

A. Yes.

Q. And this chart shows that of the lost business that Alcoa recorded, what percentage was lost to Rome?

A. Five-hundreds of one per cent.

Q. No further questions.

(Defendants' Exhibit AR-58 for Identification received in evidence.)

[fol. 1608] Cross-examination.

Mr. Melchior:

Q. Mr. Healy, directing your attention to AR-7, I believe you discussed with counsel in connection with this tabulation, Government Exhibit 465?

A. Yes, sir.

Q. Now, I ask you, Mr. Healy, are you familiar with the mineral yearbook of the Book of Mines, Department of the Interior?

A. Yes, sir.

Q. Did you consult that in connection with the preparation of this tabulation AR-7?

A. Yes, sir.

Q. In fact you have it in one of the footnotes as a source of data?

A. Yes, sir.

Q. Now, I believe you were asked on direct examination with particular respect to GX-465 as to Alcoa's proposed or new capacity under construction?

A. Yes, sir.

Q. What was your response?

A. My response was, sir, that that capacity is not physically now under construction in the sense that any work is being performed on the facilities. The facilities are par-
[fol. 1609] tially complete, they have been for an extended period of time, but work of no significance is now being done on them.

Q. Now, this capacity that was under construction, is this all of Alcoa's capacity that was under construction? Let me rephrase the question. Has all of Alcoa's proposed or under construction capacity now being suspended?

A. No, sir, not all of it.

Q. Could you enlighten us to which has been suspended and which is still continuing?

A. Yes, sir. In my examination of document 465 it appeared to me that included in the Government's capacity was 202,000 tons, which was listed as being under construction. Of this amount 150,000 tons is shown for Evansville; 32,000 tons for Massena and 20,000 tons for Point Comfort, Texas. The 150,000 tons at work is uncompleted. I

would also like to state that this work capacity was first reported publicly as being under construction in June, 1956. As of right now it is still uncompleted.

Q. Is there any work going on down there, any construction work?

[fol. 1610] Not of any major significance.

Q. There is work going on there, though?

A. There may be, sir.

Q. Well, do you know?

A. I do not know if there is any small amount of work going on. I don't know there is no major amount of work going on.

Q. Is the project an abandoned project?

A. No. The project is not an—is just presently not under construction. It is not being completed at this time because the capacity is not needed. Alcoa has other complete facilities that are not in use. It does not need this uncompleted facility.

Q. I see.

A. At this time.

Q. In the event capacity would be needed would you know what Alcoa's intention with this would be?

A. It would be very definitely to bring this to completion and use it.

Q. All right. Will you tell us about Massena?

A. Yes. With respect to Massena, the 32,000 tons was first reported as being under construction in, sometime in late '57. Between late '57 and early '58. And the 32,000 tons is as of today not completed.

[fol. 1611] Q. Is there any construction work going on there, any work?

A. No, sir, not of any significance.

Q. What is the status of the project?

A. The status is that no construction work is now in progress. The work is just not being done.

Q. The same as with Evansville?

A. Yes, sir.

Q. Now, how about the last installation you mentioned, in Texas?

A. In regard to the 20,000 tons at Point Comfort, that capacity has been completed and was completed sometime between the end of 1959 and the first quarter of 1960.

Q. Now, Mr. Healy, do you have any information with respect to the under construction capacity for any of the other major aluminum companies?

A. No, sir.

Q. You do not. Mr. Healy, directing your attention to the column, entitled "Primary Aluminum Capacity," I note that in the year 1959 Alcoa has what purports to be 33 per cent of United States domestic capacity; is that correct?

A. Yes, sir.

[fol. 1612] Q. And what percent did it have in 1960?

A. 35 per cent.

Q. Do you know what percentage Alcoa had as in the year 1961?

A. No, sir, I do not.

Q. You have no figures for '61?

A. I do not know.

Q. Do you know whether figures for domestic total had been issued by any agency?

A. I don't know that, sir.

Q. You don't know?

A. No.

Q. Do you have figures for Alcoa in the year 1961?

A. I don't have them with me but I know that they are available.

Q. You know that they are available?

A. Yes, sir.

Q. Do you know whether they were larger or smaller than the year 1960?

A. I do not know, sir.

Q. You do not know?

A. No.

Q. And you cannot make a computation from the information you just gave me as to this new capacity?

[fol. 1613] A. I would hate to assume that the 20,000 tons was the only difference.

Q. Now, Mr. Healy, directing your attention to AR-44 and also AR-44A, which supplements the information contained in AR-44; is that correct?

A. Yes, sir.

Q. And with respect to AR-44A, which purports to show Alcoa primary aluminum sales, and I believe you indicated that they were domestic sales, now if you will look at the

year 1950, we will find that in pounds Alcoa's primary aluminum sales were what figure, Mr. Healy, for 1950?

A. 167,497,000 pounds.

[fol. 1614] Q. Now, can you tell me what Alcoa's production of primary aluminum was in the year 1950?

A. 707,954,000 pounds.

Q. And you drew that figure from the worksheet of AR-44, is that correct?

A. Well, it appears on AR-44. I have drawn it from Exhibit AR-7.

Q. Does the same figure appear on AR-44 under the year 1950?

A. Yes.

Q. Can you tell me with those two figures what the approximate percentage of all aluminum produced by Alcoa was sold? Can you make that computation in round figures? I think it is about 24 percent. You can just check to see whether that is approximately correct.

A. Yes.

Q. That's about right, I think. In other words, that means in the year 1950 Alcoa sold to others about 24 percent of all the primary aluminum they produced?

A. Yes, sir.

Q. About one fourth of it went to others?

A. Yes, generally.

[fol. 1615] Q. What type of customer were these generally, would you say?

A. These are non-integrated domestic customers.

Q. Now, if you look at AR-44, and follow the years from 1950 down to 1960, what would you say generally is the trend of Alcoa production of primary aluminum? What has it been?

A. Alcoa's production of primary aluminum has been upward.

Q. Generally upward. To such an extent that by the year 1960 their production was—and would you read that figure for the record?

A. Alcoa's primary production in 1960 was 1,453,970,000 pounds.

Q. And that would appear to be about twice what it was in 1950?

A. Yes, generally.

Q. Is that right?

A. Yes.

Q. Now, directing your attention to AR-44-A again, where you list Alcoa's sales of primary aluminum, I ask you to tell me from that tabulation how much Alcoa sold in the year 1960.

[fol. 1616] A. 113,732,000 pounds.

Q. Now, could you tell me from a percentage point of view what the ratio is between Alcoa's sales and Alcoa's production in the year 1960?

A. Something less than ten percent.

Q. Something less than ten percent? I compute—about 7.8 percent. Does that sound about right?

A. Yes, sir.

Q. Now, who were these sales made to in 1960?

A. They were made to domestic non-integrated companies.

Q. And I ask you to compare the tonnage or poundage sold by Alcoa to these non-integrated companies in 1960 with what they sold in 1950.

A. The sales were down noticeably from 167 million approximately in 1950 to 113 million pounds approximately in 1960.

Q. Now, if you know will you state what has Alcoa been doing with the bulk of the production.

A. During this period substantial amounts of Alcoa's production went into inventory, due to no other demand for the metal existing.

Q. The question was the bulk of their production. What [fol. 1617] have they been doing with the majority or preponderant portion? They haven't been putting the preponderent portion into inventory, have they?

A. No, sir.

Q. What have they been doing with it?

A. Substantial amounts have been used by Alcoa. There has been an amount sold in foreign countries. And then the amount put into inventory is also of major significance.

Q. Can you tell me how much has been put into inventory, or how much is in inventory?

A. Between 1950 and 1960—in 1950, the inventory of primary aluminum was roughly 46 million pounds.

Q. 46 million pounds?

A. Yes.

Q. And how much was in inventory in 1960?

A. As of the end of 1960 that had increased to approximately 335 million pounds.

Q. 335 million pounds. And how would that figure compare with Alcoa's production in 1960? Can you give me a percentage ratio? 335 million to 1,455,000,000?

[fol. 1618] A. Oh, 335 million—25 percent? 20 percent?

Q. Did you compute a rough figure?

A. Well, on the order of 20 to 25 percent, it appears. No, it will be something more than that. I get about 23 percent.

Q. About 23 percent. In other words, the inventory of Alcoa in 1960 was only about 23 percent of their production in that year?

A. Yes, sir.

Q. The bulk of it, again I ask you, was used for what purpose? Alcoa's production. Obviously over a ten year period, if there was only—did you say 20 percent of one year's production, where did all the other aluminum go for the last ten years?

A. The bulk of it was used by Alcoa.

Q. In manufacturing fabricated products?

A. Yes, sir.

Q. Now, I direct your attention to the graph which accompanies AR-44 and I believe on direct examination you testified that the different—perhaps I better ask you to tell me what you said—you called attention to the dotted line which you indicated was Alcoa's capacity, is that correct?

A. Yes, sir.

[fol. 1619] Q. And you called attention to the darker of the two shaded areas, and what did you call that?

A. The darker of the two shaded areas represents Alcoa's primary production used by Alcoa.

Q. Used by Alcoa?

A. Yes.

Q. What is the lighter shaded area?

A. That represents chiefly sales to non-integrated domestic companies.

Q. Now, did you state that the area between the dotted line and the shaded portion represented what? Will you state what you stated that portion was?

The Court: Which shading?

Mr. Melchior: The more thinly shaded portion.

A. The space between the dotted line and the light shaded portion represents metal—well, it represents idle capacity—which idle capacity is available for any demand Alcoa might have for the metal. It represents that portion of Alcoa's production which went into inventory. It represents Alcoa's sales in the export market. It represents also Alcoa's shipments to stockpile.

[fol. 1620] Q. Which of those factors is larger, if any of them are?

A. I do not know offhand the amount shipped to stockpile.

Q. Could you tell from the graph?

A. The amount shipped to stockpile?

Q. No, I don't mean that, but can't you tell from the graph which of the amounts you listed is largest?

A. Well, the graph shows that the amount of idle capacity is a significant portion, but I do not know how much of the remainder represents stockpile and how much of it offhand represents overseas shipments.

[fol. 1621] Q. I see. You can't really tell from this graph?

A. No.

Q. But you do know that idle capacity represents a substantial part of it?

A. Yes.

Q. So to the extent that there is no production by the facilities, or to the extent that there is or there is not production, active production by the idle facilities, the dark line will move up and down; is that correct?

A. That is correct, sir.

Q. Now, the spread between the dotted line and either of the shaded portions, or the spread between the dotted line and the more darkly shaded portion will vary with the volume of pig and ingot used by Alcoa in its own operation; is that correct?

A. That is correct.

Q. If Alcoa uses more of its own product of ingot on a tonnage and volume basis, the more darkly shaded area would increase?

A. Yes, that is correct.

Q. And would close the gap; is that true?

A. Yes.

[fol. 1622] Q. Now, directing your attention to AR-45, Mr. Healy, I understand this tabulation purports to show aluminum pig, ingot or billet to be made available to non-integrated users under the provisions of GSA supply contracts; is that correct?

A. Yes, sir.

Q. And your second column to the left gives the quantity in pounds concerning which there is an obligation on Alcoa; is that correct?

A. Yes, sir.

Q. These are the pounds that Alcoa must make available to whom?

A. To non-integrated users.

Q. Now, is this all non-integrated users of aluminum or merely—is it all non-integrated users of aluminum or merely non-integrated wire and cable companies?

A. It would be all non-integrated users.

Q. As a matter of fact, under this program would it be possible for all this tonnage to go to non-integrated companies who are not wire and cable companies?

A. I would say that would be possible.

Q. Now again with respect to this same column, is there [fol. 1623] any requirement that this tonnage be made available to Small Business?

A. There is provision in the contract that a portion of this must be made available to Small Business.

Q. Do you know what portion?

A. I am not certain.

Q. But you do know that it must be made available to non-integrated companies?

A. Yes, sir.

Q. And this will be regardless of size?

A. Yes, sir.

Q. Now, there was some testimony earlier in the case that some of this hot metal—are you familiar with that term, hot metal?

A. Yes, sir.

Q. That there were some tonnages of hot metal pur-

chased by some of the automobile companies. Would they be non-integrated users of aluminum?

A. Yes, sir.

Q. They would. Now, I direct your attention to AR-46, and this tabulation is entitled "Supply to non-integrating fabricators sales of primary aluminum of the domestic integrated producers." Now, are these non-integrated fabri-
[fol. 1624] cators here the same type of non-integrated fabricators that we have been talking about?

A. Yes, sir.

Q. Regardless of the size of the company, as long as they don't make primary aluminum they are non-integrated fabricators?

A. Yes, sir.

Q. And they would include the automobile companies?

A. Yes, sir.

Q. Now, directing your attention to AR-47 and AR-48, AR-47 is primary aluminum purchased in pounds by Rome and AR-48 is the same information in dollars; is that right?

A. I believe that is the reverse, sir.

Q. The reverse? I am sorry. And we will talk about them at the same time if we can. I notice that the first column to the left is entitled "Total primary aluminum sales to non-integrated fabricators by U. S. primary producers." And I again ask you are these the same categories of non-integrated fabricators that we have mentioned with respect to the earlier tabulations?

[fol. 1625] A. Yes, sir.

Q. Now, with particular respect to these two tabulations, AR-47 and AR-48, is this primary aluminum or is this primary aluminum EC grade?

A. This is primary aluminum in total.

Q. In toto?

A. Yes.

Q. Now, would you know what these percentages in the two righthand columns would be if we made the same computation and limited it to sales to non-integrated wire and cable fabricators?

A. No, sir, I do not know.

Q. You don't know what the percentage would be. Would you think the percentages would be higher?

A. Yes, sir.

Q. Would they be materially higher?

A. They would be higher. I don't know how much. I would expect it to be a notable difference, but again I don't know how much.

Q. Do you know what percentage of all Alcoa's primary aluminum is utilized by conductor wire and cable manufacturers?

A. No, sir.

[fol. 1626] Q. Of aluminum?

A. No, sir, I don't.

Q. You have no idea?

A. No.

Q. Now, do either one of these tabulations, AR-47 and AR-48 include Rome's purchase of rod and wire conductor or EC rod and conductor wire and cable?

A. No, sir, they do not.

Q. They are not included in these tabulations. Mr. Healy, I direct your attention to government's Exhibit 447. Are you familiar with that tabulation?

A. No, sir, not especially.

Q. You have not seen it before?

A. I saw it at one time, but I do not recall until I refresh my memory just what is on it.

Mr. Bergson: Mr. Melchior, I think I should advise Mr. Healy that this was not one the original group of charts that you submitted to us. He saw the earlier charts. I don't believe he saw this chart which was submitted to us during the course of the trial.

[fol. 1627] Q. We won't make Mr. Healy analyze it at this time then.

A. Thank you.

Q. Now, Mr. Healy, directing your attention to AR-49 —strike that. I won't go into that one. Directing your attention now to AR-50 and AR-51, AR-50 is entitled "Copper and aluminum purchased by Rome," and this I believe is again in dollars, and AR-51 is the same thing in pounds; is that right?

A. Yes, sir.

[fol. 1628] Q. And you arrived at certain percentages, there, devoted to copper generally in the upper 90s?

A. Yes, sir.

Q. Now, I ask you, Mr. Healy, if these same tabulations were shown in feet, would there be any difference in your conclusions as far as percentages are concerned?

A. I have no basis for judging.

Q. You have no basis for judging. Directing your attention now to AR-53—has this one been introduced, Counsel? Offered? Maybe I'm getting ahead of you.

Mr. Bergson: 53 has been offered.

The Court: 53 is in.

Q. Directing your attention to AR-53, Mr. Healy, I wonder if you could explain to me how you arrive at the percent overlap as shown in the far right-hand column?

A. That is the relationship of the——

The Court: Wait just a minute.

Mr. Bergson: Excuse me. Just a minute.

The Court: I'm wrong. You are right.

Q. You may proceed.

A. The percentage is the relationship of the first column to the second. There is a percentage for the year 1954, [fol. 1629] $1,716,000 bears to $28,912,000.

Q. In other words, the right-hand column is just the ratio existing between the two middle columns?

A. Yes.

Q. Well, how did you arrive at what should go into the two little columns?

A. The left-hand column of the two, overlap wire and cable products, covers the Rome production comprising the categories ACSR, weatherproof line wire, and service drop.

Q. Those three categories?

A. Yes, sir.

Q. Made by——

A. Made by Rome.

Q. Made by Rome?

A. Yes.

Q. And Alcoa, or just Rome?

A. These figures relate only to Rome. The second column refers to the total Rome sales of wire and cable products.

Q. Now, why did you select for the overlap wire and cable column ACSR, weatherproof and service drop?

A. This was on instruction of counsel.

Q. I see. You don't know why you did it, or why it was [fol. 1630] done, then.

A. No, sir.

Q. Of your own knowledge?

A. No, sir.

Q. Now, I call your attention to AR-57. This, I believe, you pointed out was a listing of changes in base prices of primary aluminum, E.C., redraw rod, and certain selected cable sizes which you averaged out?

A. Yes, sir.

Q. And your purpose in preparing this—was it to show the extent of the spread in price between the raw material and the end product? Is that right?

A. Yes, sir.

Q. I believe you did state on interrogation that this merely represented list prices, and did not necessarily represent actual market prices?

A. That's correct.

Q. Are you familiar at all with market prices?

A. In a general way, yes.

Q. Can you tell me generally whether the prices set forth here for the primary aluminum are generally consistent with what you understand the market price to be on primary aluminum?

[fol. 1631] A. With regard to E.C. grade, yes.

Q. With regard to E. C. grade, you feel that the price set forth here does actually represent the market price?

A. Yes, sir.

Q. Now, with respect to E.C. redraw rod, would you say that the price given here for list prices of E.C. redraw rod represent the market prices?

A. For a portion of the period they did, and I don't recall the date now when redraw rod started to be sold at less than schedule. But there was a date when the market did change in that regard.

Q. You can't give us an approximation, can you?

A. I may be off on this, but it seems to me it was early 1957; but I may be off.

Q. Around 1957?

A. I think so.

Q. In other words, prior to that year, the redraw prices represented here were actual market prices. And subse-

quent to 1957, you think they do not represent market prices?

A. That is generally true—with the exception—I better not state that.

Q. No; don't state anything you don't know of your own [fol. 1632] knowledge; that's all I'm asking you. Now, with respect to the market prices for wire and cable—aluminum wire and cable—what would you say with respect to the prices you have set forth here with respect to a comparison between the base price as listed here for wire and cable and the market price?

A. I was not familiar with cable prices prior to 1955. Subsequent to 1955 the cable was so frequently sold at less than schedule price that I cannot make any generalization other than that.

Q. From 1955, then, down to the end of this chart, it's your information that aluminum wire and cable was sold at less than list prices?

A. Only at times. It sometimes would be sold at schedule. Other times, less than schedule.

Q. How often was it sold at schedule, to your knowledge?

A. I only know that the thing would go in cycles. I would be informed at times we were selling at schedule, and other times that we were not.

Q. Now, if, as you have informed us, that the pig prices, the pig market price, has been consistent with the listed price here, whereas from 1955 on, the market price for aluminum wire and cable has been most generally below the [fol. 1632a] list price here—what does that do to the spread?

Mr. Bergson: I don't think he said, "most generally."

The Court: No, he didn't say that.

Q. What was the term you used?

A. Frequently.

Q. What would that do to the spread?

A. Well, the spread between actual market price and the pig price would be less than shown here. Based on actual market pricing.

Q. Now, during your direct interrogation, Mr. Healy, by counsel, I believe counsel spoke of the—I don't want to misquote counsel here, but what I have written and we can

check the record if it is not correct—that Alcoa has attempted to maintain a studied relationship between these three levels of prices here. Do you recall that comment?

A. I don't believe that was the phraseology.

Mr. Melchior: Do you recall what you stated, counsel, or shall we check the record.

Mr. Bergson: I think I stated they attempt to maintain a relationship, so there would not be a squeeze.

[fol. 1633] Mr. Melchior: Fine; that's satisfactory.

By Mr. Melchior:

Q. How does Alcoa maintain this relationship so there will not be a squeeze? How does she go about it mechanically, if you know?

A. Alcoa does not establish the relationship, in that she does not control the market price of the cable. I have stated that the price Alcoa realized for cable was less than scheduled price frequently due to meeting competition. It would be the competitive market factor which would establish the spread.

Q. I am not quite sure how I see any control there. You say Alcoa has no control over the market price of the cable, is that right?

A. Let me clarify that.

Mr. Bergson: I don't think I said Alcoa had control.

Mr. Melchior: No.

Mr. Bergson: I said it attempted to maintain the spread.

Mr. Melchior: Well, I was asking the witness to explain how Alcoa does this. I'm interested.

[fol. 1634] The Witness: Alcoa does not control it.

Q. Does not control what?

A. The spread between the market price of cable and the price of primary aluminum.

Q. Well, I believe Counsel used another phrase, which I noted down, about the undulating spread, and you responded by saying "Yes, sir." Now, would you explain this undulating spread that he spoke about and you agreed to. I am not sure I understood the import of your testimony.

A. I believe the conversation at that time was with relation to this chart which shows the spread in published

price. The conversation that we just had most recently is with relation to market price.

Q. I am talking about both market price and the raw material price, the pig and the E.C. rod. These are the three factors which determine the spread.

A. Yes, sir. This chart shows that there has been a general increase in the spreads shown. However, it is not a constant, the increase in spread is not at a constant rate. At some points in the table here you will see that the spread has declined and then you will see that it has again widened.

[fol. 1635] Q. Yes, I can see that, and that is why I am asking that I don't quite understand what control Alcoa exercised over this spread?

The Court: They said they didn't exercise any.

Mr. Melchior: Well, I understood counsel to say that they made a steady effort to keep this spread.

The Court: He said something about having a pricing policy so that they wouldn't be accused of taking control. The statement was made to me. You can put counsel on to explain that. I don't want it explained. I think all that this chart shows is their pricing policy. They admit, maybe we can clear it up, they admit that at all times on competition that they would vary from their pricing policy to meet the competition of others. I don't know that there is anything complicated about it. That is my understanding of it.

Mr. Melchior: Well, I am not sure I understand how they do it, but I am not sure I can get it by testimony.

[fol. 1636] The Court: They put it right down on a piece of paper. That is how they did it. They set up a pricing list and put it on the list.

Mr. Melchior: But each of these is apparently separate.

Q. Are these not separate lists? For instance, your pig list goes out at one time with a price noted in it and would the E.C. ingot pricelist come out at the same time or a different time?

A. Generally the same time.

Q. Generally the same time. How about the wire and cable prices?

A. They would on occasion come out at the same time and there would be also wire and cable changes, which does not coincide.

Q. Does the change in aluminum pig and E.C. rod generally result in the change of the price of aluminum conductor?

A. It has always been that way, but there are exceptions, also.

Q. If the price change of pig is down, would it be likely to expect that the price of wire and cable would be down with that change?

[fol. 1637] A. Yes, sir.

Q. To your knowledge does the price of copper wire and cable have any influence on aluminum wire and cable prices, if you know?

A. I can't testify.

Mr. Melchior: Your Honor, I would like to go into AR-58, but I am a little reluctant to, because I don't know whether I will come out with any more than we already have on that.

The Court: Well, let's try it.

Q. Mr. Healy, I direct your attention to AR-58, and I have a great deal of difficulty in understanding how the unknown figure there, which is represented by 11 million and some odd pounds, how that, or a part of that was allocated to Rome, if I understand the chart correctly. Perhaps you can explain that to me, Mr. Healy.

A. Sir, I can't shed much light on that. I was advised of the portion of that figure which represented—I was advised of this 17,059 pounds, which is a portion of this eleven million pound figure.

Q. You don't know it of your own knowledge, then, I see.

Mr. Bergson: I suggest——

The Court: Gentlemen, can't we clear that up. This [fol. 1638] is taken directly from Hemeter's testimony.

Mr. Bergson: Yes, sir, and from Rolston's testimony. And if counsel needed any opportunity to clear it up, he might have done it through Mr. Rolston.

The Court: That is where it comes from.

Mr. Melchior: Yes, it is from Mr. Rolston. I understood Mr. Hemeter's testimony quite well. No further questions.

Mr. Bergson: I just have a few questions on redirect.

Redirect examination.

By Mr. Bergson:

Q. Mr. Healy, on cross-examination you asked if you could account for the 2 per cent increase in Alcoa's capacity shown in Exhibit AR-7, in the period between 1959 and '60. You also said that in late '59 or early '60, additional capacity was added at Point Comfort. Could that 2 per cent be accounted for by the Point Comfort additional capacity?

A. No, sir. Let me correct that. These changes in that general area—yes, it could be.

[fol. 1639] Q. Now, in testifying concerning Defendants' charts AR-44 and AR-44-A, Mr. Melchior brought out that in 1950, 24 per cent of Alcoa's capacity was sold to non-integrated producers and in 1960, 7.8 per cent were sold to non-integrated producers. Was that because Alcoa refused to sell any to any of the non-integrated producers?

A. No, sir.

Q. Could it have been because of the fact that between 1950 and 1960 additional primary metal suppliers came into beging and competed with Alcoa for that market?

A. It could very well be the case.

Q. In addition, in his cross-examination, Mr. Melchior pointed out that you had 23 per cent of 1960 production in inventory and your chart indicates that, or the graph indicates that your production and capacity or particularly your capacity exceeded your production. If Alcoa had orders for more aluminum would it have used that additional capacity?

A. It would have been delighted to.

Q. Would you say that in the light of what appears on Chart AR-44 that aluminum is in short supply?

A. No, sir. There is ample supply and ample idle capac-

[fol. 1640] ity.

Q. And would it be, in your opinion, would it be difficult for any non-integrated fabricator to obtain metal?

A. No, sir, it would not be.

Q. Now, in his cross-examination, Mr. Melchior also referred to charts 47 and 48, and he asked you whether or not those charts included Rome's rod purchases; do you recall that question? Let me show you one of the Govern-

ment's charts, if I can find it. In invite your attention to Government chart 448 and ask you to look at the line which is entitled "Total production, use, purchase and sales of aluminum E.C. and re-draw rods by Rome Cable Corporation 1953 to June 30, 1959." How much E.C. redraw rod did Rome purchase in 1955?

A. None.

Q. How much E.C. redraw rod did Rome purchase in 1956?

A. 151,000 pounds.

Q. How much did it purchase in 1957?

A. Four hundred pounds.

Q. How much did it purchase in 1958?

A. None.

[fol. 1640a] Q. How much of a difference do you think that would make in your computation?

A. It would be insignificant.

Q. Would it show up?

A. It probably wouldn't even show up.

Mr. Bergson: No further questions, your Honor.

[fol. 1641] Recross-examination.

By Mr. Melchior:

Mr. Melchior: I think I have just two questions, your Honor.

Q. Directing your attention to AR-53—this is just a point of information, Mr. Healy. You indicated that the products given to you for overlap wire and cable, I believe, were ACSR, weatherproof and service drop.

A. Yes, sir.

Q. You see this yellow board behind you, where they talk about overlap products?

A. Yes, sir.

Q. If I can see that far, I probably would see a product known as all aluminum cable. Is there one on there?

A. Yes, sir.

Q. Was there any reason why that particular product was not put in here?

A. It was included. If I didn't make that clear, I will correct that now.

Q. Oh, it was.

A. Yes.

Q. I see. Fine. One more final question. And it goes [fol. 1642] back to AR-58, this tabulation which I have a great deal of difficulty in understanding. I believe you stated, Mr. Healy, that the first part of it, the tabular material which totals up to 78 and some odd million pounds —is that supposed to be based on Mr. Hemeter's study which is AR-29?

A. Yes, sir, it was.

Q. As I recall Mr. Hemeter's testimony, he indicated that AR-29 was based upon potential business reports. Do you recall?

A. Yes, sir, I recall that.

Q. I asked him about several other report forms. One in particular was a lost business report. Do you recall that?

A. Yes, sir.

Q. Do you recall what he stated about the lost business report form?

A. I believe he stated that the lost business report form was not involved in this tabulation.

Q. Did he make any other comment with respect to those?

A. I don't recall, sir.

Q. He wasn't responsible for the lost business report forms, was he? Didn't he indicate that someone else had [fol. 1643] responsibility for that?

A. Yes.

Q. Didn't he indicate that this lost business report form had been abandoned because the salesmen didn't like to turn in information on lost business?

A. There was something like that.

Q. Do you recall that testimony?

A. Yes.

Q. Well, now, I note at the bottom of AR-58 that the data says summaries of Alcoa's lost business report.

Mr. Bergson: Potential business reports.

Mr. Melchior: I don't see the word potential.

The Court: It is.

Mr. Melchior: It is not on mine. It is not on the copy I

secured. Mine reads summary of Alcoa's lost business reports and Rome's sales orders. This is the copy I got from defense counsel. This explains the dillema we have been facing.

Mr. Bergson: I will give you this and I am sure now you [fol. 1644] will have no more problems.

Mr. Melchior: Well, I am not so sure of that, counsel. May it please the Court, is this the copy the Court has?

The Court: I guess so. The exhibit in evidence I think has "Summaries of Alcoa's potential business reports, Rome's sales orders."

Mr. Bergson: Here it is.

Mr. Melchior: This is a different form than the one I had earlier received from counsel.

The Court: I don't know a blessed thing about it.

Mr. Melchior: No further questions.

George Day, called as a witness on behalf of the defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Bergson:

Q. Mr. Day, will you please state your name and address for the record.

[fol. 1645] A. George Day, Pittsburgh, Pennsylvania.

Q. By whom are you employed?

A. Aluminum Company of America.

Q. In what capacity are you employed?

A. Assistant manager of the commercial research division.

Q. How long have you been assistant manager of the commercial research division?

A. Slightly over two years.

Q. And prior to that what position did you hold?

A. Prior to that I was chief analyst in that division for one year. Prior to that, senior market analyst in that division. I have been in the commercial research division for ten years.

Mr. Bergson: At this time, your Honor, I would like to offer Defendant's Exhibit AR-4 for identification, which was marked during the cross-examination of Dr. Martin and is in our chart book, and——

The Court: 1958.

Mr. Bergson: 1958. This is a report furnished to us by the Business and Defense Services Administration of the [fol. 1646] Department of Commerce in response to a request from us that in compiling the statistics of primary producers or affiliates, they include as the legend indicates those former non-integrated producers which subsequently became parts of integrated producers as part of those integrated producers for all of the years. This we wanted as a basis for the charts that we are about to offer, because it is our view that in order to judge the effect of this acquisition on independents, as the government contends, you have got to consider the independents as they exist today and not as they ceased to be independents during the course of the years. And I offer this in evidence at this time.

Mr. Melchior: We object, your Honor. We object on the basis of the fact that this tabulation includes as primary producers for all the years 1954 to 1960 not only the primary producers but the companies they acquired some years after 1954. In particular it includes with Alcoa, for [fol. 1647] the year 1954, Rome Cable Corporation which was not acquired until 1959. It includes U. S. Rubber, which was acquired by Kaiser in 1957, for all the years, and it includes Southern Electrical which was acquired in the year 1957 by Olin for all of those years.

Mr. Bergson: And it also includes, your Honor, Anaconda, which became integrated by becoming a primary producer on its own.

Mr. Melchior: In what year?

Mr. Bergson: 1955 I think it was.

Mr. Melchior: I was getting ready to make this point before you interrupted, counsel.

Mr. Bergson: I beg your pardon.

Mr. Melchior: So we are attempting to show the trend here based upon a combination of companies which in fact

did not exist for the years 1954, 1955 and 1956, and to us this is a complete distortion and voids the tabulation.

[fol. 1648] Mr. Bergson: Your Honor, in order to determine the effect of Alcoa's acquisition of Rome to use past statistics it seems to me that the companies have to be put in the same position that they were at the time of Alcoa's acquisition of Rome. That was what we made an effort to do here. The government in its charts presented statistics as they saw them. We are presenting things here as we see them. The question it seems to me that has to be determined is whether Alcoa's acquisition of Rome which took place in 1959 has had any effect so far as any independents are concerned, on independents which were in existence at that time. Now this is what these charts will show.

The Court: When you say "these charts," are there some charts——

Mr. Bergson: This chart is merely the basis for charts that are to follow.

Mr. Melchior: That's right.

Mr. Bergson: That's why I offered it in evidence at this time, so that I could provide foundation for the subsequent [fol. 1649] charts. This chart was prepared by a government agency.

The Court: Let's see if I understand what it says. In 1954 there was a shipment of wire by the primary producers or affiliates. That means included in that both Rome and Alcoa.

Mr. Bergson: No, the total figure includes everybody in the industry. That hasn't been changed. That is the way this thing was put out by the Department of Commerce in the first instance. What has been changed here is that in the column "Primary producers or affiliates" there have been taken out of the other producers column and put into the primary producer or affiliate columns those companies which were merged or became integrated prior to the acquisition of Rome.

Mr. Melchior: In other words, your Honor—and this is very important we think—because there will be about [fol. 1650] seven tabulations following which are subject to the same defect. There is a column here—and incidentally I will say we don't have any problem with the figures. It is the way they are being used. If you look at the column

"Other producers," in 1954, there are not included in that column, and in our view there should be at that time, the three merged companies which were not merged until the years 1957 and 1959 respectively. They should be included in that 14 percent figure there rather than as primary producers, because in the year 1954 Rome Cable was independent of a primary producer, Southern Electric was and so was the U. S. Rubber facilities. They were not a member of the integrated organization in 1954; did not become a part of them until three years later. I can see how in some cases it might be fair to reach back into the past and perhaps do this, but not when you are trying to show a trend, as counsel will attempt to show in the very next tabulation. [fol. 1651] He will show a trend, and he shows the trend by including the totals of the non-integrated merged companies as part of the integrated companies three years before it actually took place.

Mr. Bergson: The trend we are trying to show will be in three charts that begin with the year 1958. Those charts are Exhibits 63, 64 and 65; if you will look at those, they start out with the year 1958. That was the last full year prior to the merger, and that we figure is the proper take-off point for a determination as to what has happened as a result of this merger. Now in the other charts our main purpose is to show what position Alcoa and Rome held in this industry, and you will find there in those charts that Alcoa and Rome are broken out separately.

Mr. Melchior: I think this main problem will show in AR-59, which is the next one. You can look at that.

[fol. 1652] The Court: Just a minute, Mr. Melchior. Apparently, at a quick look at these other three exhibits, they only do go back to 1958, so that your objection to this chart previous to that is unimportant, isn't it?

Mr. Melchior: No, it isn't, your Honor. Let's look at AR59, AR60 and AR61, which are the next three. We have an additional objection for this which I will register when we come to it. But you can look at the next chart and probably that is the reason they were put in this order. You will note we have 1954 down to 1961. And they have the third column entitled "Primary producers or affiliates" and they show a percentage from 88 down to 86. Some undulations on the way. In the year 1954, 1955 and 1956

they have included not only the primary producers but also the companies that merged, which they did not merge until 1957.

The Court: I understand that, all right. Assume they do. [fol. 1653] What's the harm?

Mr. Melchior: Because it will show an entirely different trend if you pull them out, your Honor. If you pull Rome, U. S. Rubber and Southern Electrical out of the years 1954, the year 1955 and the year 1956, those percentages will change and the trend counsel apparently is going to try to show will not be there. I am not sure it is there anyway, but it will be appreciably less.

Mr. Bergson: Will there be any change in your view in the position of Alcoa and Rome, as shown in those charts, as a result of the way——

Mr. Melchior: I don't think those two columns will be affected, no. But primary producers I think will definitely be affected, and I haven't computed it. This tabulation was objected to some time ago on this very basis. In fact, there was a series of seven of them, so there was an opportunity for counsel to correct.

[fol. 1654] The Court: The thing I am getting at—what this is, if I understand it right, is a combined—beginning in 1954, a combined—this figure for bare wire for instance—of the primary producers plus the affiliates with which they were later merged.

Mr. Bergson: That's right.

The Court: Well——

Mr. Melchior: Why was this done? Why is it necessary?

The Court: I don't care why it was done. I am just trying to find out what was done first. We can argue why—because of course the government is going to offer charts favorable to themselves. The defendant is going to offer charts favorable to themselves. I am not disturbed about the why, if I can get the facts, I will worry about the why. All right. I can understand that. For instance, in 1954 they added, I suppose, Rome to the Alcoa figure.

[fol. 1655] Mr. Melchior: Not, to the primary producers.

The Court: To the primary producer figure.

Mr. Melchior: That's right. They added U.S. Rubber.

The Court: Yes, U.S. Rubber.

Mr. Bergson: And Anaconda.

Mr. Melchior: And Anaconda. And Anaconda became a primary producer probably in the year '55.

The Court: This really shows what they would have done if they had been merged at that time.

Mr. Melchior: Yes, you are right.

The Court: All right. I overrule the objection. And all it is is something I can do myself, putting it together, and adding it together.

Mr. Bergson: I don't think you could have done it, your Honor, because I don't believe the statistics were available on an individual basis.

The Court: I mean I could have——

[fol. 1656] Mr. Bergson: We could have done it ourselves without asking the BDSA to do it for us.

Mr. Melchior: You asked BDSA to do this, Counsel?

Mr. Bergson: Yes.

The Court: I think I will receive it. It is kind of hard to figure out on a number of these charts what to do with them after I get them. But if I could understand the basis of them I think I can evaluate them later. But this particular chart is adding the figures for the companies that were later merged to the primary producers, which in fact I suppose they are going to argue that they represent a condition which would have existed in 1954.

Mr. Bergson: If they had been merged.

The Court: If they had been merged.

Mr. Melchior: We feel as long as the figures for the individual companies are shown, as they do in the case of Alcoa and Rome in '59, that would be so, but if the defense tries to show trend based on these figures, we think no [fol. 1657] conclusion may be drawn.

The Court: You may be entirely right about that. I certainly think that there are several of these charts that I am not going to go for on the evidence so far, including some by the Government and some by the defendant. So don't be disturbed about that.

Why don't we take a short recess.

Mr. Bergson: Have you received this exhibit?

The Court: I will receive this exhibit.

Mr. Melchior: AR-4.

(Defendants' Exhibit AR-4 for identification received in evidence.)

(At this point a short recess was taken after which the trial was resumed.)

Mr. Bergson: May it please the Court, before we resume with Mr. Day's examination, I would like to apologize to the Court and to Mr. Melchior for the mix-up on the document that was based on the potential business reports. Apparently we furnished the Government with two sets. One set potential business reports and one set lost business [fol. 1658] reports. I think it is our fault that this mix-up occurred.

The Court: I noticed it once before in one of Mr. Melchior's questions, and I was going to call him on it. Then I decided I wouldn't.

Mr. Bergson: I am glad you didn't, because it was my fault.

The Court: OK.

By Mr. Bergson:

Q. Mr. Day, I invite your attention to Defendants' AR-59 for identification and ask you whether you prepared that exhibit or whether it was prepared under your direction and supervision?

A. Yes.

Q. Would you please tell the Court what this exhibit is?

A. This exhibit shows the shipments of ACSR and aluminum cable, bare, both for the total industry and also for primary producers or affiliates, including merged companies in the pattern that was explained prior, and all remaining producers as a group. And also shows Alcoa's shipments and Rome's shipments separately in the fourth and fifth [fol. 1659] columns. The percentages shown——

Q. Don't answer that now.

The Court: Just a second. You are on 59?

Mr. Bergson: Yes, sir, AR-59. Before offering AR-59, your Honor, I would like to make a statement, that in offering these exhibits which relate to aluminum insulated wire and cable, not this particular one, and subsequent

exhibits which relate to aluminum wire and cable generally, we are offering these materials, not because we believe that the line of commerce is the proper line of commerce, because we are attempting to meet the Plaintiff on its own ground with these exhibits, but our offering them is to be in no way taken as a concession that we admit that these are lines of commerce.

We do admit that the ACSR and aluminum cable, bare, is a separate line of commerce.

With that statement I offer Defendants' Exhibit AR-59 for identification.

[fol. 1660] Mr. Melchior: Your Honor, the government objects to this on the same basis that we objected to the earlier one.

The Court: Just a moment. I think probably I would have —I think at least I would be in a little more intelligent position to understand if you defer your objecting and you defer your offering until we have an explanation of it, so that we have the explanation. All right. I will defer ruling on it. The offer may stand. I will defer ruling on it until your witness explains it to me.

By Mr. Bergson:

Q. Now, Mr. Day, this chart was prepared by you at my request, was it not?

A. Yes.

Q. Did I tell you why I wanted it prepared this way?

A. I believe so.

Q. Can you state the reason?

A. The purpose was to try to show the trend from the year 1954 through the last full year that we have data on, 1961, the trend for the group of companies known as other [fol. 1661] producers, which would be the non-integrated producers today.

Q. The ones that remained independent?

A. That's correct. Those same companies back to the year 1954. The primary purpose was to show that particular column and also to compare Alcoa and Rome separately with the total industry.

Q. And also to show Alcoa and Rome's position as the years went on?

A. Oh, yes, naturally.

Q. Now looking at the column for Alcoa in 1954, what percentage of the market did Alcoa have?

A. 48.4 percent.

Q. And in 1961 Alcoa had how much?

A. 26.1 percent.

Q. And in 1958, the last full year before the acquisition, how much did Alcoa have?

A. 32.5 percent.

Q. And in 1959?

A. 31.4 percent.

Q. And in 1960?

A. 30.6 percent.

The Court: That is a percentage of what?

[fol. 1662] Mr. Bergson: That is the percentage of the total. That's the first column.

The Court: So that Alcoa's share alone in 1954—or is it Alcoa plus Rome in 1954?

Mr. Bergson: No, that is Alcoa alone in 1954. Rome alone has been shown in the last column.

The Court: I see.

Mr. Bergson: If I might testify a little bit myself here.

The Court: I will take your statement.

Mr. Bergson: Maybe I can clarify the purpose of this chart. What we wanted to portray here, and the only way we thought that it was proper to portray it here was when the government made a division, assuming that there was no competition among the primary producers, and lumped the primary producers in one group, and the non-integrated producers in another group, that in order to show what the trend is so far as the independents as they exist today are —that you had to take out of the figures for 1954, 1955, [fol. 1663] 1956, 1957 and 1958 those companies which became affiliated, or became integrated, which was Anaconda's case. The main purpose of this chart is to show how drastically Alcoa's share has declined since 1954; how minimal Rome's share always was; and how Alcoa has continued to decline since the merger. It also shows that of the remaining independents, this is what their position was over the period of years. Now, we weren't trying any sleight of hand or anything like that. We just felt this was the only

proper way to present this case with the fact of the merger in 1959. Do I make myself clear?

The Court: I think so. The other producers in 1954, if you eliminated Rome and the Aanaconda affiliate, whatever other one there was had 11.9.

Mr. Bergson: That's right.

The Court: And now those same producers, other producers——

[fol. 1664] Mr. Bergson: The other producers, your Honor the none-integrated producers included within those non-integrated producers from 1954 to date are the South Wires, the Nehrings, the Central Cables, the Essexes, the General Cables, companies of that kind. Those companies remained constant throughout the period 1954 to 1961. What we did was to break out of the other producers category and put over into the integrated category those producers which subsequently became integrated, but so that your Honor could see the picture so far as Alcoa and Rome was concerned, we had separate columns for Alcoa and Rome. They are included also in these primary producers and affiliates column. Alcoa is in there twice. But the percentage is the percentage to the total which has remained the same, and this is the same totals the government used in their charts except they don't have 1960 or 1961 or 1954.

The Court: I think I understand.

[fol. 1665] By Mr. Bergson:

Q. Now, Mr. Day, with that explanation I don't know whether I have left anything for you to testify to. Do you agree with what I said? Well, so far as Alcoa and Rome are concerned, what does this chart show?

A. So far as Alcoa and Rome——

Q. Right.

A. Individually are concerned?

Q. Individually and collectively. Individually, first.

A. In the case of Alcoa, since the year 1954 through 1961, Alcoa's participation has declined. Rome I would say generally the same thing, although there have been, as you call them, undulations.

Q. Now let me ask you this. In 1959, the first year, nine months of which were after the merger, and 1960 and 1961

which were after the merger, did Alcoa and Rome's share combined decline from their combined share for 1958?

A. Yes.

[fol. 1666] Mr. Bergson: Do you want me to handle all of these before I offer any of them?

The Court: No. You can offer this and I will hear Mr. Melchior about it.

Mr. Melchior: Well, the Government objects to this, your Honor, on the same basis that it did object to AR-4 in the previous tabulation, on the basis that as the witness stated, he was instructed to show a trend, and he used the word "trend" and he mentioned specifically trend of other producers, and, of course, by the same token, if he is showing a trend of other producers, he would have to show the trend of the primary producers because the two added together give you 100 per cent. We think the premature addition of the shipments of companies two or three years before they actually became a part grossly distorts any trend that may be shown.

We will not object to the Alcoa and the Rome columns, but we do object to using the primary producer column and the other producer column for the purpose of showing a trend. And the witness has said that he was instructed [fol. 1667] to prepare it for that purpose.

The Court: I think I will overrule the objection. In its valuation you may be right, but it seems to me it is not of too much importance, anyway, because the question there is the restraint of competition. Of course, Alcoa's history as shown on this chart and Rome's history as shown on this chart and bears on that subject.

Mr. Bergson: Your Honor, I think on the subsequent charts we will clarify this, and this is the very reason we have the subsequent charts.

The Court: All right. I will receive it.

(Defendants' Exhibit AR-59 for Identification received in evidence.)

By Mr. Bergson:

Q. Now, Mr. Day, I invite your attention to Defendants' Exhibit AR-60 for identification and ask you whether this chart was prepared by you or under your direction and supervision?

A. Yes.

Q. And will you please describe this chart to the Court?

[fol. 1668] A. This chart shows shipments of aluminum insulated or covered wire and cable, total industry figures for the years, in each of the years '54 through '61. Also shows for primary producers or affiliates including merged companies as a previous exhibit, in the pattern as previously exhibited, and also the shipments for each of the years of 1954 through '61, for the remaining independent producers, the same procedure as the previous chart. It also shows the shipments in each of the years '54 through 1961, for Alcoa alone, and also shows the shipments for Rome for the years '54 through '61——

Mr. Bergson: Now do you wish me to question him before I offer this, Your Honor, as we did the last one?

The Court: Yes, I think so.

Q. Now, Mr. Day, with respect to Defendants' Exhibit Ar-60 for identification, looking at the column for Alcoa, what does it show for Alcoa's percentage of business from the year 1954 to '61?

A. I didn't hear all that question.

Q. What does it show?

A. What does it show?

[fol. 1669] Q. Regarding Alcoa's participation of the buisness.

A. The year '54 Alcoa's participation was 10 per cent; and in the year 1961, Alcoa's share was 7.3 per cent. Indicating a decline.

Q. Now, I notice, however, that in 1959, which was, three months of which were prior to the acquisition, Alcoa had 12.2 per cent, which is an increase over 1954. Since the acquisition what does the chart show?

A. A very definite decline.

Q. And on the part of Rome Cable?

A. Since '59?

Q. First, from '54 to '61.

A. In 1954 Rome had 6.9 per cent participation. In '61, 5.7 per cent. On the basis of that a slight decline.

Q. Now, if you were to add Alcoa and Rome together, for the year 1958, which was the last full year prior to the acquisition, what percentage would Alcoa and Rome have?

A. 16.3.

Q. And in 1959, nine months of which was after the acquisition, how much would Alcoa and Rome have?

A. 16.6.

[fol. 1670] Q. And in 1960?

A. 14.8.

Q. And in 1961?

A. 13.0.

Mr. Bergson: Now, before we get on to the other integrated companies, I offer Defendants' Exhibit AR-60.

Mr. Melchior: The Government objects to this tabulation on the same basis that it objected to AR-59 and AR-4, on the ground that there has been a premature inclusion of the merged companies in with the integrated companies, and thus distorts any possible showing of trend.

The Court: I will overrule it. I will receive it.

(Defendants' Exhibit AR-60 for Identification received in evidence.)

By Mr. Bergson:

Q. Now, Mr. Day, I invite your attention to Defendants' Exhibit AR-61 and ask you whether that exhibit was prepared by you or under your direction or supervision?

A. Yes.

[fol. 1671] Q. Can you describe that exhibit?

A. This shows the shipments of alumnium conductor wire and cable which actually is the sum of the two previous chart products, the ACSR and aluminum cable, bare, and the insulated or covered aluminum wire and cable.

On the same pattern as the two previous exhibits, for each of the years 1954 through 1961, showing in the first column the total shipments by the industry; in the next column, shipments by the primary producers or affiliates including the merged companies, as the same method in the

two previous exhibits, and the remaining independent or non-integrated producers for each of those years.

Also, for Alcoa, the combined shipments 1954 through '61, this is for the, if I may call them, product lines—the ACSR and aluminum cable, and the insulated, for Alcoa alone.

And the last column, for Rome alone, for each of the years '54 through '61.

Q. Now, looking at the column, headed "Alcoa, what is Alcoa's percentage, what was Alcoa's percentage of the market in 1954?

A. 42.8 per cent.

Q. And in 1958, the last full year, prior to the acquisition?

A. 27.8.

[fol. 1672] Q. And in 1959, nine months of which was after the acquisition——

A. 26.9.

Q. And 1960?

A. 25.4.

Q. And 1961?

A. 23.5.

Q. And for Rome?

A. In which year, sir?

Q. From 1954

A. 1.1 percent in 1954.

Q. And in 1958?

A. 1.3 percent.

Q. And in 1959?

A. 1.5 percent.

Q. In 1960?

A. 1.2 percent.

Q. In 1961?

A. 1.3 percent.

Q. Now, what was the combined share of Alcoa and Rome in 1958, the last full year prior to the acquisition?

A. I believe that would be 29.1.

Q. And in 1959?

[fol. 1673] A. 28.4.

Q. And 1960?

A. 26.6.

Q. And 1961?

A. 24.8.

Mr. Bergson: I offer Defendant's Exhibit AR-61.

Mr. Melchior: The government objects to AR-61 on the same basis it has stated with respect to AR-59.

The Court: I will overrule the objection and receive the exhibit.

Q. Now, Mr. Day, I invite your attention to Defendant's Exhibit AR-62 and ask you whether that exhibit was prepared by you or under your direction or supervision.

A. Yes.

Q. And would you describe that exhibit to the Court?

A. This exhibit is entitled "Post-acquisition growth of non-integrated producers of ACSR and aluminum cable bare," and shows for each of the years 1958 through 1961 the same shipment data as shown in—I believe that would be Exhibit AR-59—for the total industry for the primary [fol. 1674] producers or affiliates, including merged companies for the other independent or non-integrated producers, the same pattern shown before, and for Alcoa and Rome as a combined number, and also this chart includes a column for each of those groups indicating the percentage change from 1958.

Q. Now, Mr. Day, in 1958 to your knowledge had Anaconda become integrated?

A. I believe so.

Q. Had Kaiser acquired U. S. Rubber?

A. Yes, sir.

Q. Had Olin-Mathison acquired Southern Electric?

A. Yes.

Q. So that in 1958 the only independent company that is not included with the independent companies is Rome?

A. Yes, sir.

Q. Now, taking 1958 as the base year, will you tell us what has happened to the combined Alcoa-Rome share of the market since 1958.

A. Well, taking the percentage participation column in 1958 the combined figure was 32.8 percent. In subsequent [fol. 1675] years it declined to 26.1 percent participation, in 1961.

Q. With what in 1959 and '60? I don't want to let you shortcut anything.

A. 32.1 percent in 1959. 30.7 percent in 1960.

Q. A steady decline, without undulation?

A. Correct.

Q. Now let's look at the column called "Other producers." They had what percentage participation in 1958?

A. 13.4 percent.

Q. And in 1959?

A. 16.3 percent.

Q. And in 1960?

A. 16.2 percent.

Q. And in 1961?

A. 13.3 percent.

Q. Now with Alcoa's share having declined between 1960 and 1961, and the other producers shares having declined between 1960 and 1961, who gained the advantage percentagewise?

A. The other primary producers.

Q. The other primary producers other than Alcoa?

[fol. 1676] A. Other than Alcoa.

Q. Does this indicate to you that there may be competition between Alcoa and the other primary producers?

A. Yes.

Q. Now, taking the column entitled "Percentage of change," how was that calculated?

A. Well, it was the same for all of the columns, of course. The tonnage shown was—let's take 1959 versus 1958 in the total industry column. I think this would express it. But the 1958 tonnage of 175 million pounds was divided into 197 million pounds, to indicate the—what do we call it in arithmetic?

Q. Gross change.

A. 12.5 percent, or in other words, a 12½ percent increase over the volume for 1958.

Q. Now, in the primary producers or affiliates column, what does that 8.8 mean?

A. That indicates that the shipments in 1959 were 8.8 percent greater than the shipments in 1958.

Q. And for the other producers?

[fol. 1677] A. The 36½ percent increase over the 1958 shipments.

Q. And Alcoa-Rome?

A. 10 percent over their 1958 shipments.

Q. Now let's take 1960. 1960 shows for the total production a 5.3 percent increase over 1958; is that how that is determined?

A. That's correct. 1960 tonnage is 5.3 percent greater than the tonnage in 1958.

Q. And the share of the primary producers?

A. Is 1.8 percent over their 1958.

Q. And the other producers?

A. 27½ percent greater.

Q. And Alcoa?

A. One and a half percent less than 1958.

Q. Now, 1961—

A. Total industry, 33.7 percent over their 1958 shipments. Primary producers or affiliates, 33.9 percent over their 1958 shipments. The other non-integrated producers, 32½ percent over their 1958 shipments. Alcoa-Rome shipments, 15 percent over their 1958 shipments.

Mr. Bergson: I offer Defendant's Exhibit AR-62.

[fol. 1678] Mr. Melchior: The government objects to this document, your Honor, on the basis of the fact that it is entitled "Post-acquisition growth of non-integrated producers of ACSR and aluminum cable bare." And they proceed to begin with the year 1958. We submit that 1958 was the year prior to the merger rather than the merger year, for the post-merger year, and secondly that by including Rome with the integrated producers for the year 1958, and not including Rome with the other producers in that year, all the trends and percents are completely inconsistent with what the facts would be. I think it can be readily seen that if the year 1959 were used as a base instead of 1958, a number of the pluses would become minuses. But we submit that this chart in its present form distorts the factual situation as it existed in 1958.

Mr. Bergson: Your Honor, I don't see how it is possible to portray a situation such as this unless you take the year [fol. 1679] prior to the merger, because that must be the take-off point to ascertain what has happened since the merger. If you didn't have that year you would be comparing something against nothing.

Mr. Melchior: Your Honor, we submit the year of the

take-off point should be the year of the merger, because—as showing a post-merger trend—

The Court: How could you compare what happened after the merger unless you used some comparing point prior to the merger?

Mr. Melchior: You can take the year of the merger. You have two entities and combine them all in the year of the merger. But to take the year prior to the merger and attempt then to indicate that Rome Cable in 1958 was an integrated company, which she was not, and not include her in with the other companies, which she was, is a distortion.

The Court: I am not so certain about the last. But it [fol. 1680] seems to me if you had to compare the situation after the merger, which occurred April 1st, 1959, you would have to take some point prior to the merger to use as a basis of comparison. How could you compare it with what happened after the merger unless you used something that happened before the merger as a point of comparison? [fol. 1681] Mr. Melchior: Now if the defendants desire to use the year 1958, all they have to do is treat Rome as an independent company, not as a merged company.

The Court: I say there may be some substance to that part of it but I don't see any substance to the other part. It seems to me that you have to use a point before the merger to compare with what happened afterward as a basis of comparison. So that I think '58 alright there to use. But the other one, you say that by including Rome in this column of primary producers or affiliates that that distorts the whole?

Mr. Melchior: In the year 1958, because she was not a primary producer in the year 1958.

The Court: Yes, I understand.

Mr. Bergson: We were trying to construct a situation that would make a proper basis for comparison. Now you got to compare—it seems to me, this whole dichotomy that the government makes in this industry seems to be without any foundation anyway, putting the independents on the [fol. 1682] one side and the integrated producers on the other side.

The Court: It seems to me in the whole case the government overlooks what to me is very obvious, that there is a

very definite, sharp vigorous competition between these integrated companies. And I though of that in your charts, but that goes again to the weight of your chart.

Mr. Bergson: What we are trying to show here, Your Honor, is what happened to the rest of the industry. Now if you make Rome a part of the rest of the industry in '58 and it is not part of the industry in '59, you got a cockeyed chart.

Mr. Melchior: Your Honor, we have no argument if they are going to use Rome as part of Alcoa in 1959 and subsequent years.

Mr. Bergson: We did.

Mr. Melchior: But they shouldn't be part of Alcoa in '58, because they weren't. And if they were removed from the integrated column in '58, just that one year, over to the other producer column, I think the figures would be entirely [fol. 1683] different.

Mr. Bergson: But the chart would not properly portray

The Court: It wouldn't be comparative then.

Mr. Bergson: That's right.

Mr. Melchior: Why wouldn't it?

The Court: Because you would be comparing after '58 with Rome and Alcoa together, affiliated, and trying to compare it against them entirely separated. Which figure would you use?

Mr. Melchior: I would use the year '59 just before the merger took place.

The Court: Of course you couldn't do that.

Mr. Bergson: Nine months of it they were merged.

The Court: Well I am going to receive the exhibit, bearing in mind this affiliation. If these figures would be changed why of course I am going to let you do it. What I am up against is, if I let you show it it seems to me that you destroy the basis of the whole chart. Because then you [fol. 1684] are trying to compare what happened to the integrated companies against what happened to Alcoa is a separate company and Rome as a separate company. Just how to do that, I don't know.

Mr. Melchior: Of course, Your Honor, they have a column for Alcoa and Rome. We have no quarrel with that. But our quarrel is that they distort the percentage of the

integrated companies as compared with the non-integrated companies. And we think the year '58 is the unsound year.

Mr. Bergson: Your Honor, if anybody is hurt by this acquisition from the industry standpoint it is those who remain in the industry. And the only way we can properly portray that is to treat those companies as a group. And that is what we have done here. Now I think that this is as fair a chart as we could possibly conceive.

The Court: All right. I will receive it. Overruled.

(Defendant's Exhibit AR-62 for Identification received in evidence.)

[fol. 1685] By Mr. Bergson:

Q. Now, Mr. Day, I invite your attention to Defendant's Exhibit AR-63 for Identification and ask you whether that exhibit was prepared by you or under your supervision or direction?

A. Yes.

Q. Would you please describe that exhibit?

A. This shows the growth in shipments of the non-integrated producers for aluminum insulated covered wire and cable starting with the year 1958, for each year through 1961. Tonnages shown here are the same as those shown in 60, AR-60. The same groupings in columns exist; the total is the total industry; the primary producers is explained in the note; the other producers being the remaining non-integrated companies. The only difference here being that Alcoa and Rome are combined, as in the immediately preceding exhibit.

Q. What what does this chart show in regard to the combined percentage of the market of Alcoa and Rome year by year from 1958, the year immediately prior to the acquisition through December of 1961?

A. In 1958 they had a 16.3 percent participation. In '59 16.6; in 1960 14.8 and 1951 13.0 percent participation.

[fol. 1686] Q. Now what participation do the so-called other producers have from year to year?

A. In 1958 they had 29.8 percent; in 1959 31.9 percent; in 1960 32.7 percent; in 1961 33.5 percent.

Q. Now what does the chart show so far as percentage

of change from 1958 is concerned, so far as the other producers are concerned?

A. It shows that in 1959 they shipped 27.6 percent more than they did in 1958. In 1960 they shipped 37½ percent more than they shipped in 1958. And in 1961 they shipped 51 percent more than they shipped in 1958.

Q. And how about Alcoa-Rome?

A. In 1959 Alcoa-Rome shipped 20.9 percent more than they did in 1958. In 1960 they shipped 13.8 percent more than they shipped in 1958 and in 1961 their shipments amounted to only 6.7 percent more than their 1958 shipments.

Mr. Bergson: I offer Defendant's Exhibit AR-63.

Mr. Melchior: Government objects to this on the same basis that it objected to AR-62.

Mr. Bergson: Your Honor, I would like to add one more comment on this.

[fol. 1687] The Court: Go ahead.

Mr. Bergson: The government has contended all through this case that the remaining independents have difficulty in surviving.

The Court: Yes.

Mr. Bergson: This chart and the other prior chart are for the purpose of showing how—I can't think of the right word.

The Court: You wouldn't say "ridiculous"?

Mr. Bergson: I would but I won't. I want to say how flimsy or how much without foundation that contention is.

The Court: I understand perfectly.

Mr. Melchior: May I make a comment here, Your Honor?

The Court: Yes.

Mr. Melchior: Our purpose in pointing out this distinction throughout this case between the integrateds and non-integrateds is because of the express Congressional intent that small business be continued as an important part of our economy. And we are attempting to show that, that the [fol. 1688] competitive action to the non-integraters not only by Alcoa but the other integrated companies, the continued competitive existance has become more and more difficult and in time there may be no more.

The Court: Aren't they getting more of the market?

Mr. Melchior: We don't think so, Your Honor. No sir. We don't think so.

Mr. Bergson: Do you question the accuracy of these figures?

Mr. Melchior: We question the conclusions that are drawn from these, because we don't feel the proper years are taken.

The Court: I am not talking about the proper year. I say more of the market.

Mr. Melchior: We don't think so. The statistics show that.

The Court: All right, I guess we won't finish this anyway. Recess until tomorrow morning ten o'clock.

Mr. Bergson. Did you admit this?

The Court: Yes. I will receive it.

(Defendant's Exhibit AR-63 for Indentification received into evidence.)

(Whereupon a recess was taken to February 22, 1962 at ten o'clock a.m.)

[fols. 1689-1690] [Title omitted]

Transcript of hearing—February 22, 1962

* * * * * * *

[fol. 1691] The Court: All right, gentlemen, you may proceed.

Mr. Bergson: Your Honor, we would like this morning to pursue the policy we did yesterday, to interrupt Mr. Day's testimony and put on a few utility witnesses again.

The Court: All right.

Mr. Adler: Mr. Hopkinson.

JOHN HOPKINSON, called as a witness in behalf of the Defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Adler:

Q. Would you state your name and position, please?

A. My name is John Hopkinson. I am the purchasing agent of the Hartford Electric Light Company of Hartford, Connecticut.

Q. How long have you held that position?

A. Since 1958.

Q. In your position do you have responsibility for the purchase of wire and cable products?

A. Yes, I do.

Q. How long have you been engaged in purchasing wire and cable products for public utilities?

[fol. 1692] A. Since 1947.

Q. During the period since 1947 have you been active in organizations or associations of public utility buyers or purchasing agents?

A. Yes. I am a member of the Public Utility Buyers Group of the National Association of Purchasing Agents. I am also a member of the Edison Electric Institute, Purchasing and Stores Committee. I am also a member of

several local purchasing associations in Connecticut. They are not confined directly to utility purchasing.

Q. Could you give us some information regarding the Hartford Electric Light Company, its revenues and area it serves; number of customers?

A. Yes. Our company serves a group of towns and communities in Connecticut, I think there is a total of 37. Our gross revenues last year approximated sixty million dollars. We have some 3400 miles of distribution line and I believe 219 miles of high voltage transmission line.

Q. Approximately what do your annual purchases of wire and cable amount to?

A. It varies from year to year, depending on the construction program. But that variance is roughly between [fol. 1693] five hundred and six hundred thousand dollars a year.

Q. I refer you to the board there labeled "Alcoa-Rome Overlap Products," a photostatic copy of which has been introduced in evidence as Defendants' Exhibit AR-20, and ask whether you purchased any of the products shown there?

A. Yes, we do.

Q. Could you describe which ones?

A. Well, we purchase the ACSR, which is the top exhibit, for transmission and sub transmission line purposes. We purchase the second item, the all aluminum conductor for distribution purposes, and we purchase the last item, the bottom one, for service drop, service from the pole to the house.

Q. Approximately what portion of your six hundred thousand dollars wire and cable expenditures would be represented by these products?

A. I would say approximately half.

Q. Now, referring to the period prior to April, 1959, when Alcoa acquired Rome Cable, who were your main suppliers of the products that you refer to on that board?

A. Starting at the top with the ACSR, we purchased [fol. 1694] from Alcoa, Kaiser, Anaconda and General Cable. The all aluminum conductor we purchased from those same four companies that I mentioned, and in addition purchased from the Rome Cable Corporation.

The triplex, we have customarily had four suppliers, which is Rome, Anaconda, General Cable, and Kaiser.

Q. Now, referring to the bare products, the ACSR and all aluminum cable, were there other companies in addition to the ones you named who solicited your business but from whom you did not—but who were not your suppliers?

A. Yes. We are solicited by Reynolds, Aluminum Company, and Southern Electric, which is Olin Industries, I believe.

Q. And with respect to the triplex or multiplex cable, are there other companies?

A. Yes, there is, in addition to Olin and Reynolds we are solicited by the General Electric Compa., or their wire and cable division.

Q. Now, referring still to the period for the acquisition of Rome by Alcoa, how did you make your purchases of those products?

A. Most of our purchases were made on the basis of [fol. 1695] sending orders at book prices to the companies that I have mentioned. Occasionally when we were aware of what we term a soft market, we would send out competitive bids to those same four and buy from the one who rendered the lowest price.

Q. Was it your experience during the period when Rome was a separate supplier that Rome would be a company to initiate a price reduction in that kind of a market situation?

A. That has never been my experience.

Q. Now, turning to the period since the acquisition, has there been any change in your method of purchasing?

A. No, there has not.

Q. And referring to the multiplex cable product there, do you have the same number of suppliers, the same suppliers as you did before?

A. Yes.

Q. And now with respect to the bare products, I believe you enumerated five suppliers of those products: Alcoa, Kaiser, Anaconda, General Cable and Rome before the acquisition, what is the situation today?

A. We no longer send our orders for the all aluminum conductor to Rome, but send them to Alcoa.

[fol. 1696] Q. So that today you have four instead of five suppliers?

A. That's right.

Q. Have you considered adding another supplier so that you would have five now, as you had before?

A. No, I have not. We feel that four gives us an ample number.

Q. If you wanted to add a fifth, could you do so?

A. Very easily.

Q. What are your reasons and what have been your reasons for limiting your supplier group to a relatively small number of suppliers?

A. Well, it is my feeling that we are not a tremendously large company, and we are much better off to be an important customer to a fewer number of suppliers than to spread our business over the entire industry where we would not be so important to all of them. We frequently call on any one of these four for engineering services, for emergency shipments, and we feel free to do so because of the fact that we are of monetary importance to them.

[fol. 1697] Q. Is the ability to get emergency shipments an important matter for a public utility?

A. Very definitely. There have been times during my experience as a buyer of such cable that we have had our suppliers work overtime, work nights, make special truck shipments to us in times when we have had flood conditions or ice storms or something of that sort.

Q. Is it your feeling that if you were spread too thin you might not be able to get the suppliers to cooperate in this manner?

A. That's right. We get complete cooperation from our suppliers now.

Q. Do you feel that your approach to the matter of wire and cable buying is unusual for public utilities?

A. No, I believe it is almost identical with the other utilities that are in the New England area. Those are the ones I am most familiar with.

Q. Do you have any reason to think that Alcoa by virtue of its acquisition of Rome has put itself in a stronger position to participate in your wire and cable business?

A. I do not believe that to be true.

[fol. 1698] Q. In your opinion as a purchaser of wire and

cable products, including the overlap products referred to there on the product board, has Alcoa's acquisition had any adverse effect on you?

A. No, it has not.

Mr. Adler: No further questions.

The Court: Cross-examine.

Cross-examination.

By Mr. Wertheimer:

Q. Mr. Hopkinson, on direct examination you stated that your company limits itself to a relatively small number of suppliers for a number of reasons, could you go through those again?

A. Certainly. The four suppliers that I have mentioned, and one of the reasons I mentioned was the fact that we could call on them, and have done so, for engineering services in planning our transmission lines. I did not mention, but there is an additional one. All four of these companies maintain either factory or local stocks within Connecticut of wire and conductor for our specific purposes. In other words, they almost act as a storeroom for us.

[fol. 1699] Q. Now, you used Rome Cable for your AAC and triplex prior to its acquisition.

A. Yes.

Q. Did Rome satisfy your requirements for engineering service, stockpiling and convenient location and the rest?

A. Yes.

Q. Was it a helpful company in terms of engineering help?

A. Yes, they were very helpful, although the bulk of the time we called for engineering services it was usually to the Alcoa group or to General Cable. This service was offered by Rome. I would say most of the time when we wished to take advantage of it we would turn to Alcoa or General Cable.

[fol. 1700] Q. Do you know whether some other companies who do not bid on your requirements offer the same services?

A. Yes. Yes, they do.

Q. You also mentioned emergency shipments as one of the reasons why you like to limit your business?

A. Yes.

Q. Is this because of any shortage in the industry?

A. No, no.

Q. Just because you need stores to keep your lines?

A. Based primarily on the proximity of the plants that furnished our product.

Q. Now, what rank would your utility company be among the nation's utilities, in size?

A. I do not know.

Mr. Wertheimer: That is all.

Mr. Adler: No redirect.

(Witness excused.)

Mr. Latimer: Mr. Blank.

[fol. 1701] JOHN L. BLANK, called as a witness in behalf of the Defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Latimer:

Q. Mr. Blank, would you state your full name and position, please?

A. John L. Blank; Manager of the Purchasing and Stores, Central Illinois Public Service Company, Springfield.

The Court: What is the name of that company?

The Witness: Central Illinois Public Service Company.

The Court: All right. Keep your voice up.

Q. Does your position encompass responsibility for purchasing wire and cable products?

A. It does.

Q. And how long have you held your present position?

A. Since October, 1959.

Q. And prior to that what was your position with the company?

A. I was known as general storekeeper.

Q. Pardon?

[fol. 1702] A. General storekeeper of the company.

Q. How long had you been general storekeeper?

A. Since 1946.

Q. During the time that you were general storekeeper, were you generally familiar with the purchasing of wire and cable products?

A. I was familiar to the extent that we received the products ordered by the purchasing department.

Q. And you were generally familiar with your suppliers, who your suppliers were?

A. Yes.

Q. Would you describe generally the area which your company services, and the size and number of customers?

A. We are located mostly in the lower half of the state and in 61 counties, and we publicly serve 700,000 area population, and we have 239,000 customers in our service area.

Q. Yes. Approximately what were your operating revenues last year?

A. Approximately sixty-six million.

Q. Mr. Blank, do you purchase overhead products for use in your customers' system?

A. I do.

Q. What products do you purchase for transmission and [fol. 1703] distribution, transmission and primary distribution?

A. We purchase items ACSR, bare aluminum and all aluminum for transmission, and we use the smaller sizes of ACSR for both transmission and distribution in addition to copper.

Q. What items do you purchase for secondary distribution?

A. It is mostly copper.

Q. Mostly copper. And would that be on new construction as well as replacement?

A. At present it is.

Q. Approximately how many pounds a year of copper for secondary distribution do you purchase, would you say?

A. It would be at least a hundred thousand.

Q. Have you given consideration to using another product in your secondary distribution?

A. Yes, we are considering the item of triplex.

Q. Triplex?

A. For distribution.

Q. But at the present time you are continuing to purchase copper?

A. Copper.

[fol. 1704] Q. What product do you purchase for service drop?

A. We use triplex for all our service drops now.

Q. Turning to the triplex, at the time you became responsible for the purchasing of wire and cable, who were your suppliers of triplex?

A. Kaiser and Alcoa and Anaconda, principally.

Q. To your knowledge were the three you mentioned also your suppliers in 1958?

A. Very nearly so.

Q. They were your main suppliers?

A. They were the main ones.

Q. In 1958 do you know if you purchased any triplex from Rome?

A. I believe that we did purchase a small quantity from them.

Q. Now, in the period we are talking about, in 1959, when you became responsible for the purchases of triplex, on what basis did you buy triplex?

A. Usually on a firm price basis.

The Court: On a what?

(The Court Reporter repeated the answer as above recorded.)

The Witness: Firm price basis.

Q. Did the major portion of that business go to the three [fol. 1705] companies that you mentioned?

A. Yes, it did.

Q. Now, did there come a time when the situation changed somewhat in the manner in which you purchased triplex?

A. Yes. There was a time when we got a price increase and a minimum quantity delivery arrangement that wasn't

satisfactory to us, so we sent out for bids and changed our practice on buying.

Q. Who did the price increase come from at that time?

A. The price increase came first from Kaiser.

Q. Now, when was this, precisely, when the price increase, when there was this price increase?

A. Fall of 1960, as I recall it.

Q. Fall of 1960. And then you said that Kaiser increased the price?

A. They were the first to announce their increase.

Q. And also an increase in their minimum quantity requirements?

A. That's right.

Q. And what did the two other regular suppliers do?

A. They followed up with the same price increase, identically.

Q. And what was your reaction to this price increase and [fol. 1706] the increase in the minimum quantity requirements?

A. The important thing to us was the quantity requirements, which was too large for us to use in an operation of our size. So we asked for bids on it, thinking the price would be the same, but the quantity would be different.

Q. Who did you send these bids to?

A. In addition to the three I named we sent them to Central Cable and Nehring.

Q. Now, what was the result of this submission of bids?

A. Well, we got a considerably lower price, under the price increase, and deliveries in quantities that we could use.

Q. And who gave you that?

A. Both Central Cable and Nehring, both did, but the three large companies, the price remained the same.

Q. Did you continue to solicit bids from the same five companies after this?

A. Yes, we did.

Q. I forgot to ask, did you place an order with Nehring and Central when they came in with the lower price?

A. Yes, we did.

Q. As you continued to solicit bids from the same five, [fol. 1707] what was the result?

A. Well, for quite some time the two small companies'

bid was the lowest, then the larger companies began to drop. Anaconda came down first, then Alcoa and finally Kaiser.

Q. Now, at the time you sent out bids in the fall of 1960 on triplex, were there other companies that you could have asked to big and whom you didn't choose to do so?

A. Oh, yes, there were several companies we could deal with.

Q. Could you name some of those?

A. Well, General Cable and Southwire and Olin, and there are others, Reynolds.

Q. And would these all have been acceptable suppliers of triplex?

A. I am sure they would be acceptable.

Q. Mr. Blank, can you state why you didn't choose to accept bids from all these companies and just limited it to a few?

A. Well, principally, we are a small company, and we would like to remain an important buyer to a few companies, a significant buyer, so that they would appreciate our business enough to stock material and take care of our [fol. 1708] needs in emergency, because we are a service company.

Q. Why is it important to a utility company like yourself to be assured of prompt service and delivery at the time of the emergency?

A. We do have emergencies, but service is our whole business, and it is necessary for us to give that service. We have hospitals and a lot of other businesses that depend on us—elevators and buildings—and we must maintain that service.

Q. Now, Mr. Blank, turning to the transmission and distribution produets which you purchase, when you became responsible for the purchase of those products, who were your suppliers?

A. Essentially the same ones we named before.

Q. That would be Kaiser, Alcoa and Anaconda?

A. That's right.

Q. To your knowledge were they also your main suppliers in 1958?

A. Practically the same.

Q. How did you purchase those products? On what basis did you purchase those products?

A. Mostly on a firm price basis.

Q. Do you ever send out bids on these products at times?

[fol. 1709] A. Yes.

Q. Who would you send them to?

A. We would send them—at the present time to Alcoa, Kaiser, Anaconda and probably Central Cable and Nehring.

Q. Now, were there others who you don't choose to deal with but who would be acceptable suppliers of these products?

A. If we chose to, there would be several others acceptable.

Q. Would they be the same ones you mentioned before in connection with triplex?

A. The same.

Q. Now, Mr. Blank, is the fact that Alcoa, since its acquisition of Rome Cable is now in a position to offer a broader line of wire and cable products, has this helped them at all in selling the overhead products to your Company?

A. It hasn't made any significant difference to us.

Q. In your opinion, Mr. Blank, has the merger had any adverse effect on you and your company as a purchaser of wire and cable products?

A. None at all that I can see.

Mr. Latimer: Thank you.

[fol. 1710] The Court: Cross-examine.

Mr. Mahaffie: No cross-examination.

Bruce S. Corby, called as a witness in behalf of the Defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Adler:

Q. Would you state your full name and position, please?

A. Bruce S. Corby. I am purchasing agent for the Central Hudson Gas & Electric Corporation, headquarters located in Poughkeepsie, New York.

Q. How long have you been in that position?

A. A little over two years, since October of 1959.

Q. And what was your prior position?

A. Assistant purchasing agent.

Q. For the same company?

A. For the same company.

Q. In your present job are you responsible for the purchase of wire and cable products?

A. I am, yes.

Q. In your previous position as an assistant purchasing [fol. 1711] agent, were you familiar with the policies followed by your company?

A. Yes, I was.

Q. What area is served by the Central Hudson Company?

A. We cover the mid-Hudson Valley, from north of Peekskill to south of Hudson on the east side of the river, and from the same position to just south of Albany on the west side of the river, an area of about 2500 square miles, about 380 or 390 population, and 135,000 electric meter customers.

Q. What are your approximate annual revenues?

A. Can I refer to my sheet?

Q. Yes.

A. Electric, about 30,000,000.

Q. That is the electric?

A. We are an electric and gas company and I am just referring to the electric end of it here.

Q. What would the gas be?

A. Almost seven million in addition.

Q. What are your approximate annual expenditures for wire and cable products?

A. The average annual for material and supplies, which I am excluding any large construction jobs, would run approximately $200,000 a year.

[fol. 1712] Q. What would the large construction jobs entail?

A. For instance, if we were to add 17 miles of transmission line, we would consider that a special job.

Q. And what product would that——

A. (Interrupting) That would be transmission cable.

Q. ACSR?

A. Yes.

Q. In what sizes?

A. Well——

Q. For that type of job?

A. It would depend on what the engineering specs called for on the job, what we were connecting, what load we were carrying.

Q. The type of job you are excluding from the two hundred thousand is one that doesn't happen——

A. (Interrupting) It is an extraordinary job with us and it would make a large expenditure in one year which would throw the average out, I think.

Q. So that your normal more or less steady wire and cable expenditures would be about two hundred thousand dollars?

A. Yes.

Q. Annually?

A. Yes.

[fol. 1713] Q. I refer you to the product board, there, a photographic copy of which has been put in evidence here as Defendants' Exhibit AR-20, and ask what portion approximately of the $200,000 would be represented by some or all of those products?

A. I would make an estimate of about 50 per cent, and not too much of that would be the all aluminum. In other words, the ACSR and weatherproof and triplex would be our main ones.

Q. That would represent, then, roughly, a hundred thousand dollars?

A. Yes, that would be my estimate, it would fall somewhere in there.

Q. Now, referring again to these products, I believe you testified that you purchase ACSR, the covered line wire and triplex; did you purchase those prior to April, 1959?

A. Yes, we did.

Q. And at that time who were your suppliers of those products?

A. Our main suppliers were Rome, Alcoa and Anaconda.

Q. And how was the business placed, how did you purchase those products from the three companies you named?

[fol. 1714] A. We purchased basically on a book price, and we tried to balance the business on a dollar volume between the three companies.

Q. Now, since that date, since April, 1959, have you at any time undertaken to modify your method of purchasing those products?

A. Yes, we have.

Q. And would you describe what you have done?

A. Well, starting with the full year of 1961, and our thinking and planning occurred during 1960, in an effort to better take advantage of what we considered a competitive market, we decided to send our requirements for these materials and supplies out to various companies and have them bid, and we would place the business with the lowest bidder.

Q. One company, however, might get one product and another company might be low bidder on another?

A. Yes. We had a number of items in addition to these three particular ones that I mentioned here, and we would place it item by item with the lowest bidder.

Q. To which manufacturers of these overlap products were invitations to bid sent?

A. Alcoa, Anaconda, General Cable, Kaiser and Reynolds.

Q. Were there other manufacturers of these products to [fol. 1715] whom you might have sent invitations?

A. There were two others that I can think of offhand who called on us, Olin or Southern Electrical and Essex.

Q. Did they attempt to become one of your bidders, were they interested in that?

A. Yes, they would liked to have become one.

Q. What were your reasons for not giving them an opportunity and perhaps others an opportunity?

A. We felt that the security of our source of vendors is a paramount factor with us, we didn't want to spread ourselves so thin that we were a small account with a lot of companies. We would rather be a good account with a few companies.

Q. Is that something of importanee for a public utility?

A. In our judgment it is. If the power goes off and the lights go out and there is only one thing to do, and there are no excuses, it is to get the power back on and we have to have companies that we can count on.

Q. In the bidding on these products in 1961, how did Alcoa, Rome, or the Rome Cable Division of Alcoa fare?

A. It just so happens they didn't get any.

Q. Your feeling under your present system of purchas-
[fol. 1716] ing, is that you are getting adequate competition among your suppliers?

A. Yes, I would say we were. There is one less competitor, obviously, but the amount of competion has not lessened that we can see.

Q. Do you feel that from your standpoint as a purchaser of these produets the acquisition of Rome by Alcoa has had any adverse effect?

A. No.

Mr. Adler: That's all.

Cross-examination.

By Mr. Wertheimer:

Q. Mr. Corby, you said your utility is relatively small, would you know where it ranks among United States utilities, what size?

A. I don't remember saying it was a relatively small one, however, I will say it. I have no idea where it ranks.

[fol. 1717] Q. What is your rated peak capacity?

A. Can I check here again?

Q. By all means.

A. I don't have it here. I wouldn't want to take a guess.

Q. Okay. How often do these extraordinary jobs that you spoke of come up with your system?

A. Well, it depends on the expansion in the area. In the budget for this year there is none; there was none last year; I believe the year before we had about eleven miles of transmission line that I would consider extraordinary. You see, when you build a large generating plant you have to get the power out of there. One year or one period your expenses go to build the generating plant. Then you have to get the power out and then you will be following that up with transmission lines and then the next year with distribution.

Q. There hasn't been too much of it in recent years?

A. Not in the last two or three years.

Q. You said that at least prior to the acquisition of

Rome, Rome was one of the three companies that supplied [fol. 1718] you with wire and cable products you indicated?

A. That's right.

Q. Why was Rome chosen?

A. One reason was their position geographically as far as we were concerned, the transportation from Rome to our storerooms was not as far as others. One is we felt it was a good company, it was one of those we decided on. They had given us good service and that would be just about it. Their product was a good one.

Q. You picked three companies to supply you. You obviously thought the three you picked were among the best in the field.

A. Our picking didn't mean that any of the ones we didn't pick wasn't as good as the ones we did pick.

Q. They were at least as good?

A. We would like to think they were as good as any.

Q. What caused you to change your practice of buying, was there any event that caused you to switch your purchasing habits?

A. No singular event. It was two things. One is we wanted to make an attempt to cut down our own inventory [fol. 1719] and at the same time we felt, as I have said, the market had become more competitive and I would say not only in wire and cable, this was in all our material and supply items and we wanted to take advantage of this competitive market, this buyer's market, if you would like to call it that. We felt the best way to do it was to throw our business open to bids where it was at all practical.

Q. You think that by throwing open your business to a large number of companies you get a better price than by limiting yourself to a smaller number of companies?

Mr. Adler: He didn't testify that he had thrown it open to a large number of companies.

Mr. Wertheimer: Certainly larger than he had before.

Mr. Adler: Larger is different than large.

The Court: He increased it by one or two, as I recollect. Go ahead.

By Mr. Wertheimer:

Q. By adding some companies to your list of suppliers [fol. 1720] you think you increased your chances for getting better prices?

A. Actually the increase was done because these companies had been putting or exerting more pressure to become one of our suppliers, and when we opened our method up to a bidding arrangement, naturally they heard about it and if you deal fairly with the people who are selling products to you, you have to include them or you might just as well tell them not to call on you.

Q. You went them to call on you, don't you?

A. Yes.

Q. Why?

A. The companies we deal with help us to keep abreast of the latest changes in the field in which they cover. In other words, they should be experts or can bring experts down and explain any new products.

Q. So the more people that call on you the more help you are given?

A. I wouldn't say that. There is a point of no return in this.

Q. I realize that, but you said you wanted these companies to call on you.

[fol. 1721] A. Yes, we considered them good companies.

Q. And the reason you included them, the reason you broadened your list was only because you wanted them to call on you and because they put pressure on you.

The Court: No, he said the reason they changed their manner of buying was to meet a substantially competitive market. What you are doing, counsel, is separating one distinct thing from the other. It wasn't any one thing that caused you to change, as I understand.

The Witness: No, it wasn't.

The Court: It was a combination of circumstances?

The Witness: It was a combination.

The Court: All right.

Mr. Wertheimer: No further questions.

Mr. Adler: No redirect.

[fol. 1722] Mr. Bergson: Mr. Day.

GEORGE DAY, resumed the stand, having been previously sworn, testified further as follows:

Direct examination. (Continuing)

By Mr. Bergson:

Q. Mr. Day, when we adjourned yesterday I believe we had just introduced into evidence Defendant's Exhibit AR-63.

The Court: That corresponds with my record.

Q. Now, I would like to invite your attention to Defendant's Exhibit AR-64 and I ask you whether this exhibit was prepared by you or under your direction or supervision.

A. Yes, it was.

Q. Would you please describe this exhibit?

A. AR-64 is a chart entitled "Post-acquisition growth of non-integrated producers of aluminum conductor wire and cable for each of the years '58 through '61." The category aluminum conductor wire and cable are essentially the same on the two previous charts or exhibits. And it shows the [fol. 1723] total industry shipments primary producers or affiliates. In another column the non-integrated producers and then the Alcoa-Rome combined shipments for those years.

Q. Now, looking at the Alcoa-Rome combined shipments, will you state what percentage of the total market Alcoa and Rome enjoyed in each of the years listed on the chart?

A. In 1958 they had 29.1 percent; 1959, 28.4 percent; 1960, 26.6 percent; 1961, 24.8 percent.

Q. Now, going to the column entitled "Other producers," would you state what they had?

A. In 1958 they had 17.1 percent; 1959, 20 percent; 1960, 20.5 percent; 1961, 17.9 percent.

Q. Going now to the primary producers or their affiliates.

A. The same. 1958 they had 82.9 percent; 1959, 80 percent; 1960, 79½ percent; 1961, 82.1 percent.

Q. Now, as I gather what you said from 1958 to 1961 the Alcoa-Rome share has decreased.

A. Yes.

Q. The other producers share has increased slightly?

[fol. 1724] A. Yes.

Q. And the combined primary producers share has increased more noticeably than the other producers; is that correct?

A. Yes.

Q. Now, first let me ask you whether this indicates to you whether there is competition between Alcoa and the other primary producers?

A. Yes, it certainly does.

Q. And secondly let me ask you what you attribute, to what do you attribute the small increase in percentage of the other producers as against the larger increased percentage of the primary producers.

A. I would believe that basically that is the stronger growth in the insulated portion. You are talking about the other producers percentage increase?

Q. The reason that the other producers don't show the same rate of increase that the primary producers show.

A. Oh, I think I don't get the question. I am sorry.

Q. Let me see if I can state it again. Is it because of [fol. 1725] the inclusion of ACSR in this chart as well as insulated wire and conductor that the percentage of the primary producers appears to be larger than that of the non-affiliated producers?

A. Oh. Yes.

Q. Now, let's go back to the column entitled "Percentage of change from 1958." What does it show for the percentage of change for Alcoa-Rome?

A. It shows that their combined shipments were 13.9 percent greater than they had in 1958.

Q. And for the other producers?

A. In 1961 the other producers had shipments 39.8 percent greater than in 1958.

Q. And the primary producers?

A. They had 32.6 percent greater than in 1958.

Mr. Bergson: I offer Defendant's Exhibit AR-64.

Mr. Melchior: Government objects to AR-64 on the same basis as it objected to AR-62, to the effect that Rome's share of shipments is improperly included in the year 1958 as [fol. 1726] an integrated producer.

The Court: Overruled. I will receive it.

(Defendant's Exhibit AR-64 for identification received in evidence.)

By Mr. Bergson:

Q. Now, Mr. Day, I invite your attention to chart AR-54 for identification.

The Court: 54?

Mr. Bergson: 54.

A. All right.

Q. And ask you whether that chart was prepared by you or under your direction and supervision.

A. It was.

Q. Now, will you describe that chart.

A. This chart shows Rome Cable sales of weatherproof for the years 1956 through 1960 in thousands of dollars and shows the division between aluminum and copper for that product.

Q. And it shows that in 1956 how much of the product was in aluminum?

A. 1956, 23.3 percent was aluminum and 76.7 percent in copper.

[fol. 1727] Q. 1957?

A. 18.4 percent in aluminum; 81.6 percent in copper.

Q. And in '58?

A. 21.8 percent in aluminum; 78.2 percent in copper.

Q. And that was the last full year prior to the acquisition?

A. Yes.

Q. Now, it shows even smaller percentages of aluminum and copper since the acquisition?

A. That is correct.

Mr. Bergson: I offer Defendant's Exhibit AR-54.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-54 for identification received in evidence.)

By Mr. Bergson:

Q. Now, Mr. Day, I invite your attention to Defendant's Exhibit AR-55 for identification and ask you whether or not that exhibit was prepared by you or under your direction and supervision.

A. Yes, it was.

[fol. 1728] Mr. Bergson: Now, your Honor, I—excuse me.

Q. Will you please describe the exhibit?

A. This chart shows Rome sales of service drop cable for the years 1956 to 1960, and shows the division between the aluminum product and the copper product. And for each of those years.

Q. Take the year 1956. What percentage was shown in aluminum and copper?

A. 1956 the aluminum percentage was 79.1 and copper was 20.9.

Q. And 1958?

A. 1958, 81.8 percent aluminum; 18.2 percent copper.

Q. And '59?

A. 80.8 percent aluminum; 19.2 percent copper.

Q. 1960?

A. 83.7 percent in 1960 in aluminum and 16.3 percent in copper.

Mr. Bergson: Your Honor, in offering this exhibit I am not conceding that service drop is a line of commerce, but in view of the government's case I thought we ought to [fol. 1729] have a chart on service drop and I now offer it.

The Court: Mr. Day, this chart is made up of triplex alone or multiplex?

The Witness: No, the area known as service drop cable.

The Court: That would include so-called line wire?

The Witness: I couldn't answer that.

Mr. Bergson: I am going to clear that up with Mr. Fraser, your Honor.

The Court: All right.

Mr. Bergson: Mr. Day did the statistical work on this.

The Court: All right.

Mr. Bergson: I offer it.

Mr. Melchior: You are going to clear it up by subsequent testimony?

Mr. Bergson: I will clear up his Honor's question. I don't believe the purpose for which I offer the chart needs clearing up.

Mr. Melchior: You are not going to clear it up at this [fol. 1730] time?

Mr. Bergson: No.

Mr. Melchior: No objection.

The Court: I will receive it.

(Defendant's Exhibit AR-55 for identification received in evidence.)

By Mr. Bergson:

Q. Now, Mr. Day, I invite your attention to AR-56 for identification and ask you whether that exhibit was prepared by you or under your direction or supervision?

A. Yes, it was.

Q. And would you please describe the exhibit.

A. This chart is entitled "Rome sales of service drop and weatherproof," and is actually a summation of the two previous charts on the same pattern, for the years 1956 to 1960, showing the division between aluminum and copper.

Q. And for the year 1956 it showed what?

A. It shows aluminum with 44.1 percent and copper 55.9 percent.

Q. And in '58?

A. 46.2 percent aluminum; 53.8 percent copper.

[fol. 1731] Q. And in '60?

A. 44.1 percent aluminum; 55.9 percent copper.

Mr. Bergson: I might say, your Honor, when this chart was prepared I didn't know whether it was in anticipation of your Honor's question, but it has a distinct bearing on it. I offer Defendant's Exhibit AR-56.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-56 for identification received in evidence.)

By Mr. Bergson:

Q. Now, Mr. Day, I invite your attention to Defendant's Exhibit AR-65 for identification and ask you whether that exhibit was prepared by you or under your direction or supervision.

A. Yes, it was.

Q. Would you please describe that exhibit?

A. This chart is entitled "Copper and aluminum utilization in weatherproof wire," expressed in thousands of dol-
[fol. 1732] lars and shows for the years 1958 and '59 that amount of data that we could determine that was available showing particular companies' shipments of these products and the division between aluminum and copper, if that was possible, and relates it to the total industry figure at least for '58 obtained from the Census of Manufacturers.

Q. The total industry figure was obtained from the Census of Manufacturers. Alcoa and Rome's figures I assume was obtained from company records?

A. That is correct.

Q. The figures insofar as they relate to other companies, where were they obtained?

A. They were obtained from, well the note—I can't find it here—note No. 4 shows that they were obtained from documents supplied by the Department of Justice.

Mr. Bergson: Now, your Honor, we are offering Defendant's exhibit, this exhibit solely for the purpose of showing that in those two years to the extent that we had information available, that there was copper weather-
[fol. 1733] proof wire being sold as well as aluminum weatherproof wire. We are offering it solely for that purpose, and I now offer it.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit 65 for identification received in evidence.)

By Mr. Bergson:

Q. I invite your attention now, Mr. Day, to Defendant's Exhibit AR-66 for identification and I ask you whether that exhibit was prepared by you or under your direction and supervision?

A. Yes, it was.

Q. Would you please describe that exhibit?

A. This is entitled "Copper and aluminum utilization in service drop cable," expressed in thousands of dollars, and with the previous chart shows for the years 1958 and '59 all the available data we could obtain, shipments of individual companies, total industry figure and the division between aluminum and copper.

Mr. Bergson: Now, your Honor, we are offering this exhibit again solely for the purpose of showing aluminum [fol. 1734] and copper utilization in service drop cable. We again are not conceding the existence of a service drop line of commerce, but to the extent that it might be helpful to the Court we offer it.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-66 for identification received in evidence.)

By Mr. Bergson:

Q. I now invite your attention to Defendant's Exhibit AR-67 for identification and ask you whether you prepared that exhibit or whether it was prepared under your direction or supervision.

A. It was.

Q. Would you please describe that exhibit?

A. It is entitled "Copper and aluminum utilization in weatherproof and service drop cable" in thousands of dollars for the years 1958 and '59, and it is actually a summation of the two previous exhibits.

Mr. Bergson: Defendant offers AR-67 with the same reasons that it offered 65 and 66.

[fol. 1735] Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-67 for identification received in evidence.)

Mr. Bergson: I now would like to offer Defendant's Exhibit AR-68 for identification, which is a letter dated November 20, 1961, from Maxwell R. Conklin, chief of the industry division, Bureau of the Census, United States Department of Commerce to Mr. Lee Loevinger, Assistant Attorney General, anti-trust division, United States Department of Justice, Washington, D.C.

Mr. Melchior: What is the letter? We are not familiar with the letter.

Mr. Bergson: Well, I am surprised that you are not, because we got you to furnish it.

Mr. Melchior: We don't know what the number is. The number doesn't mean anything to us.

Mr. Bergson: You were given the numbers. (Hands document to counsel)

[fol. 1736] Mr. Melchior: No objection.

The Court: I will receive it.

(Letter dated November 20, 1961, described above marked as Defendant's Exhibit AR-68 in evidence.)

By Mr. Bergson:

Q. Mr. Day, I show you Defendant's Exhibit AR-68 and ask you to read that letter to the Court.

Mr. Bergson: Would you like a copy of it, your Honor, to follow it?

The Court: Yes, I would be glad to follow it.

A. (Reading) "Dear Mr. Loevinger: This is in further reference to your request for a special tabulation for 1958 on percentages of shipments of 'other insulated wire and cable' product class 36312, as defined in the 1954 Census of Manufactures, accounted for by the four, eight and twenty largest companies.

"The results of this special tabulation, the cost of which was defrayed by your department, are as follows: Number of companies 1958, 133; in 1954 140; total value of shipments $821,452,000 in 1958; $778,322,000 in 1954.

[fol. 1737] "Four largest companies in 1958, 31 percent; in 1954, 37 percent.

"Eight largest companies in 1958, 50 percent; in 1954, 55 percent.

"Twenty largest companies in 1958, 76 percent; and in 1954, 80 percent."

There is an asterisk by that 80 percent figure which in the footnote says "This figure was previously published in error as 60 percent."

"Please note that former product class code 36312 is comprised of three product classes in 1958 as follows: 33577, 'magnet wire'; 33578, 'Power Wire and Cable'; and 33579, 'other insulated wire and cable, n.e.c."

Q. Do you know what n.e.c. means?

A. That usually stands for "not elsewhere classified."

(Reading) "If we may be of further service to you, please let us know."

Q. Now, Mr. Day, as an expert market analyst would you say that the figures contained in Defendant's Exhibit AR-68 show an increase in concentration or a decrease in concentration between 1954 and 1958?

[fol. 1738] A. I would say a decrease in concentration.

Mr. Bergson: Your witness, Mr. Melchior.

Cross-examination.

By Mr. Melchior:

Q. Mr. Day, I direct your attention to AR-59, which relates to shipments of ACSR and aluminum cable bare by primary producers or affiliates and other producers for the years 1954 to 1961. Now, I note in the third column from the left entitled "Primary producers or affiliates" they have a series of percentages running from the year 1954 to the year 1961. And I believe on direct examination you were asked by counsel why you prepared this chart and I believe one of the things you said was to show a trend on the part of shipments by primary producers and other affiliates; is that correct?

A. If you say so.

Q. Well, that is what my notes indicate and I believe that is true. Now, if that is the case would you tell me what sort of a trend there is in that column?

[fol. 1739] A. Well, I think we used the word yesterday "undulations." Variations have occurred over this long space. The trend, if there is one, well, let's put it another way, the trend starts somewhere and stops somewhere, and if you want also the period '54 to '61 it would show at that time a slightly lower participation than in 1954.

Q. Is this really a trend or is this just comparing '54 to '61?

A. I believe the latter would be the more correct statement.

Q. It is little of a trend. There are so many undulations in here that you can't see the trend.

A. I believe statistically if you want to develop a trend you can do it, arithmetically, and you can determine a trend line on a graph which may show it more accurately.

Q. Could you develop the trend with these figures over this period of time?

A. You say could I?

Q. Yes, could you?

A. Not here.

Q. Well then, how about from the year 1956 to 1961, [fol. 1740] could you develop a trend in those years?

A. Yes, I believe it could be.

Q. What would the trend be there?

A. From 1956 to '61 there does seem to be, the figures indicate that the trend is upward.

Q. Now, I direct your attention to the fourth column entitled "Other producers" and I ask you if you see a trend from 1954 to 1961 in that column?

A. Again variations occurring over the spread. There seems to be for the greater part of it a trend upwards for them. In other words, I think you would agree if we stopped at the year 1960, as I explained before, trends go from one spot to another, the trend would certainly seem to be upward. The mere fact of one year, '61, adding on a more percentage could be described as one of those types or undulations.

Q. If we started with the year '56 and worked the trend from '56 to '61, what would the general trend from there be?

A. You would say that it could be down.

Q. You could come up with a number of different conclusions on these two columns, couldn't you?

[fol. 1741] A. One could.

Q. One could. Now let me ask you this, Mr. Day, and I am talking particularly about these same two columns, primary producers or affiliates on the one hand and other producers on the other. Now, do you know whether Anaconda was a primary producer of aluminum in the year 1954?

A. No, it was not. I believe they started in late '55.

Q. Do you know whether or not Rome had been acquired by Alcoa in the year 1954?

A. It was not.

Q. And do you know whether Olin-Mathison had acquired Southern Electrical in 1954?

A. No, it had not.

Q. It had not. Do you know whether Kaiser Aluminum had acquired the United States Rubber facilities in 1954?

A. I do not believe they had.

Q. Did you as a matter of fact include all of those facilities in the year 1954 in making this tabulation?

A. Yes. The note 1 states that.

Q. Yes. If we took those four entities out of the year [fol. 1742] 1954, the four I have just mentioned from the three merger situations and the fact that Anaconda was not an integrated producer in the year 1954, what effect would that have on the percentage figures in these two columns?

A. Well, it would naturally change them.

Q. Can you tell me what the change would be in the year 1954?

A. Well, naturally if you take out the companies which we have put in that year, the figure would naturally be lower.

Q. Could you tell me how much lower it would be?

A. I don't have the individual pieces.

Q. You don't. What was the raw material you used in preparing these figures?

A. As the notes state, the documents and answers are supplied by the plaintiff in interrogatories and the other documents.

Q. Do you have the raw material here in the courtroom?

A. I believe it can be obtained.

Q. Could you work that out if I asked you to?

A. Certainly.

[fol. 1743] Q. How long would it take?

A. Well, actually I think there is an easier way for us, to take the government reports themselves which indicate the integrated producers figures for that year, because this figure is merely adding on the separate pieces to that particular BDSA figure.

Q. And what figure would that be?

Mr. Bergson: If you want to start with 55 he can use your charts.

Mr. Melchior: Fine. I am glad to have him use our charts.

Mr. Bergson: That will save time.

By Mr. Melchior:

Q. Mr. Day, are you familiar with the government exhibits?

A. Yes.

Q. Can you find them in there without assistance from counsel?

The Court: If counsel can assist him let him assist him.

Mr. Bergson: I beg your pardon?

The Court: If counsel can assist the witness, let him assist the witness. This is not murder first.

[fol. 1744] Q. What government exhibit are you going to use, Mr. Day?

The Court: They are just coming to it.

A. We are talking about ACSR and aluminum cable bare?

Q. That's right.

A. That would be your GX-439, would it not?

Q. Now, if you would use government's exhibit, what would the percentage be in the year 1955 for——

The Court: Which percentage?

Q. Looking to the year 1955 on AR-59 and looking at the column entitled "Primary producers or affiliates" which on AR-59 is now indicated as 88.5 percent, what change would

you make in that figure after reviewing government exhibit 439?

Mr. Bergson: Counsel, do you mind if I look over the witness' shoulder?

The Court: Go ahead, whether he does or not.

A. Well, the 88.5 percent we show on the AR-59 relates to that tonnage of 139 million. If you take the tonnage of 116 [fol. 1744a] million roughly, as shown on the GX-439, since the total figure is the same for industry, that comes out at 73.7 percent.

[fol. 1745] Q. So you would change that number to 73.7 per cent. Now, comparing the 73.7 per cent with the figure you have in 1961 in that same column on AR-59, and without going through each of the intervening years, could you draw a conclusion as to a trend now that would be any different from your conclusion you made earlier, basing your statement entirely on AR-59?

A. If we chose for the year 1955 a 73.7 per cent participation, as you say, and you show in 1961 an 86.7 per cent, providing you had the same companies involved, I would say you could show that those companies increased their share. But in fact there is a different make-up each year of this primary producer affiliate group.

Q. There are still the same companies involved regardless of whether you use either chart, except that in some cases we have considered the merger as taking place before the year it actually took place, isn't that it?

A. We are talking about today, that is, 1961, of a number of companies. If you take the 73.7 per cent, you are only talking about three companies then.

Q. How many were there?

[fol. 1746] A. In what year?

Q. The year you are talking about, how many primary producers were there in the year 1955?

A. In practical effect, three.

Q. Three. Who were they?

A. Aluminum Company of America, Kaiser Aluminum, Reynolds Metals Company.

Q. In 1955; how many were there in 1956?

A. I said in practical fact——

Q. (Interrupting) I don't know what you mean by that.

A. Anaconda started late in 1955, and for all practical purposes if you were taking a full year's production that would not be included.

Q. How many primary producers as a matter of fact were there in the year 1954?

A. There were three to my knowledge.

Q. Three?

A. We are talking in ACSR.

Q. There were how many in 1954?

A. Three.

Q. And how many in 1955?

A. Three, plus.

Q. Three plus Anaconda?

A. Right.

[fol. 1747] Q. Which came in at the end of the year?

A. Right.

Q. How many in 1956?

A. There were four.

Q. And how many in 1961?

A. There would be five.

Q. Five primary producers——

Mr. Bergson: Wait a minute. Five primary producers producing wire and cable.

The Witness: Yes, we are talking about ACSR and cable.

Mr. Melchior: Your answers have that qualification in it.

The Witness: Namely, we are only talking about ACSR and cable by integrated companies, and who those integrated companies were.

By Mr. Melchior:

Q. Yes. Now, Mr. Day, directing your attention to the column "Other Producers," on AR-59, what change would you make in the percentage phase of that column for the year 1955, if you applied the same change?

A. 26.3 per cent.

Q. Now, without going through the detail of filling out [fol. 1748] each year between 1955 and 1961, if I would ask you whether you would note any trend between the years 1955 and 1961 in that column, what would your answer be?

A. I would believe obviously, if you started with 26 per

cent and end up with 13 per cent, that there would be indicated a decline.

Q. Would you state what it would be?

A. There would be indicated a decline.

Q. What percentage of decline, as a matter of fact?

A. Well, I don't think you can take the difference in percentage share as the declining percent. You would have to get it on the volume, would you not?

Q. You can't compare 26.3 to 13.3 and give me a ratio?

A. I say, roughly speaking, there is a decline in market participation of the difference, of whatever there would be, roughly 13 per cent.

The Court: Let me ask you, Mr. Day, I am not certain I am following you. If you use a different figure for 1955, which I guess is what you are doing on that other producers column in AR-59, wouldn't you have to use a different figure in 1960 or 1961, I guess it is?

The Witness: This way, your Honor. In 1961 we have [fol. 1749] a make-up here between primary producers or affiliates versus the other producers as it exists today. Counsel was stating if we used the picture as it existed then in 1955, the make-up between integrated and non-integrated, what those percentage numbers show, and I was merely answering his question.

The Court: I guess I missed it. Say that last over again, if you can.

The Witness: The point is that the 1961 figures, we agree this is a picture of what it is today, exists today, the make-up of the industry, integrated versus non-integrated. Counsel was asking us to show what the share would be of the non-integrated as the industry was actually made up in 1955, and then asks what would be the change in the percentage share for non-integrateds in 1955 as they existed in 1955 and non-integrated in 1961 as they existed in 1961.

Mr. Bergson: Your Honor, maybe I can clear this up a little bit if I may be permitted.

The Court: All right. Make your statement.

[fol. 1750] Mr. Bergson: You will recall that we said when we prepared the charts that we tried to reconstruct the industry so that we could show what happened to those independents who remained in the industry as independents, and

we put into the primary producers column those former independents which became affiliated with primary producers. This accounts for the difference between the two charts.

Frankly, your Honor, we think this business of making a distinction between primary producer and non-integrated producer is an artificial distinction, and it is a distinction that we feel that we have to meet in this case because the Government has made it.

The insinuation of the Government chart is that the primary producers don't compete with the non-integrated producers. But as the evidence has shown, there is complete competition between all of these producers.

The Court: Yes.

Mr. Bergson: And our charts were made up in order to try to get this, what I would call straw man that the Gov-
[fol. 1751] ernment has injected into this case, to meet that.

The Court: I am just trying to understand this table and trying to understand what counsel is driving at. I think I have got it as good as I probably ever will have it.

Mr. Melchior: I will ask several questions and maybe we can clarify it. I will ask these questions of the witness.

By Mr. Melchior:

Q. In the year 1961, Mr. Day, by reference to primary producers or affiliates column, what share of the ACSR and cable, bare, market, according to these figures was held by primary producers of aluminum who produced these products?

A. That would be 86.7 per cent as shown here.

Q. Yes, and what share of the market was held by other producers who would be the non-integrated producers?

A. 13.3 per cent, it shows.

Q. In other words, as of 1961, the integrateds have 86 per cent and the non-integrated have 13 per cent. Now, to go back to the year 1955, what were the percentages, what was the percentage held by the primary producers in
[fol. 1752] those years, in that year, and I am asking you to tell me the figure that denotes only those primary producers who at that time were actually producing ACSR?

A. That was the figure we mentioned before.

Q. That is the one you worked out, yes, what percentage was that?

A. 73.7 per cent.

Q. And what was the share of the market held by the non-integrated producers in 1955?

A. The balance, 26.3 per cent.

Q. 26.3 per cent.

Mr. Melchior: So, your Honor, the Government is not insinuating there is no competition between the two. The government recognizes there is intense competition as was demonstrated, but the purpose of the tabulation that the Government presented, GX-349, is to show the rapidly declining nature of the market held by the non-integrated as compared to the integrated. It is that simple, and we think that Defendants' chart which artificially creates these mergers several years before they transpired destroys that quite obvious trend.

[fol. 1753] The Court: What good is your chart when you tell me that you admit that the competition between the integrated companies is active, vigorous and continuing, because, after all, isn't my job to determine the question of the substantial lessening of competition in the whole market rather than taking a segment thereof?

Mr. Melchior: No, I think by testimony in this case on the part of non-integrated producers and by documents which are now in evidence, we are showing that this competition between the two is resulting in a losing battle on the part of the non-integrated, that business is going to the integrateds by virtue of the advantages enjoyed by the integrateds.

The Court: A battle is won and lost in competition every day.

Mr. Bergson: May I be heard a little bit?

The Court: Just one minute. I don't quite follow you, because, of course, when one man gets a contract, why, I suppose it is a percentage change, whether it is an inte-

[fol. 1754] grated company or not an integrated company, so I don't quite follow your conclusion.

Mr. Melchior: All right, let me say one more thing.

The Court: Wait a minute, just hold it. You are going

to have all the time in the world. I don't quite follow the proposition that because some particular company is declining in its business of making cable or selling groceries, that that constitutes an anti-trust violation. I have got the idea, I may be wrong, that the ultimate purpose of the statute is to obtain a vigorous, active competition, and so long as that active, vigorous competition exists I don't understand it constitutes a violation.

Mr. Melchior: Well, the Congress, as your Honor——

The Court: Don't tell me about Congress. I have read so much about it. I watched both you people, you cite one thing out of what some senator said, somebody else cites something else. I don't know. I have my conclusion on that, [fol. 1755] so don't waste any time on it.

Mr. Melchior: I am not going into the legislative history, your Honor, but I think the Congress by the anti-trust laws has tried to protect and insure the existence of competition.

The Court: That's right.

Mr. Melchior: And the most recent enunciation they have made is in the field of mergers, and they want to insure that through mergers those who are advantaged by other ways are not permitted to get an additional advantage through the merger process, and we can demonstrate and we have demonstrated that there have been three very significant mergers or acquisitions of non-integrated companies by the integrated companies.

The Court: Sure. I know all about that. I know I am getting back to, back to your fundamental proposition, that as long as we have an active, vigorous competition and that the merger does not reduce that activity or vigor, it [fol. 1756] is not my understanding that it violates the anti-trust laws. So that in watching your case going in, I thought—I may be wrong about it, I have changed my mind many times—that you minimized, overlooked and practically discarded the active, vigorous competition between these integrated companies in referring to competition as a whole.

Mr. Melchior: No, I think we have shown by the testimony of the non-integrated companies, who have testified on this stand, that they are have extreme difficulty in com-

peting with the integrateds. They pointed out not only are the integrated companies——

The Court: No use of arguing the evidence. It isn't quite that way as I listen to the evidence. Even the price cuts come from some of these non-integrated companies.

Mr. Melchior: That is true, price cuts come from both directions.

The Court: Those are questions of fact. No use arguing those. I will let you say something, Mr. Bergson, but keep it brief.

Mr. Bergson: I think you said it for me, your Honor.

[fol. 1757] The Court: All right. We will take a short recess. (Recess was taken after which the trial was resumed.)

The Court: All right, Mr. Melchior.

Mr. Melchior: Thank you, sir.

Cross-examination (Continued)

By Mr. Melchior:

Q. Mr. Day, directing your attention to AR-59 again, and the most-right-hand column on that page, up to the year of the merger, which was 1959, could you note any trend in Rome's shipments of ACSR and aluminum cable, bare?

A. Why, I would say the tonnage shipments from 1958, say, were greater than they were in 1954, and there seems to be an increase.

Q. Yes. Then in the year 1960, the first full year subsequent to the merger, it dropped down substantially, and then in the year 1961 you didn't take the trouble to compute a percentage, is that it?

A. I did compute it but we were going on one decimal point.

Q. All right. Now, directing your attention to AR-60, is [fol. 1758] there any real trend shown in the third column which is entitled "Primary producers or affiliates", would you say?

A. In the year 1954—from the year 1954 to 1961?

Q. From the year 1954 to 1961 is there really a trend there?

A. Generally it is up and down, but I would say that you couldn't distinguish too clear a trend there.

Q. It is more of these undulations?

A. Yes.

Q. And how about for the column, entitled "Other Producers"?

A. I would say it also is—it would have to be because it is the balance of the figure. It would be the same picture.

Q. Now, again, I ask you if we utilized the full figures for the years 1954, 1955 and 1956, rather than the figures which resulted from the mergers which had not taken place, these percentages would be somewhat different, wouldn't they?

A. They would be different.

Q. Would they be different in the same general fashion as in the case of AR-59?

A. That is hard to answer immediately, because we are [fol. 1759] dealing with insulated here as opposed to ACSR.

Q. Let me ask you this, in the year 1955, in the column entitled "Primary Producers," you show 72.8 per cent?

A. Yes.

Q. Now, would that percentage increase or decrease if we made the same type of change that we did in AR-59?

A. If we showed only the integrated companies as they existed in 1955?

Q. Yes.

A. The percentage figure would be lower than shown.

Q. Would be lower?

A. Yes.

Q. And by the same token, the 27.2 per cent which appears in the "Other Producers" column would increase?

A. Would be higher.

Q. Yes. And directing your attention to AR-61 and specifically to the columns entitled "Primary Producers or Affiliates," and "Other Producers," are there any real trends shown in those two columns in your view?

A. Going from the year '54 to '61?

[fol. 1760] Q. From the year '54 to '61, yes.

A. There seems, in this particular chart there would seem to be a slight tendency to decrease in the "Primary Producer" column, but it is not a great factor.

Q. Not too pronounced?

A. That would be right.

Q. And if we would make the same change in AR-61, in the year 1955, so as to represent actual conditions in the year 1955, would the 85.3 per cent in the primary column increase or decrease, if we represented actual conditions?

A. Since this is a combination, I would have to check it a second. The share of the integraters as they existed would be lower than the 85.3.

Q. And what were you referring to when you drew that conclusion?

A. This is marked GX-438.

Q. Government Exhibit 438?

A. Yes, sir.

Q. Now, Mr. Day, directing your attention to AR-62, which is entitled "Post-acquisition Growth of Integrated Producers of ACSR and Bare," now if you use the year 1959 in that tabulation as your base year instead of the [fol. 1761] year 1958, what changes would you make in the third broad column which is entitled "Other Producers"? I note that in that column for the year '59 you show a plus 36 per cent change and in 1960 you show a plus 27.5 per cent change and in 1961 a plus 32.5 change. Now I ask you if you changed your base year from 1958 to 1959, what would happen to those pluses in the year 1960 and 1961?

A. If we had changed, if we had used '59 as the base yes, obviously the '60 and '61 years would show, well, '60 would show a very slight decline.

Q. It would show a negative number?

A. Would show a negative. '61 would probably come out negative, but it is quite close to the thirty-two million figure.

Q. What would you compare then in 1961 in pounds? You would compare the 31,132 pounds to 1959, which is 32,058?

A. Correct.

Q. So actually it would come out negative?

A. It would be negative, yes.

Q. It would be negative. And directing your attention to AR-63, if you change your base year from 1958 to 1959, [fol. 1762] would your percentage change figures in those columns change any?

A. You are talking of the "Other Producers" column; are you?

Q. Well, we can talk about the "Other Producers" column, yes.

A. Is that the column you want?

Q. Yes.

A. If we chose '59 as the base year there still would be pluses in '60 and '61. The magnitude of the increase would be lower than that shown here.

Q. Would it be very much lower?

A. Well, I can't do it that fast.

Q. You can't compute it.

The Court: I suppose that that would also apply to the far column on the right; wouldn't it?

The Witness: Yes, sir. If we adopt '59 as the base year, in the Alcoa-Rome columns you are saying, your Honor?

[fol. 1763] The Court: Yes.

The Witness: Well, that would show——

The Court: Decreases.

The Witness: Some big fat minuses for them.

The Court: What's that?

The Witness: That would show some large minus figures for Alcoa there.

The Court: So that that would mean, if I understand the table right, that since the Acquisition Alcoa-Rome had a smaller share of the aluminum insulated or covered wire and cable, is that right?

The Witness: Yes, sir, your Honor.

The Court: So while the integrated companies as a whole might have increased their share, these particular transactions which we are concerned with here resulted in a lessening of the share of the two companies directly involved?

The Witness: Yes, your Honor.

By Mr. Melchior:

Q. Now, Mr. Day, directing your attention to AR-54, what does this purport to show?

[fol. 1764] A. This shows Rome's sales of weatherproof, their total for the years 1956 through 1960 in dollars, and shows the aluminum proportion as compared with the copper proportion.

Q. And with respect to AR-55, what does that show?

A. It shows Rome's sales of service drop cable in thousands of dollars, the years 1956 through 1960, the total value, and also the aluminum proportion and copper proportion.

Q. Now, I note that you compared these two types of conductors, aluminum and copper on a dollar basis; now, if you would have used a copper equivalent basis, would your percentages have been any different?

A. I don't understand copper equivalent.

Q. Do you understand what the term copper equivalent means?

A. Are we talking of a copper equivalent in weight?

Q. Well, as far as conductivity is concerned.

A. Well, yes, I understand what you mean by it.

Q. Well, if you would have worked this table out on the [fol. 1765] basis of copper equivalent for both these metals on a conductivity basis, would your percentages be any different do you know?

A. I couldn't answer that because I only worked with available figures.

The Court: I don't believe I understand that. Say that again, Mr. Melchior.

Mr. Melchior: Well, I don't mean to imply I have a technical knowledge of this.

The Court: Neither have I.

Mr. Melchior: Aluminum and copper have different conductivity ratios.

The Court: Yes.

Mr. Melchior: As I understand it, copper conducts electricity more rapidly; copper is much heavier and there is a formula that can be worked out whereby you can determine on a conductivity basis in order to do the same job how much aluminum you would use and how much copper you would use to do the same job.

The Court: But in order to do that your would have to [fol. 1766] have—have to know the job requirement, I suppose.

Mr. Melchior: Yes, you would, and if the witness can't answer it I am not going to pursue it.

The Court: All right.

By Mr. Melchior:

Q. Now, with respect to AR-55, did you utilize any company records in compiling this or was your source merely defendant's answers to interrogatories?

A. These were from company records.

Q. From company records?

A. Well, both. That Table 1 which I have shown there was my source for these figures.

Q. You merely took the figures from that source and utilized them?

A. Yes.

Mr. Bergson: You don't question those figures, do you, Mr. Melchior?

Mr. Melchior: I don't. I am trying to find out how the table was put together.

The Witness: I merely took the figures from that table and put them here.

[fol. 1767] By Mr. Melchior:

Q. Now, I show you, Mr. Day, AR-68 and ask you if you are familiar with that document?

A. Yes, I am familiar with it.

Q. Now, what does that purport to show, Mr. Day?

A. Well, I believe in reading it, it purports to show data, a tabulation of data I believe in the insulated wire and cable field. I am not clear from this letter, however, if it includes all of the insulated wire and cable field or whether it refers to a portion of it. It speaks "further reference to your request for tabulation——"

Mr. Bergson: May I ask counsel if he has that request available.

Mr. Melchior: Beg pardon?

Mr. Bergson: Do you have the Justice Department request of the Bureau of the Census available?

Mr. Melchior: I am not sure that we do. It may have been an oral request. I did not make that request myself, counsel. We would have to check. We will be glad to inform you later.

[fol. 1768] Q. My question was really going to be this, Mr. Day. Does this reference to insulated wire and cable

to you indicate that all insulated wire and cable is included in these figures?

A. I would take it the other way. That it refers to a category so-called "Other insulated wire and cable."

Q. In other words, on the face of the document it does not appear to be all insulated wire and cable; is that correct?

A. That would be my reaction to reading this, yes.

Mr. Melchior: No further questions.

Mr. Bergson: Just one or two questions on redirect, your Honor, addressing ourselves to Defendant's Exhibit AR-68.

Redirect examination.

By Mr. Bergson:

Q. I show you Defendant's AR-9 for identification, which is the 1958 "Census of Manufactures" report and ask you if you can tell from that what other wires or insulated wires and cable may have been omitted?

[fol. 1769] A. Apparently Census code 33574, communication wire and cable; 33576, appliances wire and flexible cord sets. That would be it.

Q. Did Alcoa ever manufacture any of those products to your knowledge?

A. Not to my knowledge.

Mr. Bergson: No further questions.

Recross examination.

By Mr. Melchior:

Q. I take it, Mr. Day, that from your knowledge of the Census of Manufacturers then the information appearing on AR-68 is not complete insofar as all insulated wire and cable is concerned?

A. That would appear so.

Mr. Melchior: It appears from the face of the letter that it is complete insofar as the Justice Department's request was concerned.

Mr. Bergson: But counsel doesn't know what that request is.

The Court: No. Why don't you get the request.

[fol. 1770] Mr. Melchior: If we can.

The Court: And may be it can clear itself out.

Mr. Melchior: It might have been an oral request.

Mr. Bergson: It says "This is in further response to your request for special tabulation for 1958 on percentage of shipments of other insulated wire and cable products." That is all they wanted. They didn't get the right answer so they didn't use it.

The Court: All right. We will recess until two o'clock.

The Clerk: The court is in recess until two o'clock.

(Whereupon at 12:45 p.m. an adjournment was taken to 2:00 p.m. of the same day.)

[fol. 1771] AFTERNOON SESSION

2:00 p.m.

The Court: All right, gentlemen.

Mr. Bergson: May it please the Court, during the noon recess counsel for the government made available to me copies of the letter requesting information from the Bureau of the Census, and I would like to offer that letter in evidence as Defendant's Exhibit AR-68-A. It is a letter dated October 27, 1961, to Mr. Malcolm R. Conklin, chief of the industry division, Bureau of the Census, from Lee Loevinger, Assistant Attorney General, anti-trust division.

The Court: It may help to explain or understand Exhibit 68.

Mr. Bergson: That is the purpose I am offering it for.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR68-A marked received in evidence.)

Mr. Bergson: Mr. Fraser.

[fol. 1772] A. D. Ross Fraser, called as a witness on behalf of the defendant, being first duly sworn, testified as follows:

Direct examination.

By Mr. Bergson:

Q. Mr. Fraser, will you please state your name and address?

A. A. D. Ross Fraser, Golf Course Road, Rome, New York.

Q. By whom are you employed?

A. Rome Cable Corporation. I was the first employee.

Q. What position do you now hold with Rome Cable?

A. President.

Q. And how long have you been president of Rome Cable?

A. Since 1944.

Mr. Bergson: Your Honor, I propose to qualify Mr. Fraser not only—I mean use him not only as a fact witness but to qualify him as an expert in the wire and cable business. So I will ask more questions as to his background than I [fol. 1773] ordinarily would.

The Court: Go ahead.

By Mr. Bergson:

Q. Mr. Fraser, where did you attend college?

A. Clark University in Worcester, Massachusetts.

Q. And what degree did you receive?

A. A.B., 1922.

Q. And after your graduation from college what was your first connection with the wire and cable industry?

A. I joined the Rome Wire Company in November of 1922 in the production department.

Q. And what were your responsibilities?

A. Well, I was production clerk and eventually became production manager. Later, when the company merged with General Cable in 1927 I was a staff man, statistician, assistant to the president.

Q. And while you were at Rome Cable as assistant to the president——

A. General Cable.

Q. —General Cable, I mean, as an assistant to the president, what did your duties encompass?

A. A wide variety of duties, and we had merged about [fol. 1774] sixteen plants and I was doing various jobs in connection with organizing production work, organizing accouting activities, doing special jobs for him, handling all the reports covering the operations.

Q. Did you in the course of that work have responsibility for analyzing the financial structure and products of other companies in the industry?

A. I certainly did. I compiled a complete history of all of the then companies in the wire industry, covering their financial structure, their sales structure, their products. It was one of the most complete books produced up to that time.

Q. Now, how long were you employed by the General Cable Company?

A. Until the end of 1933.

Q. Now, when were you first employed by the Rome Cable Company?

A. November, 1935.

Q. 1935?

A. Before the company was actually incorporated I became an employee of the group that were forming it. We were incorporated January 20, 1936, however.

[fol. 1774a] Q. Now, during the period from 1933 to 1936 you were not in the wire and cable business?

A. That's correct.

[fol. 1775] Q. When Rome Cable was formed, what position did you hold?

A. I was secretary and a director.

Q. Were you also a member of the executive committee?

A. I was.

Q. And you continued in that capacity until you became president?

A. I did.

Q. And that was in 19——

A. October, 1944.

Q. Now, during the period that you have been president of the Rome Cable, have you continued to keep in touch

with the financial structure, the activities of your various competitors?

A. I have.

Q. And as President of Rome Cable, what were your duties?

A. Well, I was the administrative officer who supervised all the planning and the administration of the duties of all the various departments.

Q. You were the chief administrative officer?

A. Right.

Q. You are familiar with a trade organization known as Nema; are you not?

[fol. 1776] A. I am.

Q. That is what?

A. National Electric Manufacturers Association.

Q. How long have you been active in that association, if you have been active in it?

A. Oh, I started the initial interest in the late 20s, and I think we joined in it in Rome Cable in the late 30s. I was instrumental in reorganizing and being chairman of the wire section for a period of time. I have been a director for a number of years. Was vice-president and treasurer at various times and last year I was president of Nema.

Q. And now you are president emeritus?

A. Emeritus, yes, that's right.

Q. I know you wouldn't tell us this unless I asked you: Did you in November, 1961, receive the McGraw-Hill award for outstanding contributions in the electrical industry?

A. I did.

Q. Have you, during the course of your career in the wire and cable industry, been associated with any governmental bodies?

A. I have.

Q. Would you please tell us what those are?

[fol. 1777] A. During World War II, I aided the Wire and Cable Industry Committee. I was working with the equivalent of BDSA. It was WPB in those days. In the Korean upset I was a full-time member of the Committee on Operating under NPA, I think it was.

Q. National Production Authority?

A. National Production Authority. And in that capacity

I worked on certain subcommittees during the crisis of the copper situation and supply.

Q. Was the NPA part of the Department of Commerce?

A. Yes.

Q. And was that a predecessor organization of the Business and Defense Service Administration?

A. It was.

Q. Now, Mr. Fraser, prior to its acquisition by Alcoa, would you describe for the Court the general character and the business of the Rome Cable Corporation?

A. The Rome Cable Corporation was a wire and cable operation mainly, since its start in the copper field. We were the first company other than integrated company, to have a rod mill for copper rolling. However, we were mainly an insulator of wire and cable and had an expansion of our products in that area. Would you like me to talk [fol. 1778] about the products or the distribution?

Q. Just generally about the products.

A. We were national distributors selling through our own salesmen. I can't remember how many offices we had now, but somewhere around 20. We had several warehouses. Our Rome plant was entirely a wire and cable operation.

In 1950 we acquired a small operation in Torrance, California, which made at that time just EMT conduit. Later we produced rigid steel conduit at that plant. And on April, 1957 or 8, I can't remember just which, we also acquired a small operation in Collegeville, Pennsylvania, which is just outside of Philadelphia, and that made cable support systems, troughs, trays, and certain items for the utility companies as well.

Q. Have you finished?

A. I think I have unless there is some other angle you want me to comment upon.

Q. I think that is fairly comprehensive. As an insulator of wire and cable products, what types of metals did you use as conductor?

A. Well, up until 1950 it was exclusively copper. I think [fol. 1779] '50 or '51. And then we began also to use aluminum. So copper and aluminum were our two main metals, although during World War emergency we even insulated jute.

Q. Did you ever insulate string?

A. Well, that is nigh on to string.

Q. Now, how many products would you say generally, I don't mean size and colors and things like that, but different products, wire and cable products, did Rome make prior to its acquisition by Alcoa?

A. If we are talking about main class, I would say about 25. Are you talking about insulated only?

Q. Insulated.

A. Oh, pardon me. Oh, 12, 14, I would say.

Q. And within the main classification, about how many styles would you say you manufactured?

A. You mean sub products?

Q. Sub products.

A. We have never gotten an accurate count of that, but that runs into the hundreds; if you include colors and combinations, you would go into the thousands.

Q. Now, of those products, you also said you made bare wire and cable?

[fol. 1780] A. Yes, sir, solid and stranded, both copper and aluminum.

Q. And did you make a product known as ACSR?

A. Only in a limited size, up to size 4/0.

Q. So what products would you say that Rome was making prior to the acquisition that Alcoa was also making or selling?

A. We were making——

Q. —at the time of the acquisition?

A. We were making ACSR up to 4/0, the all aluminum cable, I think we could make up to a million or even a little higher than that, we made polyethylene line wire and polyethylene service drop. I think those are the only ones there was an overlap, which is covered very well by this chart.

Q. This chart, you are referring to Defendants' Exhibit AR-20, a color photo of which has been introduced in evidence?

A. Yes, I should remember that, having been repeated so many times.

Q. Now, what would you say was the conductor metal that was used predominantly by Rome prior to its acquisition by Alcoa?

A. Copper.

[fol. 1781] Q. And to how large an extent would you say that copper was used as compared to aluminum at the time of the acquisition?

A. Well, just what do you mean by that?

Q. Well——

A. (Interrupting) A percentage?

Q. What would be the percentage, if you know?

A. That, of course, varies. If you take it as a percentage of purchases of aluminum versus purchases of copper, I would say it was somewhere in the nature of 95 or 96 per cent, something along there.

Q. And if you take it by sales of aluminum products versus copper products?

A. I would say probably 90 per cent.

Q. Now, Mr. Fraser, I show you Government Exhibit GX-52, which is a copy of a speech that you made to the Rochester Society of Investment Analysts on January 16, 1957, and I invite your attention to the sentence that begins on the bottom of page 12 and continues on the top of page 13. Would you read that?

A. "In the last five years aluminum has become an important base conductor for insulated wire. In 1952 it only represented 5 per cent of our total volume in copper equiv-

[fol. 1782] alent, whereas in this last year it has climbed to almost 25 percent of our total."

Q. Now, what did you mean by the phrase "copper equivalent"?

A. Well——

Q. This has been asked before and now we have an expert to tell us about it.

A. Aluminum weighs about one-third the weight of copper, and therefore from an angle of footage we use three times the footage in order to correct for the difference in weight. This statement which was made in that speech took all of our copper which we produced—we produced quite a considerable amount of toll copper, you understand, for other people, and included also the toll aluminum that we were producing for Alcoa, because since the early 50s we had been a toll insulator for Alcoa. So by adding the Alcoa-provided aluminum to that which we were producing and selling in our own right, and multiplying that

figure by 3, we came up in the year 1956 to about 25 per cent of the total volume. I have here figures——

Q. (Interrupting) Well, before you answer that, let me [fol. 1783] ask you this question If you had been talking to the Rochester analysts and had given them the information in poundage rather than in copper equivalent, what would the percentage have been?

A. About one-third of that.

Q. And if you had been talking in terms of dollars, what would it be?

A. It would be less than that. I gave you the figures on purchases, copper was in the middle 90s, as I recall it.

Q. So about 5 per cent?

A. About 5 per cent. I would like to say this, too, that the type of product which we were covering, the aluminum covered product, required less operations in the mill, so there were many more hours proportionately put on the copper products than there were on the aluminum.

Q. Now, have you any figures to indicate what the copper equivalent usage of Rome was in the years 1957 and '58, the two years subsequent to this speech to the Rochester analysts and the two years immediately prior to the acquisition by Alcoa?

A. In 1957 the copper equivalent was 18.1 per cent; in [fol. 1784] 1958 it was 18 per cent.

Q. Now, Mr. Fraser, before we go on, I would like to bring up to date some charts that we put in evidence, just so that they will be complete. We have the 1961 figures, your Honor, that were not available at the time the charts were prepared, and I would like to ask Mr. Fraser to give them to us and maybe you could write them on your copy of the charts as he gives them to us. Would you look at Defendants' AR-54?

A. Yes, sir.

Q. Do you have comparable figures to those stated in the chart for the year 1961?

A. I do.

Q. Would you please state what they are?

A. In 1961 the total value was 1,461,000; the aluminum was $329,000; the aluminum percentage was 22.5. The copper value was $1,132,000; and the percentage 77.5 per cent.

Q. Now, would you turn to Defendants' Exhibit AR-55, the next chart, and give us the 1961 figures? This is service drop cable.

A. The 1961 figures to be added to AR-55, are as follows: Total, 2,211,000; aluminum 1,857,000; total 86 per cent. Copper, 354,000; 16 per cent.

[fol. 1785] Q. Now, will you please turn to Defendants' Exhibit AR-56 and give us the comparable figures for '61, for that chart?

A. The comparable figures for the year 1961 for AR-56 are as follows: Total 3,672,000. Aluminum value, 2,186,000; 59 per cent. Copper value, 1,486,000; 41 per cent.

Q. Now, Mr. Fraser, where did you obtain these figures from?

A. From our company records.

Q. Now, Mr. Fraser, do you know why Defendants' offered Chart 56, which is a combination of charts AR-54 and 55?

Mr. Melchior: I think that is an improper question. How would he know why Defendants offered it?

Mr. Bergson: Well, he is a defendant.

The Court: I will overruled it and see if I get some explanation.

The Witness: Overruled, is it?

Mr. Bergson: Yes.

The Court: Yes.

A. Because we have no way as a manufacturer of knowing what happens to weatherproof as far as service drop [fol. 1786] is concerned, so we combined the two so there would be——

Q. Do you mean by that, and I don't know how to ask this question, is weatherproof used as service drop?

A. Yes, sir. But we have no way of knowing except by going around and asking individual utilities whether they use it.

Q. Let me ask you the other question. Is triplex used in place of weatherproof?

A. No.

Q. Is triplex used for secondary distribution?

A. Yes.

Q. By utilities?

A. Yes.

Q. Would you have any way of knowing when triplex is purchased whether it is used for service drop purposes or secondary distribution purposes?

A. Our sales department, our engineering group would know, but I wouldn't be apt to know that.

Q. Now, Mr. Fraser, in the course of conducting your business did Rome, and does Rome, periodically review its production line to see whether or not certain products should be added to the line or certain products should be [fol. 1787] dropped from the line?

A. Constantly. Never ending.

Q. Why is this?

A. Well, we want to keep ourselves up to date. We are also interested in whether we are making any money in the product line; whether we are maintaining our service to our customers or whether there are some new uses to which our equipment can provide material and make greater use of our equipment. In fact, we consider it a matter of good operations to be on the ball as far as what is going on in our industry. It is important to our employees in providing them with good employment.

Q. It is question of determining what product lines are being used and also what product lines are profitable?

A. That's right.

Q. Did Rome Cable, to your recollection, ever purchase any equipment to be used for the production of one product and after its installation used it for an entirely different product?

A. Yes. A very good example of that is, I think has been brought out here. There is a big market for certain communications cables and we bought certain twisters and [fol. 1788] cablers to enter that particular field. When the equipment arrived and there were certain changes in the market structure on the particular products which we could make, and it so happened that the production then and the market demand had become very great for instrumentation cable and the start of the missile cable type which we envisioned as a very good field for us, with our research and engineering background, to put that equipment to use, and that is what was done with it.

Q. From your knowledge of this, is this practice of re-

viewing production lines a common practice in the industry?

A. I would definitely say so, because in periods of intense competition in certain products, it is quite general for companies to evaluate their insulated or other products that are in demand and see what they can do towards getting into that field.

It is a very normal type of operation for alert people.

Q. Now, in your operations at Rome Cable, did you watch what other companies were doing and adopt products that were developed by them and put them and put them into [fol. 1789] your line?

A. One of the continuing pleas to our sales organization, to our engineering group, to our suppliers, was to be kept posted on what was new in the market place. And that went into new insulations, new packages, a whole variety and host of things that would make a product more appealing to the customer.

Q. When you talk about "new packages," do you mean packaging materials or——

A. Even new packages, I mean. In some cases, for example, we found that it was much better to have wire in a 500-foot length than in a 5,000-foot length for the use of a customer.

Q. Now, conversely, did Rome develop products that were subsequently adopted by other wire and cable manufacturers?

A. Very definitely.

Q. Was triplex one of those products?

A. Yes, sir.

Q. When did Rome develop triplex?

A. In 1948 and '49.

Q. And with what coverings did Rome cover that triplex?

A. Polyethylene and neoprene. I don't remember which were first, but those were the two.

[fol. 1790] Q. And what was the conductor that was used?

A. Copper. We didn't have any aluminum at that time.

Q. Now, directing your attention now to the overlapping product, what was Rome's pricing policy in regard to those products?

A. Well, we issued a price sheet and generally we followed that price sheet.

Q. Would you characterize yourself as an aggressive competitor in those products?

A. No, sir. If you mean by aggressive competitor, price cutter, no.

Q. That is what I mean.

A. But we were an aggressive competitor.

Q. Now, Mr. Fraser, when did Rome Cable first insulate aluminum wire or cable?

A. That was towards the end of 1951.

Q. And what were the circumstances which brought that about?

A. Well, copper and aluminum were both scarce and under allocation during the Korean War, and my recollection is that in the last quarter of 1951 there was allocated to the wire and cable industry 200,000 pounds of aluminum for the full quarter of, last quarter of '51.

[fol. 1791] Q. And did Rome Cable apply for some of that allocation?

A. We did.

Q. And do you remember how many other companies applied for part of that allocation?

A. Well, I don't know how many applied, but there were eight allocations given, as I recall it. There may have been more applied.

Q. And to whom were those allocations given, if you know?

A. Alcoa—these are some I am quite sure of—I am not sure of the whole eight—Alcoa, Kaiser, Rome, General Cable, Anaconda, I believe Essex, but I am not sure of that.

Q. Reynolds?

A. I do not believe Reynolds got any at that time.

Q. But to the best of your recollection or knowledge, eight companies participated in that allocation?

A. Yes, sir.

Q. For 1951?

A. Yes, sir.

Q. Now, Mr. Fraser, I show you a copy of a directory of aluminum suppliers dated April 1, 1961, put out by the United States Department of Commerce, Business and De-

fense Service Administration, which has been marked for [fol. 1791a] identification as Defendants' Exhibit AR-5, and ask you if you can tell from this exhibit how many companies are listed as manufacturing wire and cable?

A. You mean insulated only or——

Q. ACSR and aluminum cable, bare.

A. Eleven.

[fol. 1792] Q. And how many as insulated?

A. 29.

Mr. Bergson: I offer Defendant's Exhibit AR-5 for identification.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-5 for identification received in evidence.)

By Mr. Bergson:

Q. Mr. Fraser, going back to this 1951 date, you said that you didn't know whether there were any other applicants for the 200,000 pounds than the eight; do you know how many companies were engaged in the business of manufacturing ACSR or aluminum insulated products in 1951?

A. Well, there was Alcoa, Kaiser, Reynolds, Southern Electric, Nehring, South Wire, Central, General Cable—wait a minute—1951?

Q. 1951, yes.

A. I am not so sure that there was aluminum available for——

Q. No, whether they were in the business of manufacturing aluminum wire and cable.

A. The only ones that were in the business would be [fol. 1793] Alcoa, Kaiser, Reynolds. I would say that was it.

Q. And the others of the eight that you are talking about were initially getting into the insulating or making of aluminum wire and cable at that time?

A. I would like to add that Southern Electric I know was in the aluminum wire business. I knew that positively at that time.

Q. So that to the best of your knowledge prior to the time

of this allocation there were four companies manufacturing aluminum and there were eight that got an allotment under this first allotment.

A. That's right, but that was an allotment for covered aluminum, not bare.

Q. I understand. Now, Mr. Fraser, I show you a document entitled "Primary aluminum output gains strongly," put out by the Business and Defense Services Administration of the United States Department of Commerce, under date of April 11, 1961, which has been marked for identification as Defendant's Exhibit AR-70, and I ask you to look at the second page of that document and tell us what [fol. 1794] it shows as to the number of companies listed as primary metal producers in 1950.

A. Three.

Q. 1955?

A. Four.

Q. 1960?

A. Six.

Q. Now, dropping down to ACSR, the number of companies listed for 1950.

A. Twelve.

Q. 1955.

A. Twelve.

Q. 1960.

A. Eleven.

Q. And for wire, insulated covered wire and cable?

A. 1950 says "Not available."

Q. And 1955?

A. Forty-eight.

Q. And 1960?

A. Forty-seven.

Q. And for extruded shapes and drawn tube.

A. 1950, 39; 1955, 110; 1960, 133.

Q. Now, do you know how aluminum conduit is made?

[fol. 1795] A. Yes, sir.

Q. How is it made?

A. It is extruded pipe which then has the threads put in it and something inside the tube.

Q. It is extruded pipe?

A. It is extruded pipe.

Mr. Bergson: I offer Defendant's Exhibit AR-70.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-70 for identification received in evidence.)

By Mr. Bergson:

Q. Now, Mr. Fraser, you told us that Rome Cable got into the aluminum phase of this insulated wire and cable business as a result of an allocation in 1951.

A. That is right.

Q. Now, do you know what new equipment Rome required in order to get into this aluminum wire and cable insulation?

A. We needed no new equipment to get in for that which was necessary at that time.

[fol. 1796] Q. Did you hear Mr. Ellis testify?

A. Yes.

Q. Was his testimony substantially correct?

A. Yes, sir.

Q. So far as your knowledge?

A. Yes, sir.

Q. Now, did Rome at any time give consideration to going into the production of larger sizes of ACSR?

A. We gave consideration to it.

Q. Did you reach a determination as to what you should do regarding it?

A. Decided not to do it.

Q. When did you decide not to do it?

A. The subject was brought up at various and sundry times, and each time we came up with the same answer.

Q. Do you remember the last time it was brought up?

A. Well, I presume in our reconsideration of products it could have been brought up in 1958. We examined those things at periodic times and decided against it.

Q. Why did you decide against it?

[fol. 1797] A. Well, we looked at the profitability of products and where we could put our money to best return for our share owners, and with what was involved of increase in organization and increase in equipment we felt

that our area of activity was more in the insulated products and the smaller sizes of ACSR, to a limited extent.

Q. What do you mean by a limited extent, the smaller sizes of ACSR?

A. To a limited extent, in any case you are limited by the fact that some customers will not split an order, for example, if they are buying large sizes and small sizes they won't favor you with giving you just the small sizes and somebody else taking the large sizes. We had that situation in our Torrence plant when we only had thin wall conduit. It was necessary for us to have rigid conduit along with it.

Q. So you limited yourself to the smaller sizes of ACSR?

A. It did not require the engineering or the equipment expenditure.

Q. Now, Mr. Fraser, did there come a time when Rome acquired a rod making machine?

[fol. 1798] A. Do you mean a drawing machine for aluminum?

Q. For aluminum.

A. You mean rolling?

Q. No, I mean a continuous casting machine.

A. Yes, a Properzi. I think we acquired that—well, actually it was installed in early 1953. I think we got our first production——

Q. When did you get your first commercial production from that?

A. The latter part of 1953, as I recall it. It took us about seven or eight months.

Q. Now, Mr. Fraser, what is an ER?

A. An ER is an executive request for an expenditure, and our policy in our company was that at the end of the calendar year or towards the end I would ask our manufacturing, our engineering, our research, our sales department to set down all of the new equipment which they felt was necessary for the next year. There was no limit put on them at that time of that request. That could be for new products, it could be for expansion of present products, it could be for improvement of quality, it could be for cost [fol. 1799] reduction, it could even be for health reasons.

Q. Well, now, when did you receive the first ER for the Properzi equipment?

A. I think it was November of 1951. I have got it right here somewhere—it is dated November 8, 1951 and I signed it November 9, 1951. That was not actually in production according to this until March 31, 1953.

Q. When were the funds for the Properzi equipment actually expended?

A. I would assume—it doesn't say when it was delivered here or when we paid the bill, but I would assume that about two thirds of that was six months after this date here, and then of course you have all the installation charges and foundation charges. This does not detail that.

Q. Now, I show you government's Exhibit GX-68 which contains this statement, "In respect to the equipment $336,000 approved to date on ER's and Ellis advises that the furnaces have been promised for May and they should be ready in July" et cetera. Does that mean that at that date final determination had been made for the installation of that equipment?

[fol. 1800] A. Not until this was actually approved, is the only time that actually—There was no authority to place the order unless this was signed.

Q. What is "this"?

A. This is the ER.

Q. And when was that?

A. That was November 9, 1951.

Q. That was prior to that.

A. It states that these were approved ER's, but after that the engineering department would come up with their specifications and in some cases there might be changes in them.

Q. But in any event, Mr. Fraser, Rome was in the business of drawing, stranding and insulating aluminum for how long a period prior to the time you were using your own rod?

A. Insulating, we were insulating by buying a conductor. The drawing came nearer the period of the rod and we converted an old copper elevator supply machine to aluminum by changing the dip. I think the cost of that ran into something like $5,000 or so. Stranding was no problem of conversion at all.

Q. Was insulating any problem of conversion?

[fol. 1801] A. No. No.

Q. Now, from your knowledge of the industry is there any problem involved in making the transition from drawing, stranding and insulating copper wire to the insulation, the drawing, stranding and insulation of aluminum wire?

A. Well, as has been testified here, many companies produce copper and aluminum on the same drawing machine by a good clean-out of the machine and a different dip system. The stranding presents no problem and the insulating presents no problem.

Q. Now, Mr. Fraser, I would like to talk a little bit about the structure of the wire and cable industry. Do you know how many companies there are in the wire and cable industry?

A. Well, over two hundred I would say. I have seen as high as 275.

Q. And could you tell us the names of some of the principal companies in the wire and cable industry?

A. General Cable, Anaconda, Phelps-Dodge, Kaiser.

Q. Not too fast, please. Mr. Jordan has got to spell these [fol. 1802] names.

A. Reynolds, Olin, Essex, Triangle, Crescent, Simplex, Walker Brothers, Narragansett, American Insulated, Collyer, Hudson Wire, Camden Wire. Detwiler's——

Q. Central?

A. Central. Nehring, South Wire, Crescent Company as well as Crescent Insulated. Suprenant.

Q. S-u-p-r-e-n-a-n-t?

A. Superior Cable, Warren Wire, Acme Wire, Belden Manufacturing, American Steel and Wire.

Q. American Steel and Wire, what company is that?

A. That is a division of the United States Steel Company. You got Royal Insulator, which is a division of I. T. & T. So is Suprenant now. Boston Insulated; H. K. Porter, Western Insulated, which is a division of Erie Company, Kerite, the Okonite division of Kennecott.

Q. How about General Electric?

A. Oh, yes, General Electric, one of the large ones. I am sure with a minute or two more I could produce a great many others. There is Chester Wire and Cable.

[fol. 1803] Q. How about Continental Steel?

A. A very big one. Continental Steel. Copperweld Steel.

Q. Well, I think that is enough.

A. Circle. Rockbestos, they are a part of Cerro de Pasco. Rea Magnet Wire.

Q. They are a part of Alcoa?

A. A part of Alcoa.

Q. I think you have done a pretty good job, Mr. Fraser.

Mr. Bergson: I would like to have this marked.

(Document entitled "List of companies and plants producing copper wire and cable" marked as Defendant's Exhibit AR-71 for identification.)

By Mr. Bergson:

Q. I now show you a document which has been marked Defendant's AR-71 for identification which is entitled "List of companies and plants producing copper wire and cable" promulgated by the United States Bureau of Commerce, Business and Defense Services Administration, July 10, 1958. I am not going to ask you to read into the record all [fol. 1804] the companies listed thereon, but do you consider that to be a reasonably accurate list of the companies in the business at that time?

A. I would say that is a very good list. There are only three or four that I missed of major character, I think.

Q. I think there is one that you missed.

A. Plastic Wire and Cable.

Q. How about Alcoa?

A. I thought that you didn't want our own.

Q. Oh, I am sorry.

A. I assumed that was part of the record.

OFFERS IN EVIDENCE

Mr. Bergson: I offer Defendant's Exhibit AR-71 for identification.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-71 for identification received in evidence.)

Mr. Bergson: I would like to offer at this time, your Honor, two additional exhibits. One is Defendant's Exhibit AR-72, which is an exhibit containing the financial sta-

tistics of some of the wire and cable companies and some of the conduit producers all of whom, and completely inclusive [fol. 1805] of those in Moody's Industrial Manual. I offer this as defendant's group Exhibit 72.

The Court: What am I supposed to do with it?

Mr. Bergson: I think it will help to fill up the clerk's files. But the purpose of it is that one of the factors that are considered in this case is the strength of the remaining competitors, and it is offered for that purpose. We will call your attention to important phases of it in our briefs, and I am sure you won't have to read it yourself.

Mr. Melchior: What numbers are they, Mr. Bergson?

(Discussion between Mr. Bergson and Mr. Melchior.)

The Court: I will receive it.

(Defendant's Exhibit AR-72 received in evidence.)

Mr. Bergson: I would like also at this time, your Honor, to offer excerpts from a volume entitled "Wire and wire [fol. 1806] products buyers guide." It is a list of the companies in the wire industries. It is a recognized guide for purchasers of wire and cable products. The pages that I am offering are those with regard to wire and cable products. This I would like to offer as Defendant's Exhibit AR-73.

Mr. Melchior: May we have the page numbers?

(Discussion between Mr. Bergson and Mr. Melchior.)

Mr. Melchior: No objection, your Honor.

The Court: Received.

(Guide marked as Defendant's Exhibit AR-73 in evidence.)

The Court: Are the pages that you want marked in some way in the exhibit?

Mr. Bergson: We have a cover page, your Honor. We have an introduction and then we have the pages entitled "Wire, electric wire and cable."

[fol. 1807] The Court: Oh, I see.

Mr. Bergson: I have the guide itself if you would like to see it.

The Court: No.

By Mr. Bergson:

Q. Mr. Fraser, is it standard industry practice to regard insulators of wire and cable as being insulators of copper wire and cable on the one hand and aluminum wire and cable on the other hand?

A. No, sir.

Q. What is the standard practice?

A. To regard them as insulators.

Q. Now, is there a wire and cable section of the National Electrical Manufacturers Association?

A. Yes, sir.

Q. This is the group of which you are president?

A. I was chairman.

Q. And of which you were chairman of the wire and cable section for many years?

A. Yes, sir. Yes, sir.

Q. Does the membership of that group consist of insulators of both aluminum and copper wire and cable?

[fol. 1808] A. Yes, sir.

Q. Is there a section for copper and a special section for aluminum?

A. No, sir.

Q. Now, Mr. Fraser, are you familiar with the 1958 Census of Manufacturers relating to non-ferrous metal, mill and foundry products?

A. Reasonably so.

Q. I show you a copy of the 1958 Census of Manufacturers relating to non-ferrous metal, mill and foundry products which has been marked Defendant's Exhibit AR-9 for identification, and I invite your attention to page 22 thereof.

A. Yes.

Q. Are the products shown on those pages insulated wire and cable products, 22 and 23?

A. I am looking—yes, sir, from the middle of page 22 and all of 23.

Q. Does the Census of Manufacturers in classifying wire and cable products make any distinction between copper and aluminum?

A. No. In fact the very first item says "Coaxial cable, lead or aluminum sheath and flexible—" I can find no such [fol. 1809] separation.

Q. Now, turning to Table 6, Table 6-A, page 20, does the Census of Manufacturers make any distinction between bare aluminum wire and cable and copper wire and cable?

A. Product code 33571 and 33521 is entitled "Aluminum and aluminum base alloy wire and cable (including ACSR)" Section 33572 says "Copper base alloy wire (including strand and cable, bare and tin, for electrical transmission)—" There are a number of others which go on. Do you want me to read them?

A. No, that is enough. So that the Census of Manufacturers in bare wire and cable makes a distinction between copper and aluminum but does not make such distinction insofar as insulated wire and cable products is concerned.

A. That is correct.

Mr. Bergson: I offer Defendant's Exhibit AR-9.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-9 for identification received in evidence.)

[fol. 1810] The Court: I assume that is on the theory of a line of commerce.

Mr. Bergson: Yes, your Honor, this is to show the Census of Manufacturers, the industry, nobody makes this artificial distinction that the government is making.

The Court: Well, if the government can get me to do it, then they are okay.

Mr. Bergson: They are better off, anyway, I don't think they are okay, they still have to show a lessening of competition.

The Court: We will find that out two or three years from now.

Mr. Bergson: I would like at this time, your Honor, to offer as Exhibit AR74 certain pages from the Standard Industrial Classification Manual, promulgated by the Executive Office of the President, Bureau of the Budget. Now, the pages that I am offering are the entire introduction, the one page that talks about these insulated products, which says "Drawing and insulating of non-ferrous [fol. 1811] wire," as a census category, it says "Establishments primarily engaged in drawing and insulating

wire and cable of non-ferrous metals" and the entire appendix which has general comments. What I am omitting are the classifications of all the other industries.

I have the Standard Industrial Classification Manual available here, but I think that again that would just clutter up the file.

Mr. Melchior: Do you offer it?

Mr. Bergson: Yes.

Mr. Melchior: What number?

Mr. Bergson: AR-74.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-74 marked received in evidence.)

By Mr. Bergson:

Q. Now, Mr. Fraser, as president of Rome Cable Corporation and with your broad knowledge of the wire and cable industry, how would you classify competition in the [fol. 1812] insulated wire and cable business?

A. Exceedingly rough.

Q. What do you mean by that?

A. Very competitive.

Q. There is intense competition?

A. Right.

Q. Now, I would like now to invite your attention to the beginning of Rome's contractural relation with Alcoa, other than as a purchaser of metal. The government has introduced in evidence documents relating to a tolling arrangement between Alcoa and Rome. Would you tell us briefly what that tolling arrangement was about and how it came about?

A. Yes, sir. As I detailed earlier, there became an increasing interest with the allocation of metal by NPA and in the insulation of aluminum wire and cable. We had done some of it, as I detailed earlier, and one day I received a call from Mr. Ralph Davies.

Q. Would you identify him?

A. Ralph Davies was then vice president and general sales manager of Alcoa. And I had known Mr. Davies and [fol. 1813] he said that they felt that they should be-

come an insulator of aluminum. They were the largest producer and inventor of ACSR and all aluminum cable, and they felt that they should enter the insulating field. They wanted to know if they could come and talk with us and perhaps enter into an arrangement whereby we could provide know-how as to how they could get into the business, order equipment, help them get the various factors that were necessary in order for them to get into the insulated business. I said we would be glad to have them come and visit us, and when they did come and visit us we took them for a trip through the plant and after that in a discussion with them we made the suggestion for their consideration that if they wanted to provide us with the conductor, that is, either the solid conductor or the stranded conductor in aluminum or the ACSR conductor, that we would be glad to work up a tolling arrangement with them. In other words, that we would give them a price for our services, and that they would then sell the product, we would ship it to wherever they wished it to go.

[fol. 1814] Q. This was at what period?

A. 1952, as I recall it, early 1952.

Q. And at that time did you consider Rome to be a skilled insulator of wire and cable products?

A. We certainly did.

Q. What happened as a result of this discussion of yours?

A. They took the idea back to Pittsburgh, talked it over, and we received a call that they would be interested in our working up some figures in that connection, which we did by the various sizes and types, and out of it, after certain other negotiations regarding the various details and mechanics of handling things, such as stocks and so forth, we entered into a tolling arrangement agreement with them in a letter which I believe is part of the record.

Q. This was sometime in March?

A. In March of 1952, as I recall it.

Q. Now, at the time that you entered into this tolling arrangement, was anything said as to the permanence of the arrangement?

A. No, we were both very frank about it. We didn't know [fol. 1815] how it would work out as far as we were concerned, and they said they did not expect to go into the insulating of wire for—I just don't recall the period now,

but we felt that, and the final agreement gave both companies plenty of time to operate under the arrangement, and the letter as I recall it said that if Alcoa after such and such a date should decide that they wanted to insulate products themselves, they would give us a notification of nine or twelve months.

Q. Did they ever give you such notification?

A. Yes, I think it was in 1955 or thereabouts they said they had decided to insulate their own polyethelene, and plenty of time was given during that period. They even said that some of the special types of polyethelene we would continue to make, and they were not going to neoprene insulate any at that time and that we could consider up to another date that they would expect to get all their neoprene insulated products from us.

Q. Now, when Alcoa began to insulate its own polyethelene products, were you left with idle equipment on [fol. 1816] your hands?

A. No, sir.

Q. Will you explain how that happened?

A. Well, the bane of the average manufacturer's existence is that if any equipment becomes idle how he is going to use that equipment. We were able to use it, and I think Mr. Ellis explained this, for plastic building wire, for certain of the other products that we were working on. We had plenty of time to make the switchover.

Q. Now, did there come a time during the course of the tolling arrangement when Alcoa advised you that it was contemplating going into the manufacture of neoprene wire and cable, neoprene covered wire and cable, insulated?

A. I don't recall that we had any official notice; we certainly had from our initial conversations expected that that might be so.

Q. Now, during the period that we were talking about, were there any discussions between you and Alcoa—this is the period prior to 1957, the——

A. No——

Q. Let me finish the question. 1952 to 1956, regarding [fol. 1817] merger or acquisition?

A. No, sir.

Q. Now, when was the subject of merger between Alcoa and Rome first brought up?

The Court: I guess you are starting a new subject.
Mr. Bergson: Yes.
The Court: Take a short recess.
The Clerk: The court is in recess.

(At this point a recess was taken after which the trial was resumed.)

(After recess.)

By Mr. Bergson:

Q. Mr. Fraser, before we get into the merger discussions there is one question that I would like to ask you. When Alcoa began to manufacture its own polyethelene covering wire and cable, did it sell any product other than those listed on the product board?

A. Not to my knowledge.

Q. Now, I think there was one thing that you indicated during the recess that you would like to correct. When I asked you whether, when we included weatherproof and service drop in the same chart that the reason that that [fol. 1818] was because the triplex that is used in service drop is also used as secondary cable.

A. Correct. I thought I corrected that earlier.

Q. Well, it is clear now.

A. Now to the subject of the merger discussions. When did the first discussions take place?

A. In July of 1957.

Q. Now, how many discussions took place during the course of—in that period?

A. There was a maximum of three. I think it was just two, but I am not quite sure of that.

Q. Did Alcoa make an offer to Rome Cable to acquire Rome Cable?

A. They did.

Q. And what happened to that offer?

A. The directors of Rome Cable felt that the offer was not large enough and we voted to decline, and we parted friends.

Q. Do you recall how much Alcoa offered at that time?

[fol. 1819] A. As I recall, it was in the neighborhood of 22 million dollars. It might have been a bit more, but not much.

Q. So that at that time—when did you decline the offer?

A. I think it was in September of that year, or maybe October. Somewhere around there.

Q. Did there come a time when merger discussions were resumed between Alcoa and Rome?

A. Since I was making one of my periodic visits to Pittsburgh discussing——

Q. When?

A. In October of 1958. At that time Mr. Davies asked me if we had any different feeling or wished to have some further discussion or if he thought our board might be interested in it. At that time I said if he was thinking of only making the same offer that he might better, while I could not speak definitely for the board I felt that it would be turned down again.

Q. Did Mr. Davies ask you to make a counter proposal?

A. He did.

Q. And did you do so?

[fol. 1820] A. We did.

Q. And do you recall what that counter proposal was?

A. It was four shares of Rome Cable for five—the other way around—around four shares of Alcoa for five of Rome.

Q. And was that offer accepted?

A. No.

Q. Did Alcoa make a counter offer?

A. In January of 1959 a counter offer of three for five was made, which amounted to thirty-three or four million dollars, and we submitted that to our board of directors. Our board of directors voted to submit it to the share owners and that was done. The share owners voted almost unanimously to accept the offer, and on April 1, 1959 we became a division of Alcoa, a separately incorporated Rome Cable Corporation of Delaware, whereas we had been Rome Cable of New York before.

Q. Now, Mr. Fraser, you said that discussions were resumed in October, and the offer was finally accepted or made in January of 1959?

A. Right.

Q. Were there frequent discussions between October and
[fol. 1820a] January?

A. Not any group discussions.

[fol. 1821] Q. No discussions at all?

A. No, no group discussions at all.

Q. When you say no group discussions, what do you mean?

A. I mean no members of Alcoa or the Rome organization.

Q. Discussed it with one another?

A. Discussing it with one another.

Q. Now, Mr. Fraser, during the course of the negotiations, did any Alcoa official use any threat whatsoever on you?

A. Absolutely not.

Q. During the course of the negotiations was there any discussion as to the existing competition between Rome and Alcoa?

A. No, sir.

Q. Did Alcoa tell you why it was interested in acquiring Rome?

A. Yes, they wanted to expand their line of products in order to be competitive with others in the industry, diversify their products.

Q. Insulated product line?

A. That's right.

Q. Now, what were Rome's reasons for entering into this transaction?

[fol. 1822] Mr. Melchior: If I may interrupt at this point, your Honor, I think I ought to make the objection for the record. It is the position of the government that the reasons for the merger, even good reasons and good motives, are not relevant to a consideration of the probabilities, and I would cite in that respect the authority of the Bethlehem case where that very question was raised. Defendants in this case, according to the Court, "earnestly urged that in considering the impact on competition of the proposed merger, that the Court take into account what they point to as its beneficial aspects, and they said that any lessening of competition resulting from the merger should be balanced against the benefits which would

accrue from the Bethlehem's plan to expand the Youngstown plants, thus creating new steel capacity in an existing deficit area and enhancing the power of the merged company to give United States Steel more effective and vigorous competition, than Bethlehem and Youngstown can now give separately. They urged that because the capacity was severely limited in the Mid-West, and Bethlehem's strength [fol. 1823] was on the East Coast and West Coast, the addition of Youngstown who was strong in the central part of the country would better balance the competition against the industry leader, United States Steel, and would at the same time create better competitive conditions."

The Court rejected this out of hand, and concluded "if the merger offends the statute in any relevant market, then good motives and even demonstrable benefits are irrelevant and afford no defense."

The Court: Well, that is probably true, taken generally in the context of that case, but let's take the corollary of that. Suppose that this witness says that Alcoa threatened him, do you mean to say that the Government couldn't prove that? Overruled. Certainly the motive doesn't, but the circumstances, I think, are admissible. If a company is going bankrupt, all of that is admissible, in my opinion.

Mr. Melchior: If the company is going bankrupt, yes.

The Court: That is what he is asking, are the reasons.

[fol. 1824] Mr. Melchior: I don't know what he is trying to demonstrate. It sounds as though he is trying to demonstrate good motives.

The Court: I am sure he is not going to prove anything sinister in the whole affair.

Mr. Melchior: The Government doesn't suggest anything sinister.

The Court: Then no harm is done.

Mr. Bergson: I guess there is no need of my arguing.

The Court: No.

The Witness: Would you repeat the question?

By Mr. Bergson:

Q. What were Rome's reasons for entering into this transaction?

A. There were several, we as officers and directors

were trustees of our share owners' money; we were paid officers; the offer from a financial angle was a very fine one which had to be weighed very considerably in our discussions. Second, we had known the Alcoa organization and their personnel and their policies, and we liked them. We were the kind of concern—well, the founder of the company, Mr. Herbert T. Dyett said that organization was [fol. 1825] much more important than bricks and mortar, and we were very proud of our organization and we felt that our people would have an excellent opportunity in the larger organization. We were interested in the community. We felt that the people and our employees would also benefit, and when we talked with the Alcoa people that January, there was more time spent on discussing personnel and organization than there was on balance sheets and figures and things of that nature.

Q. And as a result of the acquisition were personnel transferred from Alcoa to Rome?

A. Yes.

Q. And was the responsibility for all of Alcoa's wire and cable sales placed in the Rome organization?

A. It was.

Q. This, I assume, is what you had in mind when you said it would be of benefit to the community?

A. Yes, definitely. We have had several fine people added to the community, doing an important job, good citizens.

Q. Now, Mr. Fraser, at the time that Alcoa acquired [fol. 1826] Rome, did Rome have any plans to go into the manufacture of aluminum conduit?

A. Did you say plans?

Q. Plans.

A. No plans.

Q. Will you state your personal relationship with Mr. Sam Rea of the Rea Magnet Wire Company?

A. Mr. Sam Rea, who was president of Rea Magnet Wire Company, I knew his father very well. He was an associate in General Cable. He left General Cable to set up Rea Magnet Wire Company in Fort Wayne. When he died, Sam came to me at different times to discuss his personal problems as head of the company and it was just

a—well, I was a bit older than he was and he would like to come and talk over his problems with me.

Q. Did he ask your advice in regard to possible public offering of stock?

A. He did. He knew that I had had considerable experience in that area. Rea Magnet Wire was a family-controlled organization. He had, I think, two sisters who had heavy amounts of their estate in that, and he was interested in what the possibilities might be of making a public offering which might diversify their stock holdings or give [fol. 1827] a better market. I told him the mechanics of how to go about that. I asked him if he knew a good investment banker. He said he did. Also a good accountant. He said he did. And he carried on those investigations. The accountant submitted a figure to the investment banker the investment banker then told him what he thought he might sell the stock at. He figured what the tax payment would be on that and he decided against it.

Q. He told you about this and did he ask your further advice as to what he should do?

A. Well, he had certain other things he was investigating, which I did not think very much about, and then I said—well, he thought something of possibly becoming associated or working with a metal company, and I suggested would he be interested if I would be able to set things up where he could, where I could inquire of Alcoa, and that was one of the companies he was thinking about, because they had a tolling arrangement. And I said I could not answer for Alcoa but I would be glad to ask whether they were at all interested. And I contacted Mr. Hickman, and then came a meeting and from there on came the merger terms and [fol. 1828] arrangements. Early in 1960 an offer was made, or the latter part of '59, I can't remember which, and their shareowners voted to accept the offer, and they became a division of Alcoa.

Q. Now, did Rea Magnet Wire make any product that would be made either by Alcoa or Rome?

A. No. We had no overlap whatsoever. We made a heavy size of enamel and other types of magnet wire for an entirely different trade. They were not a seller of bare wire at all, and occasionally accommodation items that they made were in the fine wire size.

Q. Now, do you recall a transaction involving the Interstate Electric Company?

A. Yes, I do.

Q. Can you tell us about that?

A. Well, with recent happenings while this trial has been going on and the terrific interest in missiles, we, as a manufacturer, are making a great deal of missile cable. Our Los Angeles office advised us that a company known as Interstate Electric Company, I think their name was, were going out of business. They had equipment to make cable assemblies for the missile and instrument cable in- [fol. 1829] dustry. We made an offer of a hundred and thirty thousand dollars, I think, to buy their equipment. We moved their equipment to a location adjoining our Los Angeles warehouse and have been making assemblies there for almost two years.

Q. These are missile assemblies?

A. Yes.

Q. When did you acquire the machinery of Interstate Electric Company?

A. May of 1960, I think it was.

Q. Now, Mr. Fraser, during the course of the conduct of your company's business, prior to this acquisition, did you periodically have meetings called "Whither goest thou," meetings?

A. Quo Vadis, yes, sir.

Q. And would you describe what those meetings were?

A. Shortly after I became president in 1944, we instituted what we first started out calling an organizational audit. At these meetings we first examined the entire organization from every department in order to see how well equipped we were for the future, who were the men we had that might be promoted. At those meetings we examined [fol. 1830] certain subjects like new products, possible new equipment. A whole wide range that we sent out to the members who attended the meetings and too on the outside as subject for discussion. These were meetings where we were looking ahead in many cases five years as to where our destiny was going to be.

Q. Were any decisions made at those meetings?

A. They had no decision making power.

Q. Or when certain subjects were proposed for discussion by you, were they proposed by you evoking comment?

A. Very definitely. In many cases I purposely put them in, as I hoped that they would be acted favorably upon in order to get the reaction to be sure I was right in my judgment as far as conducting the company was concerned, but I wanted them all to express their opinion.

Q. Now, did your company also have a copper committee?

A. We had and still do. As a matter of fact, one is meeting today, what orders we have on hand, to determine what production we will have ahead for the next month and what the requirements will be.

Q. The purpose of that committee is to determine what your needs are for raw material for copper?

[fol. 1831] A. That is correct.

Q. Did you also conduct aluminum meetings?

A. We conducted aluminum meetings but not of this same nature. It was only that the subject was an important one. You realize as a small, closely knit organization, our executive committee meetings could be called and held just for as long as it would take Dr. Schatzel to get from the laboratory to my office. Before the meeting was over, it would be into several other important subjects that we had before us.

Q. Did you have copper meetings on the one hand and aluminum meetings on the other hand because products made with copper or products made with aluminum were different products?

A. No, sir.

Q. Now, Mr. Fraser, during the year 1955, was there a period of an aluminum shortage?

A. Yes, sir.

Q. How long did that period last?

A. Three to six months at the most, I think we were beginning to get out of it before the six months was up.

Q. Has aluminum been in short supply since that time?

[fol. 1832] A. No, sir.

Q. Have you had any problems in obtaining aluminum, did you have any problems in obtaining aluminum from 1956 to the time of your acquisition?

A. No.

Q. Now, Mr. Fraser, I show you Government's Exhibit 123, which is the Minutes of a meeting of the Executive Committee of Rome Cable Corporation, dated June 4, 1956, and I invite your attention to the next to the last paragraph and ask you to read that paragraph.

A. "Mr. J. H. Dyett was empowered to sign a proposed contract with Kaiser Aluminum for 600,000 pounds a year until 1966, subject to approval of the quality and terms by the engineering department."

Q. Now, will you tell us what the circumstances were surrounding that transaction?

A. The government had asked all of the prime producers to give a figure to them indicating the amount that should be provided for their needs. The prime aluminum producers, in this case, Kaiser, whom we had just contacted within the previous five or six months to become a supplier, was one of those companies which was asked this, and they suggested a ten-year contract. It was our basic [fol. 1833] philosophy as a company not to enter into any contracts for a longer period than one year. However, after realizing this need of the Government's, and 600,000 pounds as a relative small proportion of the amount that we had expected to use, we authorized Mr. Dyett to sign such a contract, but it was never entered into.

Q. And this was in 1956?

A. Right.

Q. Now, Mr. Fraser, since Rome's acquisition by Alcoa, have there been any discussions regarding the acquisition by Alcoa-Rome of any other wire or cable company?

A. Yes.

Q. Would you tell us what companies were involved?

A. As I recall it, there were three, Narragansett Wire & Cable, Suprenant Manufacturing Company and Hi Temp.

Q. How did those discussions come about?

A. Came about in letters which I received from different people in Pittsburgh, and they, I believe, in one case, had received a telephone call or a letter from—I don't know whether you would call him a broker, somebody who was [fol. 1834] authorized to accept offers on a company. The other two came from salesmen, as I recall it, or district managers in the field.

Q. Were any of these discussions initiated by Alcoa alone?

A. Absolutely not.

Q. And what decision did Alcoa or Rome make in regard to each of these three?

A. Negative in each case.

Q. And why?

A. Well——

Q. (Interrupting) Take each one.

A. In one case, Narragansett Wire & Cable, they had a distinct overlap of products in the building wire industry, and we felt that there was no advantage to any addition of that line. The location of their plant was not good, and we were not interested in carrying on any further negotiations with them.

Q. And how about Hi Temp?

A. Hi Temp was an excellent little company but it also made a great many of overlap products, and their location was also in the East, and by that time there was, as I recall it, the suit instituted, and we had decided that in that [fol. 1835] event, anyway, we wouldn't go on.

Q. But the main reason for turning it down was the business reason?

A. Absolutely.

Q. And how about Suprenant?

A. Same reasons.

Q. And there the main reason was a business reason?

A. That's right.

Q. And besides that, you were in a lawsuit and didn't want to bite off more than you could chew?

A. That's correct.

Mr. Bergson: No further questions.

The Court: Cross-examine.

Cross-examination.

By Mr. Melchior:

Q. Mr. Fraser, I would like to direct your attention to AR-70, which——

A. It isn't here—all right, I have it.

Q. Which purports to be a release by the United States

Department of Commerce; are you familiar with that document?

A. Yes, sir.

[fol. 1836] Q. I would like to ask you to turn to page 2, if you will.

A. Yes, sir.

Q. There I find listed on page 2 a number of product categories.

A. Yes.

Q. And with particular respect to the category of extruded shapes and drawn tube?

A. Yes.

Q. Could you tell me generally what products are included in that category?

A. Well, that is an item that I don't know too much about. I know that they make extruded pipes and other shapes, but I am not at all familiar with the whole line of products.

Q. Can you name any of the products?

A. Yes. They extrude pipe for conduit, I do know that.

Q. Anything else?

A. No, I am afraid I can't add anything to that at all.

Q. You don't know whether more is included in that?

A. I know there is more included but I can't tell you what.

Q. I find listed extruded shapes and drawn tubes and behind that a certain number of producers in the year [fol. 1837] 1950, 59?

A. Yes.

Q. And in 1955, 110?

A. Yes.

Q. And in 1960, 133?

A. Right.

Q. Now, you are familiar with the aluminum conduit business, I take it?

A. Yes, sir.

Q. Do you know how many of those 133 companies manufacture or fabricate aluminum conduit or did in 1960?

A. I know a few of them.

Q. Would you like to name those that fabricate?

A. Alcoa, Reynolds, Kaiser, Hazelwood, American Rigid Conduit——

Q. (Interrupting) Who?

A. The company that testified here, American Rigid Conduit.

Q. Aluminum Rigid Conduit?

A. Aluminum Rigid Conduit, Hazelwood, Jasco, Channel Master, Harvey, there are probably others locally from what we have heard but I couldn't identify them.

[fol. 1838] Q. You can't name any others at the moment?

A. Not at the moment.

Q. Do you think there are very many more?

A. There are some more, I don't know whether you would call them many more. There are many more who have capabilities of doing it.

Q. I didn't ask you that, Mr. Fraser, I wanted to know how many you could name in 1960, and you have named something less than ten, and I notice there are 133 listed. Certainly there are not 133, is that right?

A. Who are making aluminum conduit?

Q. That's right.

A. I agree with that.

Q. In other words, this category must include a number of companies other than those who are engaged in making aluminum conduit or extruding pipe?

A. I would say so.

Mr. Bergson: We will concede that, and we didn't intend to show that.

By Mr. Melchior:

Q. Yes. Now, directing your attention to the category wire and insulated or covered wire and cable?

A. Yes.

[fol. 1839] Q. Now, do you know what products are included in that category?

A. I could guess, I think, rather well.

Q. Beg pardon?

A. I think I could guess.

Q. I don't want you to guess, didn't you testify that you had been employed by the Business and Defense Services Administration?

A. Not employed. I said I was a member of a committee.

Q. Industry Advisory Committee?

A. Yes, and it was not discussed as to the products or scope of that.

Q. I see. So in your work with BDSA, as a member of the Industry Advisory Committee, you didn't get into these things?

A. This is during the war period, that Industry Advisory Committee was largely for advising with the industry regarding problems on supply for the industry.

Q. And which war are you referring to?

A. The one that I was actually on the committee was the Korean War, and I served as an advisor to the Committee during World War II.

Q. But in that work, with that committee you didn't get [fol. 1840] into the statistics?

A. Not these.

Q. Would you know whether this category includes products other than conductor wire and cable products?

A. I wouldn't think it would.

Q. Why do you say that?

A. I could expand this list much beyond this 47 under the terms of wire and insulated wire and cable.

Q. I am merely asking you whether you can look at that and tell me whether that category includes producers of wire which is not conductor wire and cable, do you know that?

A. Well, do you mean—no, there should be no people included who are not producers of conductor wire and cable.

Q. Are you testifying, then, that in 1961, according to this there were 47 producers of aluminum conductor wire and cable? That is what that seems to indicate?

A. Well, they had the list of people and that is the basis on which it would be compiled. I don't have the list of companies here in front of me. I would have to see that in [fol. 1841] order to testify accurately.

Q. Then you do not know whether this indicates 47 companies making aluminum wire and cable?

A. I do not know.

Q. Now, I believe you testified on direct examination that when Rome Cable initially went into the field of aluminum wire and cable, drawing aluminum wire and

cable, that you didn't find it necessary to buy a great deal of additional equipment?

A. Correct.

Q. You could use the equipment you had used for copper wire and cable, generally?

A. Correct.

Q. Can you tell me at the time Rome went into the business of drawing aluminum wire and cable, which is, as I recall, back around 1953, or thereabouts, how many wire drawing machines did you have, roughly?

A. We had two heavy drawing machines and I can't tell how many intermediate, very sizable number of fine wire drawing machines.

[fol. 1842] Q. Can you give me an indication in round figures?

A. I am afraid I couldn't.

Q. You have no idea. Was it twenty?

A. Well, much less than that in the number that would be involved in the drawing of the aluminum sizes involved. I would say they might have been four or six that could have been——

Q. No. I just want to know how many wire drawing machines you had.

A. I can't remember.

Q. You mentioned two heavy ones?

A. That's right.

Q. And four or six——

A. Oh, no.

Q. I didn't hear your answer then.

A. I am afraid I can't remember.

Q. You don't remember?

A. No.

Q. What position did you hold at that time, Mr. Fraser?

A. I was president.

Q. You were president. Do you know this, Mr. Fraser, whether or not you alternated these machines as a matter [fol. 1843] of practice in drawing wire one time and aluminum another?

A. No, sir. When we first started making insulated aluminum wire we did not draw our own wire. We bought the bare conductor and insulated or stranded the conductor to the insulator.

Q. When you did begin drawing aluminum wire——

A. It was in 1953 when we converted the elevator supply machine, fixed up a dip and we began drawing. After we purchased rods we began I think it was in the first part of 1953.

Q. Do you know how many machines you used to draw it?

A. One.

Q. Did you use this one machine?

A. Yes.

Q. Did you reconvert it to aluminum?

A. No. We reconverted it from a copper drawing machine to aluminum drawing machine. It was used exclusively for aluminum. But other companies in the industry——

Q. You have answered my question, Mr. Fraser. Now I believe you said you acquired a Properzi continuous casting unit in 1953.

[fol. 1844] A. Right.

Q. Why did you acquire this?

A. Well, we thought that we should, we found we could produce rod at a cheaper price than what we could buy it on the outside, and I mean as a rod it would add to our profit picture, and that was our reason.

Q. Now, I would like to direct your attention to AR-71 which purports to be a list of companies and plants producing copper wire and cable.

A. Yes, sir.

Q. And the date seems to be July 10, 1958, and the list apparently was prepared by the copper division of BDSA.

A. Yes, sir.

Q. Would it be very difficult for you to quickly go through that list and tell me which of those companies to your knowledge produced aluminum wire and cable? Are you familiar with the industry?

A. Well, many of them have—I mean they produced it at different times.

Q. I am thinking of 1958 when this was prepared. I think that would be the best thing to stick to that year.

[fol. 1845] A. I could tell quite a bit of them, but I don't know that I——

Q. Could you just go through and check them off?

A. American Insulated Wire Corporation. Anaconda Wire and Cable. Belden Manufacturing Company. William Brand. Camden Wire. Central Wire.

Q. What was that? I'm sorry I didn't hear this.

A. Did you say insulated wire and cable?

Q. Aluminum.

A. I know but I should not have named Camden Wire as an insulator. Circle Wire and Cable.

Q. Circle.

A. Collyer Insulated. Continental Copper and Steel. Cornish Wire. Crescent Insulated. Crescent Company. Essex Wire. General Cable Corporation. General Electric Corporation. General Motors. Hudson Wire Company. That Kennecott Wire and Cable, that is part of Okonite, and Okonite is an insulator. Kerite. Narragansett. National Electric Products. Okonite.

[fol. 1846] Q. Excuse me. Was that the same one you referred to earlier?

A. Okonite is also a division of Kennecott and Kennecott Wire and Cable is put under Okonite.

Q. Kennecott Wire and Cable.

A. Plastic Wire and Cable. Rea Magnet Wire is here as a separate company. They do. John A. Roebling Sons were at that time. They were a division of Colorado Fuel and Iron, are now a division of, or their equipment was bought by Reynolds last year or so.

Q. Yes.

A. Rockbestos. Rome Cable. Simplex Wire and Cable. Southern Electrical Corporation, which is now a part of Olin. South Wire. I am passing over some of those that I am not sure about.

Q. Yes.

A. I believe they do, but I am not sure. I am only giving you the ones that I am reasonably sure of.

Q. Yes. Sure.

A. Texas wire and Cable. That was formerly a part of Narragansett and has been sold, as Mr. Morley testified, and is a separate organization now.

[fol. 1847] Q. Do you know whether they are still in the wire and cable business?

A. They are still in the wire and cable business.

Q. They are.

A. But whether they are making aluminum, I don't know. They have equipment, as he said. Triangle Conduit. United States Rubber is now a part or division or wholly owned by Kaiser, and they make it. United States Steel Corporation. American Steel and Wire makes it. Walker Brothers.

Q. Do you know that Walker Brothers is still in that business?

Mr. Bergson: You asked him about 1958.

A. '58. I do not know.

Q. You don't know whether they are or not?

A. I mean because of the fact that the analysis of the profit picture, the designation of a definite year is a little harder because they might be out of it in '58 and in it in '59.

Q. Yes.

A. I don't quite keep that close tabs.

Q. I was asking about '58, and that is what you have been [fol. 1848] giving me, I understand.

A. Whitney Blake. Westinghouse makes some but they do not make it for sale. It is for their own use. Western Electric also make a considerable quantity, but they do not make it for sale.

Q. Would you call their production captive production?

A. Western Electric? Yes.

Q. Is that the term used in the trade?

A. Yes. The same as Westinghouse. And General Motors is the same.

Q. Their production is captive?

A. Yes. They make some, I believe, for their automotive distribution.

Q. I see. Now, I believe you testified, Mr. Fraser, that you served in an official position in NEMA.

A. That's right, I was president last year.

Q. I beg your pardon?

A. I was president last year.

Q. Do you know when that organization was founded?

A. 1925. There was a predecessor organization, I don't quite remember the name of it, I think it was officially des- [fol. 1849] ignated in 1925.

Q. Do you know——

A. Or '26.

Q. —what sort of an organization it was when it was founded?

A. Well, it was various people in the electrical industry, transformer manufacturers, motor manufacturers, appliance manufacturers, wire and cable manufacturers.

[fol. 1850] Q. Now when were you an officer, sir? About?

A. Oh, I was vice president——

Q. Just approximately?

A. Two or three years ago. I was treasurer for one or two years and I was president last year. I have been a director for six or seven years.

Q. The reason I asked you that, I want to ask you if you were familiar with the first member of NEMA who drew aluminum wire and cable as a conductor or when the first member of that organization began drawing aluminum wire and cable? Would you know that?

A. The first member of NEMA who drew it?

Q. Yes.

A. In 1923 I think the wire members were copper drawers.

A. Yes. I could not tell you who the members of Nema were in 1925. Certainly the composition of NEMA industry has changed considerably since that time. I have no way of knowing.

Q. How about in the thirties, would you know what the membership was in the thirties, with respect to wire and cable manufacturers?

A. No. I am more familiar with it in the forties.

Q. What was the conductor wire and cable membership in the forties, was it predominantly copper?

A. Oh yes.

[fol. 1851] Q. Was it all copper?

A. I believe that some of the companies have done some small amounts in aluminum.

Q. It was pre-dominantly copper.

A. Yes. And NEMA does not represent all of the types of wire and cable, either.

Q. I see. Do you know how many aluminum conductor wire and cable companies are members of NEMA today? Or, let me ask you this. Are all aluminum wire and cable —conductor wire and cable companies members of NEMA?

A. No.

Q. They are not?

A. No. Because some of them can't come within the scope. For example, bare conductor and acsr conductor as such, they cannot become members of NEMA if that is the only product they make.

Q. What is the requirement?

A. Each item has a separate product scope. Weatherproof wire, producers of weatherproof wire, if they only produce weatherproof wire cannot become a member of NEMA.

Q. Is Alcoa a member of NEMA?

A. Through the fact of Rome Cable Division as we handle their products. But Alcoa as a produeer of simply ascr could not have been a member of NEMA.

[fol. 1852] Q. Was Rome Cable a member prior to the merger with Alcoa?

A. Oh yes. We have been a member from either late 30's or early 40's. It was shortly after we became a company.

Q. And Rome has continued its membership?

A. Yes.

Q. But Alcoa has not joined in it's own right?

A. No.

Q. Are you generally familiar with the statistics kept by NEMA?

A. Yes, I am.

Q. Does NEMA collect any statistics on aluminum wire and cable?

A. Yes. But it is combined into a grouping. There is a separate sub-heading under the construction wire industry or building wire and it is included in the total of building wire.

Q. It is kept separate under building wire, as aluminum?

A. Yes.

Q. Is there any other category where they collect statistics separately? On wire and cable?

A. They are going through a transformation now. There could be something in the power cable, but it is not much.

[fol. 1853] Q. You say there is a transformation going on? What do you mean by that?

A. The Statistical Committee is continuously analyzing

the statistics or the products to see if they can get a better type of reporting that will report all categories in the industry or all the products in the industry.

Q. Does NEMA collect aluminum conduit statistics?

A. They started to. There was an aluminum conduit section—effort being made to form one oh for I think a period of six months. Our NEMA dues are based on sales. So in order to find out what the dues of these particular companies were, I believe that for a six months period the sales of I think seven companies were submitted to the Statistical Department of NEMA. But there is no regularly monthly statistics now. In sizes. Like there is in steel.

Q. Are they still collecting statistics on aluminum conduit to your knowledge?

A. No sir, not to my knowledge.

Q. They are no longer collecting them?

A. These were not statistics. These were dollar values. When we talk about statistics in the steel these are by sizes and footages.

Q. I see.

[fol. 1854] A. To my knowledge there has never been any size information on aluminum conduit collected by NEMA.

Q. They are collected on a dollar basis, you say?

A. Just on six months. Wholly for dues.

Q. I see. Now you do have some familiarity with BDSA. I conclude from your remarks that you have some familiarity with the statistics published by BDSA. Do you know whether BDSA collects statistics on aluminum wire and cable separately from copper wire and cable?

A. They collect statistics on ACSR and on aluminum cable and they collect statistics monthly on insulated or covered. I am familiar with those.

[fol. 1855] Q. I was interested in your testimony on the tolling arrangement between ALCOA and Rome?

A. Yes.

Q. Getting back—beginning back around 1952, you said they had some conversations with your company?

A. Right.

Q. Were you involved in those conversations?

A. I was.

Q. Did the ALCOA representatives indicate to you why

they were interested in having you work out some arrangement?

A. They did not, they did not bring up the subject, I was the one who brought up the subject to them.

Q. Did they give you any reasons why they were interested in the tolling arrangement after you brought the subject up?

A. They took the subject back to Pittsburgh, talked it over, and I presume one of the matters or items that they took under consideration is that we would be able to provide the material promptly, whereas they would have to buy equipment; and we had know-how, which they were willing to pay us for under their other suggestion to us. I presume that was a consideration. I wasn't a part of their discussions, I only know they accepted our proposition.

Q. You had know-how and they didn't; is that it?

A. As far as I know.

Q. Now, I believe Mr. Bergson asked you on direct exam-[fol. 1856] ination whether prior to the merger Rome had—I guess the term was, made or considered, made any plans to go into the field of conduit?

A. He did, and I said we had no plans at the time of the acquisition. In keeping with past practice we had made various investigations of whether we should go into that business or not, but at the time of the acquisition we had no plans so to do.

Q. You had deliberated the matter within the company and given consideration to it?

A. Absolutely, that and many other subjects that we never eventuated into plans.

Q. Then Mr. Bergson asked you about the "whither thou goest" meetings and you indicated these were general discussions meetings, that no decisions were ever made there?

A. No decisions could be made; there were recommendations made.

Q. Were recommendations made by this group?

A. Recommendations could be made by this group.

Q. As a matter of fact, were recommendations ever made—well, let me ask you this, Mr. Fraser, if recom-

mendations would have been made, who would they have been made to?

A. They would have been made to the Executive Committee, and the Executive Committee would have—and possibly would have gone to the Board of Directors, depending on what it was.

Q. Were any members of the Executive Committee and Board of Directors in these "whither goest thou" meet-
[fol. 1857] ings?

A. Yes, sir.

Q. Would you identify anybody who was in those meetings at that time?

A. The Executive Vice President; Vice President in charge of Engineering, Marketing, Manufacturing, Sales Manager, Treasurer—I think that covers it—and Secretary—no, the Secretary was not a member of the Executive Committee and we also added the Comptroller and Counsel.

Q. In other words, you had a goodly number of the members of the Executive Committee and the Board of Directors attending these meetings then, didn't you?

A. That's right, but no decisions.

Q. Now, you also were asked about aluminum meetings?

A. Yes, sir.

Q. What did you discuss at the aluminum meetings in general?

A. Whether we should buy a Properzi machine; how we should go about getting into that particular type of business. When we first started out we thought we would have to buy a special drawing machine and that is where the $336,000 came into being, because at that time in our discussions we felt that we should have an aluminum drawing machine, a new one. Later investigation, some months later, some more aluminum meetings later, we found that we could get by by getting a new copper Vaughn drawing machine and convert the elevator supply machine into an
[fol. 1858] aluminum drawing, because that had sufficient capacity to meet our needs.

Q. Is it fair to say your aluminum meetings generally concerned aluminum directly or indirectly, is that a fair statement?

A. That's correct, but I could also produce minutes where we were talking sometimes about new insulating materials.

Q. Would insulating materials relate directly or indirectly to aluminum?

A. These type meetings were just called aluminum meetings; every week we run through the whole gamut of our whole product line.

Q. You insulated aluminum wire and cable, didn't you?

A. Yes, sir.

Q. Now, you were asked about other merger discussions and you mentioned specifically that you had discussions or your company had discussions with Narragansett Wire and Cable, Suprenant and Hi-Temp?

A. I did not say we had discussions. I said that I received a letter or letters, because there were three separate ones, or possibly more, concerning these individual companies.

Q. Well——

A. (Interrupting) The information had come to Pittsburgh, I couldn't even identify from what particular sources, in one case I did know that the Boston district manager had one of his customers with Suprenont and he [fol. 1859] indicated to him that he might like to sell his company. I can't remember how Hi-Temp came into the picture. Narragansett came in from somebody who was authorized to find a buyer for the company. I don't know who he was.

Q. I was interested in Narragansett specifically; I didn't mean to go into the other two. I believe you did make some statement you gave some consideration to Narragansett?

A. I did not—pardon me.

Q. I think you said you gave some consideration to their product line and their plant location?

A. We did that in all three, looking at them.

Q. What did you say about Narragansett?

A. I said we were not interested in their particular type of operation. They made largely building wire. We had capacity for making plenty of building wire. We didn't like their method of distributing their products, let's say, some of their policies, and we were not interested.

Q. You were not interested in Narragansett's product line because it overlapped yours?

A. That was one reason.

Q. If their product line had not overlapped yours may you have been interested from a product line standpoint?

A. I think that is begging the question. Each company [fol. 1860] would naturally be considered from its own merits if we were interested in acquiring, which we were not.

Q. I have one more question, Mr. Fraser, and I approach this with fear and trepidition.

A. How shall I feel?

Q. I am approaching it as a layman to an expert in the field. This is a question I asked Mr. Day this morning and Mr. Day apparently didn't know any more about it than I do, and this relates to the question of copper equivalent. I would like to get something on the record and I am sure you can explain it properly. If you could tell us in language —layman's language. I believe you did testify on direct examination—well, would you state it again so I don't misquote you? I think it would be better if you would state it. What does copper equivalent mean—then I will ask the question.

A. Well, a pound of copper, or, rather, it takes three pounds of copper to produce the same footage as one pound of aluminum.

Q. Three pounds of copper to produce the same footage?

A. That's right.

Q. As aluminum. Now when you say footage, do you mean on the basis of conductivity?

A. No, sir.

Q. Well, now, could you give me that rule of thumb on the basis of conductivity? In other words, I have a particular [fol. 1861] electrical job to do and let's take, for example, number two aluminum wire, I want to run number two aluminum wire; now what would be the copper counterpart?

A. Four.

Q. Number four copper counterpart?

A. Yes.

Q. Now, could you give me an indication how much cop-

per and how much aluminum I would need to do the job, for instance; on the basis of a thousand feet?

A. I don't have those tables right with me.

Q. If we give you the Rome Cable handbook could you use that?

A. Yes—it's been a long time since I have had to deal with these.

Q. I didn't mean to embarrass you, I thought that was something easy.

A. It used to be when I was in the production end of things.

Q. It is not easy for me and I thought I would use this as an opportunity to get it. I would have asked Mr. Schatzel except it didn't occur to me.

The Court: If it can be more accurate by Mr. Schatzel, I will permit you to ask him.

Mr. Bergson: That is perfectly all right.

The Court: No use of us guessing at it.

The Witness: I think I can give you that.

[fol. 1862] By Mr. Melchior:

Q. We looked it up last night and we found it very quickly, so I am sure you can. A thousand feet of number two aluminum weighs how much?

A. Just a minute until I find the aluminum item in here—what size?

Q. A thousand feet of number two aluminum?

A. 61 lbs.

Q. For a thousand feet of number two aluminum?

A. Right.

Q. Now how about its counterpart, number four copper in a thousand feet, what would that weight?

A. Four, you said?

Q. Yes, sir; that is the counterpart, isn't it?

A. Yes, sir; 126 lbs.

Q. So what would the ratio be, would it be one pound of aluminum to two pounds of copper?

A. What did I give you on the other?

Q. 61 lbs. you said for number two aluminum and 126 lbs. for number four copper.

A. That's correct.

Q. It is roughly two to one, rather than three to one, isn't it?

A. For weight, but then when you get into the equivalent size—well, I am just guessing, it is a little over three.

Q. I better let you talk——

[fol. 1863] A. You better let Doctor Schatzel clear that up.

Mr. Bergson: I would be perfectly willing to have Mr. Schatzel come back on the stand and explain it if you would like to have it explained.

Mr. Melchior: You qualified Mr. Fraser as an expert and I am willing to accept his judgment.

Mr. Bergson: As an expert in the electrical industry.

By Mr. Melchior:

Q. You agree with the Rome handbook it takes twice as much copper from a conductivity standpoint as it does aluminum?

A. I would prefer not to answer that question put in that particular way. The gauges say that.

Q. The gauges say that?

A. The handbook.

Mr. Melchior: That's all we have to go by. Thank you, Mr. Fraser.

The Court: Recess until Tuesday morning. Court will recess until tomorrow morning at 10:00 o'clock.

(Thereupon, at 5:10 p.m. a recess was taken in the above action to Tuesday, February 27, 1962, at 10:00 a.m.)

Volume II

TRANSCRIPT OF RECORD

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1963

No. 204

UNITED STATES, APPELLANT,

vs.

ALUMINUM COMPANY OF AMERICA, ET AL.

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF NEW YORK

FILED JUNE 11, 1963

PROBABLE JURISDICTION NOTED OCTOBER 14, 1963

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INDEX

Record from the United States District Court for the Northern District of New York—Continued	Original	Print
Transcript of hearing, February 27, 1962	1864	977
Colloquy between court and counsel	1866	977
Testimony of James R. MacDonald—direct	1875	981
—cross	1894	990
Testimony of Anthony J. Nesti—direct	1920	1004
Offers in evidence	1922	1005
Testimony of Anthony J. Nesti—cross	1938	1013
—redirect	1978	1034
—recross	1984	1036
Colloquy between court and counsel	1984	1036
Testimony of Frank L. Magee—direct	2001	1044
Offers in evidence	2004	1046
Testimony of Frank L. Magee—cross	2043	1066
Testimony of Ralph V. Davies—direct	2062	1076
Offers in evidence	2080	1085

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
Transcript of hearing, February 27, 1962—Continued		
Testimony of Ralph V. Davies—cross	2099	1096
—redirect	2112	1103
Kemp W. Reece—direct	2113	1103
Leon E. Hickman—direct	2121	1107
Theodore H. Kerry—direct	2130	1112
—cross	2143	1118
Thomas L. Gilbert—direct	2147	1121
—cross	2162	1128
—redirect	2170	1132
Testimony of John S. Pendorf—direct	2171	1133
Offers in evidence	2172	1134
Testimony of John S. Pendorf—cross	2175	1135
—redirect	2177	1136
Offers in evidence	2187	1141
Defendants rest	2187	1141
Colloquy between court and counsel	2187	1141
Transcript of hearing, March 1, 1962	2206	1150
Rebuttal argument	2209	1150
Testimony of Leo V. Finn—direct	2209	1151
Offers in evidence	2211	1152
Testimony of Leo V. Finn—cross	2213	1153
—redirect	2226	1160
Testimony of Bernard P. Bernsten—direct	2227	1160
Offers in evidence	2228	1161
Testimony of Bernard P. Bernsten—cross	2245	1169
—redirect	2280	1187
—recross	2282	1188
The Court	2282	1188
Offers in evidence and colloquy thereon	2283	1188
Both sides rest	2290	1192
Motion for a judgment for the defendants	2291	1192
Colloquy between court and counsel	2291	1192
Plaintiff's interrogatories and defendants' answers thereto	3367	1195
Nos. 6, 7, and 9	3404	1195
No. 16	3455	1199
No. 18	3467	1209
Nos. 47 and 48	3562	1215
No. 50	3569	1221
No. 61	3728	1225
No. 63	3741	1236
No. 69	3826	1239
Defendants' answers to plaintiff's interrogatories	3835	1245
Table II	3835	1245
Table III	3850	1261

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
Defendants' answers to plaintiff's interrogatories—Continued		
Table V	3864	1270
Table VII	3874	1277
Findings of fact	4437	1283
Opinion, Brennan, J.	4459	1305
Letter of Judge Brennan dated February 21, 1963, re additional findings of fact to supplement the findings already filed	4499a	1334
Additional findings of fact	4500	1336
Notice of appeal to the Supreme Court of the United States	4502	1337
Clerk's certificate (omitted in printing)	4504	
PLAINTIFF'S EXHIBITS		
3—Letter from Leon E. Hickman, Vice President and General Counsel of Alcoa to Victor R. Hansen, Assistant Attorney General, Antitrust Division, dated April 2, 1959	4505	1339
5—Letter from Frank L. Magee, President, Alcoa to Rome Cable Corporation, dated January 21, 1959	4507	1340
6—Letter from Frank L. Magee, President, Alcoa to A. D. Ross Fraser, President, Rome Cable Corporation, dated January 21, 1959	4509	1342
7—Telegram from Rome Cable Corporation to J. R. Leadham, New York Stock Exchange, Dow Jones & Co., Pacific Coast Stock Exchange and T. P. Phelan, Pacific Coast Stock Exchange, dated January 22, 1959 announcing plans to affiliate with Alcoa	4512	1345
8—Memorandum of Telephone Statement given by A. D. R. Fraser to Paul Windels, Jr., Securities and Exchange Commission, dated January 23, 1959	4514	1348
9—Rome Proxy and Proxy Statement, dated March 3, 1959	4515	1349

[fols. 1864-1865] [Title omitted]

Transcript of hearing—February 27, 1962

* * * * * * *

[fol. 1866] COLLOQUY BETWEEN COURT AND COUNSEL

Mr. Bergson: Before we proceed with the taking of testimony this morning, your Honor, you will recall that at the close of the Government's case, the Government offered a series of some 18 documents relating to these real estate projects that Alcoa has an interest in, and you reserved your ruling on that. I would like to ask if you could consider ruling on it before I put one of my witnesses on, because——

Mr. Melchior: May it please the Court, on that, it is the Government's intention to interrogate one of the witnesses on the documents this morning, probably Mr. Hickman, so if your Honor has any intention of——

The Court: Gentlemen, here is exactly that—I read them, first read them last weekend, and thought of them last night; thought I would discuss the matter with you today at noon. It is just as well that it comes up now. What is the purpose of the documents? Frankly, I can't see anything in them of value either way. What they show is that Alcoa is interested in expanding its market for aluminum, [fol. 1867] and is willing and has entered into arrangements whereby they facilitate the use of their product in certain ventures.

Mr. Melchior: We think it is highly relevant, your Honor.

The Court: On what theory?

Mr. Melchior: On the ground that by this device, Alcoa is in a position to insure that its products are utilized in these projects in which the only connection it has is by the lending of money, and that they do not necessarily own the project involved, but merely advance funds and use this as a wedge or device, and to expand.

The Court: There can't be any dispute, as I would see it, over the fact that this manufacturer devises ways to require the use of its product. So, all right. You have got a big, long, complicated agreement; I don't see anything to it at all.

Mr. Bergson: Well, I couldn't appreciate the relevancy of these documents. I objected to them the other day and I still can't——

The Court: I don't think they are particularly harmful. [fol. 1868] There is nothing hidden or secret about it, as I see. They refer to a lot of negotiations, agreements, whereby the business venture is entered into, no question about it. The object, I suppose, of the Aluminum Company was to have an outlet for its products, and apparently, as I read them, to have the buildings be a show place for the use of aluminum. I think that is all there is to it. Whether their agreement was good or bad, whether they win or lose any money, I am not interested. I would be inclined to think I would sustain the objection to them. One more thing. Each one of them was stamped with notice that they are protected by some protective order entered by some Judge in Missouri.

Mr. Bergson: Yes, your Honor.

The Court: I don't know what that order is.

Mr. Bergson: Well, in that case, in which we also represented Alcoa, the Government filed a very, very broad discovery motion. Judge Moore, out in St. Louis, granted the Government's motion in toto, and on his own motion [fol. 1869] in granting it in toto said, "In view of the scope of this order," in effect, "we will have these documents subject to a protective order."

Now, when the Government got these documents in this other case, the Cupples Case, you are familiar with that, we had discussed it in our pretrial procedures before.

The Court: I know the name, that's all.

Mr. Bergson: The attorneys in that case felt that they might have some bearing in this case. Miss Lungren, who you may remember, who was with Mr. Karp in this case for a while, is on that Cupples case. They called us and said that they were going to make a motion out in St. Louis to have the protective order amended so that they could use these documents in this case. We said we didn't think these documents are relevant to this case, but we certainly are not going to hold you to the protective order and we gave them a letter saying without waiving any rights to our right to objection as to the materiality that they were free

to turn the documents over to this staff in this case. Isn't [fol. 1870] that right, Mr. Melchior?

Mr. Melchior: That is my information, which came from Mr. Bergson by telephone, that in so far as these documents are concerned, they are no longer covered by the protective order.

Mr. Bergson: In so far as this case is concerned.

Mr. Melchior: In this particular proceeding.

Mr. Bergson: This Alcoa-Rome case.

Mr. Melchior: So there would be no problem for the Court here on that.

The Court: The thing that bothers me, of course, is if I go in, let them in, the Defendant can be here a week explaining each of these details on these negotiations. The documents themselves refer to negotiations with different parties, representatives of Alcoa, Mr. Zeckendorf, and all of them, and I can't for the life of me see how they are material when we get down to the ultimate result, and it is not disputed. The Government is taking this kind of position, which is a hard one for me to follow, that what has hap- [fol. 1871] pened after '59 is not particularly relevant.

In their charts they don't put in any record of these conduit, these lines of commerce, to include 1960, saying, "Well, that is more or less unimportant. That what happened afterwards, the question is as to whether or not it is likely to affect competition." Well, if I understand it right, this bunch of papers, this so-called Cuddles, is it?

Mr. Bergson: Cuddles Case. I wish it were.

The Court: That happened after this merger.

Mr. Bergson: I beg your pardon?

The Court: Didn't that happen after this merger?

Mr. Bergson: Yes.

Mr. Melchior: If I may comment on that, your Honor.

The Court: Yes.

Mr. Melchior: The Government didn't fail to bring the statistics up to '60 and '61 because it didn't think it was relevant, but there has to be a cut-off period at some time. [fol. 1872] The Court: Yes, I remember your arguing it very well.

Mr. Melchior: We had to canvas the whole industry to get the statistics and they were based on the latest here at the time——

The Court: I don't think that is quite true. I think this Doctor testified that he had the statistics.

Mr. Melchior: In cerain cases we had a universe, but from the companies in the wire and cable, we didn't have industry statistics complete.

Mr. Bergson: But for the universe and Alcoa and Rome they had them.

The Court: That is my recollection. Your argument was just the opposite to what your arguement is now. I am going to sustain the objection and keep them out. My reason is I don't think they are important. I think we open this case up to an exploration that is not particularly relevant or important to the ultimate issue that we have here. There [fol. 1873] cannot be any dispute about the happening of this. There is an agreement but whether Zeckendorf conferred with Hickman or Hickman went to New York to confer with anybody else, I don't see any importance to it. If you put them all in, you have to call anyone mentioned in them to explain them and so the Government may urge an inference from them. Al- there is to it is that they were seeking through a combined financial arrangement to insure that certain buildings or certain structions will be a show place for Alcoa's products and broaden the sales.

Mr. Melchior: There are references in certain of these documents, your Honor, and I am not sure whether you are excluding them all or not, but there are certain references in these documents to the acquiring of properties and the use of the acquired properties, not only Rome but Cupples and Rea, their use in supplying these buildings and the probable effect they would have on keeping out the same products made by their competitors.

Does your Honor have any objection to interrogating [fol. 1874] witnesses on these items and then re-offering them?

The Court: No. You can go ahead. I will stop you if I think you are going too far.

Mr. Melchior: Sure.

The Court: I don't want to get into a controversy—I guess there are a couple of deals in these transactions.

Mr. Melchior: Several. That is going to be the import of the testimony I want to elicit.

The Court: There can't be any dispute about it. All

right. I will sustain the objection and exclude them at this time.

[fol. 1875] Mr. Bergson: I call Mr. MacDonald.

JAMES R. MACDONALD, called as a witness on behalf of the defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Bergson:

Q. Mr. MacDonald, will you please state your name and address for the record?

A. My name is James R. MacDonald, I live at 375 Wichwood Road, Westfield, New Jersey.

Q. By whom are you employed?

A. I am chairman and president of the board of General Cable Corporation, 730 Third Avenue, New York City, New York.

Q. Are you chief executive officer of General Cable Corporation?

A. I am.

Q. In what business is the General Cable Corporation engaged?

A. Our main business is in the fabrication of electric wire and cable.

Q. Do you also manufacture conduit?

A. We manufacture a small amount of conduit, yes.

[fol. 1876] Q. How long have you been employed by General Cable Corporation?

A. I started in January of 1940 as assistant to the vice president in charge of sales. I became director of sales in 1941, vice president in charge of sales in 1941—I think I am right on these figures—and executive vice president in 1949. President in 1952, I believe it was, and chairman of the board in 1954 and '56.

Q. And you have occupied those positions continuously since that time?

A. That's right.

Q. Now, Mr. MacDonald, what were the annual sales of General Cable in the year 1961, do you recall?

A. Roughly 167 million dollars. You want the exact figure?

Q. Well, that's close enough.

A. All right.

Q. And what were they in 1960?

A. Approximately 165 million dollars.

Q. Now, Mr. MacDonald, is General Cable affiliated in any way with any copper producer?

[fol. 1877] A. American Smelting and Refining Company owns approximately 36 percent of General Cable Corporation, and in varying percentages of around that same figure has owned, since 1927 or '28, someplace in that period. Their common stock and preferred stock, according to our proxy statement, is 37.28 percent.

Q. Now, does any producer of primary aluminum own any stock in General Cable Corporation?

A. No.

Q. Does American Smelting and Refining own any stock in any primary producer of aluminum?

A. American Smelting and Refining owns in the 30 percent—I don't know exactly where—of Revere Copper and Brass. Revere is a joint owner. I don't know the exact figures, but I would guess in the neigborhood 50—40 to 60, I think the spread is, in a company called Ormet, which produces——

Q. Do you as president and chairman of the board of General Cable consider General Cable to be an integrated aluminum company?

A. No, not at all.

Q. In your wire and cable products, what metals do you [fol. 1878] use as the conductor metals?

A. Whatever the customer wants. We are fabricators. We are not producers of raw materials, so our job and our function is to have the equipment, engineering and the product design to meet a customer's requirements. So we make copper, we make aluminum, we make steel wires, whatever the requirement is. We make brasses and bronzes in the wire field.

Q. You are equipped to make insulated wire and cable, irrespective of what the conductor is?

A. That's right.

Q. Now, in making cable with aluminum as the conductor,

and in making cable with copper as the conductor, can the same machinery be used?

A. Yes, the machinery is fundamentally interchangeable. On the wire drawing side, there is a different dip system required on aluminum versus copper, but it is a minor change-over. But the equipment is the same equipment.

Q. Now, in the conduct of your business, has A.S.R.—American Smelting and Refining—attempted in any way to influence General Cable in the type of conductor metal it [fol. 1879] uses in its products?

A. No.

Q. And the determining factor on what conductor metal you use is the demand of your customer?

A. That's true.

Q. Now, Mr. MacDonald, General Cable purchases aluminum for its aluminum wire and cable products?

A. That's right.

Q. Within the last four years can you tell us what your total purchases of aluminum were? That's 1958, 1959, 1960 and 1961.

A. I will give you our purchases, which are not necessarily exactly in conformance with our shipments. Everybody in a "lifo" business, which our metals are, our accounting structure is on a lifo method of accounting, particularly on raw materials.

Q. And lifo means last in, first out?

A. That's right. So that in any given year our purchases of basic materials may go up or down, depending on our lifo position for that particular year. So that these figures [fol. 1880] will be a little bit out of balance on usage.

Q. But in a period of years they would balance out?

A. That's right. In 1958 we purchased 17—you want exact or round figures?

Q. Well, round figures.

A. 17¾ million pounds. In 1959, where we had large purchases in December, it was 26 million, 5. In 1960 it was 17 million, 9 and in 1961, 19 million, 3.

Q. Now, of the 17 million 7 that you purchased in 1958, how much was purchased from Revere?

A. 4,140,000.

Q. And from Alcoa?

A. 13,186,000.

Q. And in 1959, where you had 26 million 5, approximately how much was purchased from Revere?

A. Nine and a half million.

Q. How much was purchased from Alcoa?

A. 14 million 8.

Q. And in 1960, when you had approximately 17 million 9, how much was purchased from Revere?

A. Four million nine.

[fol. 1881] Q. And how much from Alcoa?

A. Six million eight.

Q. And in 1961, when you had 19 million 3, approximately how much was purchased from Revere?

A. Three million five.

Q. And how much from Alcoa?

A. Six million three.

Q. I notice that these totals don't—I mean the amounts purchased from Alcoa and Rome don't add up to the total. Do you purchase aluminum from other sources?

A. Yes. Starting in 1959 other sources of aluminum became available, and we like to spread our business around.

Q. Now, have you purchased any foreign aluminum?

A. We purchased some foreign aluminum in 1954 and '55. We did not in the years that you are asking for.

Q. Why didn't you purchase foreign aluminum in these recent years?

A. Well, we had an adequate supply domestically. We like the service of the people we buy it from. We believe in protecting American industry, to be honest about it.

[fol. 1882] Q. But would it be available to you if you desired to purchase it?

A. Oh, yes, sure. Plenty.

Q. The acquisition by Alcoa of Rome Cable took place on April 1st, or March 31st, 1959. Since that time has General Cable expanded its plant capacity for the production of these so-called overlap products which are shown on the product chart here which is defendant's Exhibit AR-20? This is ACSR, all aluminum cable, aluminum line wire and aluminum multiplex.

A. We previously, up to 1959, made aluminum products of that type and other types in our St. Louis plant. We built a new plant in Quincy, Michigan, which came into operation about a year—about, oh, November or December

of 1960, and moved our equipment out of our St. Louis plant up to Quincy, and added to that equipment, so that the capacity of Quincy is probably, oh, twice what it was in the old St. Louis plant. At about the same time we built a plant in Sanger, California and moved some equipment out of our Emeryville, California plant, which was making [fol. 1883] aluminum products, added to that equipment and now that plant at Sanger, California is about half of the capacity of the plant is in aluminum products and roughly half in Emeryville. We have added to our Tampa, Florida plant since that period in the production of aluminum products.

[fol. 1884] Q. I am talking about these particular products.

A. Yes. Well, utility types of products, yes.

Q. Right. Now, Mr. MacDonald, have you in recent years, say from 1956, experienced any difficulty in obtaining your aluminum needs?

A. No. Let me see. '56. When were controls over?

Q. I think controls ended in '54 or '53.

A. Since controls, we have had no problem.

Q. And the problems that you had prior to the period you just mentioned were due to Government control and allocations?

A. Yes. Through Korea all aluminum and copper were on an allocated basis, so we were restricted as to what we could buy.

Q. During that restricted period when you were restricted as to aluminum and as to copper, did you make such products as you could with the material that was available to you? That is not a very clear question.

A. This question I will have to answer indirectly because in any allocated period copper and aluminum per se were controlled materials not as to raw material but the finished product. So that the customer had to get the authority to [fol. 1885] give us a piece of paper that would allow us to get the raw material or make the product for him.

Q. And whatever the customer got you you made for him?

A. That's right.

Q. Did it make any difference whether it was aluminum or copper?

A. No.

Q. Do you have any views as to the future supply of aluminum?

A. Well, I would like to read, I have a copy here, your Honor, or our, it is a draft of our annual report for 1961, which is not in final form, but it goes to our stockholders in about two weeks. And I think in answering your question, and here is the statement I made which I quote:

"With world capacity for production of aluminum well, in excess of demand, producers of aluminum continued in 1961 to operate at reduced capacity. The severe competition for available domestic business resulted in a reduction in September, 1961, in the price of aluminum ingot of 2 cents a pound. This reduction had no impact on the earnings of the corporation under this method of lifo evaluating inventories."

[fol. 1886] I think that is a better answer to give you.

Q. That is what you are saying to your stockholders?

A. That's right.

Q. Talking about this lifo method of evaluating your inventories, how does your company purchase aluminum, in terms of firm price as against price at time of delivery?

A. It is our system on all of our basic raw materials to always try to purchase at the price in effect at the time of shipment to us. Because we, over the years, have worked with our customers in the same way, on our finished product. In other words, most of our finished products are sold to the customer with metals being priced in effect at time of shipment. So that we, both sides, the utility and the cable company has taken the gambling effect out of the metal side of the picture.

Q. So if you were offered an opportunity by your supplier to purchase either on a fixed price, firm price basis or on a price in effect at time of delivery, which method would you choose?

A. Price in effect at time of delivery. I am not smart enough to know how metals are going to go.

Q. And you consider this sound business judgment?

[fol. 1887] A. If I may be a little jocular on it, if I were smart enough to know how to make money out of the

purchase and sales of raw materials, I am going to close 32 plants and open a little office in Wall Street to do my speculating there and get out of these labor problems.

Q. Mr. MacDonald, in these products that are on this board, which is Defendants' Exhibit AR-20, is there any foreign competition in the sale of those products?

A. As yet I have seen none. I do believe that some of our customers are bringing in the basic raw material. I have no way of knowing it except through gossip. I have seen as yet no competition on the finished product by the finished wire and cable manufacturer.

Q. As an executive, as the top executive of a substantial company in the wire and cable business and having been in the wire and cable business yourself for over twenty years, do you foresee a probability of any substantial competition from foreign aluminum in these products?

A. Well, again, I would like to read, and I think it phrases a little better than I could offhand, part again of the Chair-
[fol. 1888] man's letter to our stockholders under the heading of imports.

> "The Import Committee of the wire and cable division of the National Electrical Manufacturers Association formed in 1960 continued its activities to obtain appropriate protection for domestic producers. The indications are that the recently concluded negotiations under the General Agreement on Tariffs and Trade revised the previous government protection of 15 percent ad valorem on imports to 12 percent; the excise tax of 1.7 cents per pound on the copper content of imported wire and cable was not subject to negotiations under the agreement. The current tariffs are completely inadequate to protect domestic producers against the materially lower costs of foreign producers as well as their pricing policies on exports in the United States. The recently enunciated program of the Administration for drastically revising our basic concepts with respect to foreign trade could in its present form have a serious impact on the future of the wire and cable industry. The Corporation is work-
> [fol. 1889] ing closely with the Import Committee in

preparing constructive proposals on exports and imports for presentation to the appropriate government agencies."

Q. If I were to try to paraphrase that, would it be a correct statement to say that you foresee in the future that foreign competition will probably have an effect on the wire and cable industry in general and on aluminum wire and cable products as well?

A. Yes.

Q. Now, you stated earlier in your testimony, Mr. MacDonald, that General Cable Corporation is in the conduit business as well?

A. That's right.

Q. Where do you manufacture that conduit?

A. In Baltimore, Maryland, near Sparrows Point.

Q. That is what type of conduit, what metal is it?

A. Steel,

Q. In the sale of your steel conduit do you consider steel to be in competition with aluminum conduit?

A. Very much so.

Q. Do you market your conduit on the West Coast?

[fol. 1890] A. Yes, we do.

Q. How do you ship to the West Coast?

A. By boat.

Q. By boat from Baltimore?

A. That's right.

Q. Do you find that in shipping by boat from Baltimore to the West Coast, that your company is at any competitive disadvantage with a manufacturer of conduit located on the West Coast.

A. We could be in a difficult position in his immediate area, but once you get away from his immediate area he can't meet my freight cost. In other words, my freight cost out of Baltimore by boat is roughly the same, whether it is Los Angeles, San Francisco, or Seattle. So, he would only hit me in the one area that he was in.

Q. Which is Los Angeles, if the plant was located in Los Angeles?

A. Yes.

Q. Now, Rome Cable has a plant in Torrance, California, which is in the vicinity of Los Angeles. Do you consider

that you have a competitive advantage over Rome Cable in San Francisco?

A. Yes.

[fol. 1891] Q. Do you consider that you have a competitive advantage over Rome Cable in any of the areas north of San Francisco?

A. Yes.

Q. And any of the area south of San Francisco?

A. Yes. Do you want to go to Hawaii?

Q. No. I would love to, but not now. What would be the particular geographical area that you might be at a disadvantage competitively with the Torrance Plant, if any?

A. I would say in the area, I don't know enough of the freight maps any more, but I would guess within a 50-mile area or 75-mile. It depends on the freight situation.

Q. Of Torrance, within a 50 or 75-mile area of Torrance you might be at a disadvantage?

A. That's right.

Q. Mr. MacDonald——

The Court: Just before you go to that, Mr. Bergson, I don't believe I quite understand that, Mr. MacDonald. Why wouldn't you have an advantage, let's see, you said you would have an advantage, why wouldn't the Torrance Plant have an advantage over you who have to ship from Balti- [fol. 1892] more, assuming that they are shipping 200 miles from the place of their manufacture?

The Witness: Judge, our freight rates, freight methods, in the United States are not altogether completely logical. The cost of shipping by boat from Baltimore through the Canal to Los Angeles is almost the same or identical as though I ship by boat from Baltimore through the Canal to San Francisco or if I ship from Baltimore through the Canal to Seattle. Now, the manufacturer out there, and we have this problem with our own cable plants, a manufacturer out there, if he has to ship from Los Angeles area, has to go by truck or train or wait for that unusual boat that might hit Los Angeles, and Seattle and I would say his freight cost would be greater than my freight cost.

By Mr. Bergson:

Q. I think one other factor that would help you to explain this for the Judge would be this: Does a plant located on the East Coast pay less for its raw material?

[fol. 1893] A. Sure.

Q. Than a plant located on the West Coast?

A. That's right.

Q. And this is due to the pricing policies in the steel industry?

A. Yes, because of their freight conditions. Freight is a big element on conduit.

Q. Do you know, Mr. MacDonald, whether or not since March 31, 1959, General Cable's sales of aluminum wire and cable products have increased or not?

A. If I could leave out one customer, I would say they have increased. We lost a very large account in 1959, end of 1959, and we shrunk back. A very large account. Since then we have gradually rebuilt our business. Not with that account, I am sorry to say.

[fol. 1894] Q. Let me ask you this, Mr. MacDonald, has the acquisition of Rome Cable by Alcoa adversely affected General Cable in its business?

A. I would say no, not at all.

Q. Do you foresee the probability in the future that this acquisition will affect General Cable in its business?

A. No.

Mr. Bergson: Your witness, Mr. Melchior.

Cross-examination.

By Mr. Melchior:

Q. Mr. MacDonald, on direct examination you were asked by counsel if you considered your company to be an integrated producer of aluminum wire and cable, I believe.

A. That's right.

Q. You stated you did not?

A. That's right.

Q. What do you understand the term integrated producer of aluminum wire and cable to mean?

A. I would say a company that produces from either bauxite or alumina through the cycle.

[fol. 1895] Q. Through the cycle?

A. Of pig to rolling, wire drawing, to the finished product.

Q. Where does your company start, as far as aluminum wire and cable is concerned—with what raw material?

A. We start either with pig or with the rod.

Q. You start with pig or rod?

A. That's right.

Q. And you acquire your pig from others?

A. That's right.

Q. And I believe you indicated that over the period of 1958 to 1961 you had acquired substantial percentages from Alcoa and from Revere?

A. That's right.

Q. Now, I believe you also spoke of a stock relationship between General Cable and American Smelting and Refining, called ASARCO?

A. That's right.

Q. You indicated that ASARCO owns a substantial block of stock in General Cable—I didn't hear the percentage you gave.

A. It's of the voting stock. It is 37.28 percent.

[fol. 1896] Q. ASARCO, you estimated, owns about 37 percent of the voting stock of your company, General Cable?

A. That's right.

Q. I believe you also spoke of a stock relationship between ASARCO and Revere. Did you indicate what percentage of stock ownership?

A. I don't know exactly, sir, but I would guess in the neighborhood of 35 percent.

Q. Something in the 30's between ASARCO and Revere?

A. That's right.

Q. You also spoke of a stock relationship between Revere and a company called Ormet.

A. That's right.

Q. I believe you stated that Revere and Olin each owned about 50 percent of the stock of Ormet, is that correct, just in round figures, something like that?

A. I would say.

Q. And under this stock arrangement, or by collateral agreement, is there any understanding between Olin-

Mathison, Revere and Ormet as to the disposition of stocks of pig aluminum that is produced by Ormet?

[fol. 1897] A. Well, I am giving now my impression rather than actual facts, but I understand in the agreement between Olin and Revere in establishing Ormet, that Olin underwrote 60 percent, I believe is the figure, of the output of the Ormet operation, and Revere underwrote 40 percent of the output of the operation. I believe that's it.

Q. What business is Ormet engaged in?

A. Producing aluminum.

Q. Primary aluminum? Aluminum pig and ingot?

A. That's right.

Q. Now, how many directors are there on the board of General Cable, Mr. MacDonald?

A. Fourteen.

Q. Is this in the year 1960?

A. 1961.

Q. Now, of these fourteen directors on the board of General Cable, do you know how many of these same persons are also officers or directors in SARCO?

A. Yes. Six.

Q. Six out of the fourteen are also officers and directors in ASARCO. Now, for the years immediately preceding [fol. 1898] the year 1961, do you know whether there have been officers or directors of ASARCO who were also directors of General Cable?

A. Oh, yes, I would say roughly the same percentage.

Q. Has this condition existed for some time?

A. That's right.

Q. For how many years would you say, if you know?

A. My own knowledge, at least since 1940. I presume the records would indicate that it went back to the original formation of General Cable Company in the late 1920's.

Q. I see. Now, do you know of your own knowledge how many directors there are on the board of Revere Copper and Brass in 1961?

A. I do not.

Q. You do not know?

A. I could guess, if you want me to guess. I do not know.

Q. Can you estimate about how many?

A. I don't know.

Q. Do you know what directors on the board of Revere are also officers or directors of the ASARCO?

[fol. 1899] A. Phrase that question again please.

(The pending question was read by the reporter.)

A. I don't know. I don't think so.

Q. You do not think so?

A. I do not think so. I don't know, honestly, but I do not think so.

Q. Do you know a Mr. R. D. Bradford?

A. Yes, sir.

Q. Do you know whether he is a director in Revere?

A. I believe he is.

Q. Do you know whether he is a director of ASARCO?

A. Yes, sir.

Q. He is?

A. I think he is, yes.

Q. Are you familiar with F. G. Hamrick?

A. You phrased your question—or did I misunderstand your question? Didn't you ask me if there were any officers of Revere that were directors of American Smelting?

Q. What I am trying to find out is if any of the officers [fol. 1900] or directors of Revere are also at the same time officers and directors of the ASARCO.

A. If I could ask you the question the other way—are any of the officers and directors of American Smelting directors of Revere, I would say yes.

Q. Yes. Well, now, of the number on the board of directors of Revere——

A. I don't know.

Q. You don't know that. Do you know whether Mr. Hamrick stands in that position?

A. I would not know.

Q. How about J. D. Mackenzie?

A. I would be sure he would be.

Q. I didn't hear you.

A. Yes, he would be.

Q. How about S. E. Strauss?

A. I wouldn't be sure.

Q. How about Mr. E. Tittman?

A. I would believe he would be, yes.

Q. He would be?

A. I think so.

Q. How about R. W. Vaughn?

A. I would think he would be.

[fol. 1901] Q. Now, I believe on direct examination when you were discussing the two suppliers of aluminum to General Cable, and you spoke of Revere and Alcoa, I don't know whether or not you indicated these were the two major suppliers or not, and I ask you are these the two major suppliers?

A. They were in 1958 and '59. And previous to that it would have been Alcoa almost complete. But then in 1960 we started diversifying as other sources came into availability to us. For instance, in the figures I quoted in 1960 we purchased approximately 18 million pounds—17 million 9, with about seven million of that purchased from people in Revere or Alcoa.

Q. Can you state how many other companies there were supplying, if you know?

A. I would say three or four. And in 1961 roughly half of our purchases were a total from Revere and Alcoa, and the other half in round figures from other people.

Q. From three or four?

A. Kaiser; Anaconda.

Q. You say you started diversifying around 1959 or 1960. What do you mean, you started diversifying?

[fol. 1902] A. Buying from more of the other people.

Q. Why did you do that?

A. It's just good business. We don't like to ever have our basic raw materials in the hands of only a few suppliers, but at certain periods that was all we could do. But as Anaconda aluminum came into available source, we started moving in there. As Kaiser started selling rod, we started going to Kaiser. It is just good ordinary business practice to diversify.

Q. In other words, from a business standpoint you feel it is competitively desirable to have a wide number of suppliers and not be limited to——

A. That's right.

Q. I see. You spoke of foreign sources of pig. How readily available are foreign sources of pig, Mr. MacDonald, today?

A. I don't quite understand your question.

Q. Did you purchase any overseas?

A. No.

Q. Why not?

A. I think I explained that. We like the service we get from the suppliers in the United States. We have assur- [fol. 1903] ance of our records with them that in times of shortage they will take care of us. We do not have to carry big inventories, because they are right in our back yard. They will work with us engineering-wise. Why should we buy from——

Q. There would be more problems involved in purchasing overseas?

A. Of course.

Q. What would some of these problems be?

A. One would be the first question of a much bigger inventory on the part of myself because of shipping time. Much greater gamble on the pricing structure because of the longer shipping time. The question of better inspection, if there was a shipload coming in that was not proper. The question of handling it, getting it back to them is a greater problem.

Q. Do you consider your company one of the leading purchasers of aluminum?

A. No. I would say of the independent aluminum people we are probably a good source, but I don't think in the aluminum field that ten thousand tons a year is a big customer. I don't think it is classified as a big customer; I [fol. 1904] don't know. The aluminum people would know better than I on that.

Q. I want to understand your answer. You say you do not consider General Cable to be a large purchaser of aluminum?

A. We are purchasing in the neighborhood of ten thousand tons of aluminum per year. I believe the American production of aluminum is in the neighborhood of two million tons, someplace in there, so I wouldn't consider ten thousand in relation to two million a big purchaser of the product.

Q. I think your figures—do you think your figures indicate that you are becoming a larger purchaser of aluminum?

A. I think we are moving up as the demand moves up.

Q. From your knowledge of the aluminum wire and

cable business do you think your requirements of aluminum will increase in future years?

A. Yes.

Q. Why?

A. I think we are a better merchandising organization than our competitors, and I think we will get a bigger per-
[fol. 1905] centage of the business.

Q. Do you think your requirements for aluminum will increase in the same rate or greater or lesser rate of your requirements of copper for conductor wire and cable?

A. Gee, I wouldn't know how to answer that.

Q. I am asking you as a business estimate now. You have been in the business for some time.

A. I wouldn't think so. I think our percentage of the available aluminum conductor market would be relatively increasing on the same relative basis as our percentage of copper conductor wire.

Q. You think you will keep up the present balance in the future?

A. I think so.

Q. What is the balance today on a percentage ratio basis, if you can state?

A. You have got to interpret with me a little bit.

Q. Well, let's do it—first we can do it on a poundage or tonnage basis.

A. That's the easier way, but you have got to again interpret. Aluminum is one third the weight of copper. So
[fol. 1906] ten thousand tons of aluminum per year is the equivalent of thirty thousand tons of copper for a given amount of wire and cable. We would average probably, of our own copper, not total, in the neighborhood of 150 million pounds of copper a year. So if you add 30,000 tons, or 60 million, to that, to the aluminum average, it would come to 210 million pounds total, of which copper would be 150 over 210—75 percent—about 70 percent is copper.

Q. And the ratio is between 60 and 150 for a total of 210 on a poundage basis?

A. Approximately.

Q. And it is in favor of copper, is that right?

A. That's approximate.

Mr. Bergson: Are you sure that was poundage or on an equivalent basis?

The Witness: On an equivalent basis. Not a poundage basis.

Q. An equivalent basis on weight. A weight equivalent base.

A. For one pound of aluminum I get the equivalent in footage of three pounds of copper.

Q. It is on a footage basis then?

[fol. 1907] A. Footage.

Q. And if we put it on a poundage basis, it would be 150 to 20?

A. That's right.

Q. If we put it on conductivity basis what would it be?

A. Two to one.

Q. 40 to 150 in favor of copper?

A. Yes.

Q. And you expect the same ratio to continue as far as you can determine?

A. As far as we can determine, yes.

Q. Are you going to push aluminum more than copper?

A. No. We fabricate. I keep on emphasizing that, that we are not raw material producers. General Cable is a fabricating company. We honestly don't care what the customer wants. We are equipped to make it. That's it.

Q. From your own knowledge of the market, Mr. MacDonald, do you think aluminum is going to replace copper in the electrical conductor field to a substantial degree?

A. I think it already has in certain fields. This type of [fol. 1908] material is probably today—I am just guessing—around 80 percent of the overhead lines today are probably aluminum. My own feeling is that aluminum has made—I don't think the aluminum people will like this statement but I believe aluminum has already made into the wire and cable field its great advance. From now on, I doubt very much whether it will take over many more important elements of the wire and cable field.

Q. Do you think there are certain areas in the electrical conductor wire and cable field that aluminum may never displace copper?

A. Yes.

Q. Would you amplify that a little bit, please?

A. Well, I would say on heavy underground cables it is difficult to believe, unless there is something completely out

of line such as wars, substitution of materials—I can't believe that aluminum will ever take the place of copper in underground cables, because of lower conductivity of aluminum, the conductor gets bigger, the insulation gets bigger, the duct system gets bigger and the economic advantages [fol. 1909] of aluminum on overhead lines are lost. The weight effect is lost because with the duct system you don't care and the duct system takes up the saving in the cost of the conductor. So I doubt in my own mind whether in that field or in the telephone field aluminum will ever become a factor as a conductor.

[fol. 1910] Q. Would you tell us why in the telephone field?

A. For the same basic reason it is a little harder to draw. It is much harder to strip on finer size with your telephone wires in copper moving into the 26 gauge, which would be 28 or 9 gauge in aluminum—you engineers correct me—and I would guess that they are stripping in there on a big, big bare 18 cable and if they nick that aluminum a little bit the aluminum is shot. I believe that the Western Electric Company of the Bell System has been experimenting for many, many years in the use of aluminum conductors for aluminum cable, and it is still in the experimental stage.

Q. How about in the field of extremely fine conductor wire?

A. Well, I would rather have one of our fellows answer that, but I don't believe any of us have been able to find out how to draw anything below, I guess, either 32 or 33. I think I am right. Sam, do you want to——

Q. We are interested in your knowledge on the subject, Mr. MacDonald. I am not sure I understand what you said about it.

A. I do not believe any of us in the wire and cable field [fol. 1911] have found it feasible as yet to draw the aluminum into the finer sizes. I do not believe—well, I don't know what the breaking point is. We can draw copper down to 55 gauge but aluminum, it is some place in the 30s, the breakage size.

Q. Do you think you have as much know how in your company as the other wire and cable companies in this nation?

A. I would think so.

The Court: That is a modest answer.

Q. As a matter of fact, isn't it true that your company is the largest wire and cable company in the nation?

A. That is true.

Q. How about in the field of flexible cords and things like that, what opportunities do you think exist for aluminum in that field, the welding cables?

A. In the welding cable, aluminum is already in there pretty well.

Q. Has it been a satisfactory——

A. Oh, yes. In fact, in certain uses it has better use than copper.

Q. Has some advantages over copper?

A. Yes, because of its lightness. A man can handle a welding coil of aluminum without a helper, more so than [fol. 1912] he can with copper.

Q. It will be lighter, but it will be bigger in the different size?

A. That doesn't hurt it.

Q. How about in other flexible cords?

A. What we know in the industry as flexible cords is the small wires and I would question whether they will ever get into that type of wiring.

Q. I was listening to your testimony about these new plants you opened in various places. You mentioned specifically Quincy, Sanger, California and some additions in Tampa, Florida. And St. Louis, I believe you mentioned. Are those all aluminum expansion or just wire and cable expansion?

A. Wire and cable. But as it happens the one in Quincy, Michigan, is completely aluminum. We are making no copper products there at all.

Q. Your company make any acquisitions of wire and cable companies since January, 1961?

A. I think, as you well know, Mr. Uncle Sam has a suit started against us for the acquisition of seven or eight companies, I believe, are mentioned in the suit. Wait a minute, since what date?

Q. I wasn't fishing for that, Mr. MacDonald, but it is [fol. 1913] all right if you put it in the record. That is why I said take '61, so you wouldn't have to answer that.

A. I didn't think fast enough.

Q. But I will agree it is true.

A. No, not since January, 1961.

Q. I don't know whether I should ask you this question or not, and I am not going to insist on your answering it if you don't want to, because of trade secrets, but you indicated that your sales of aluminum had been constantly up except for the loss of a large customer in 1959, but that after that they had been going up. Is there any reason why you shouldn't identify that customer? If you would rather not, I would not ask for the name.

A. I don't believe anything will be accomplished——

Q. All right.

A. But I will answer backwards to get at what you are asking. The customer was not taken away from us by Rome or by Alcoa or by an integrated company.

Q. Shall I conclude from that that a non-integrated company took it?

A. I don't know what else you can conclude.

[fol. 1914] Q. Is this an unusual situation or a usual situation?

A. I hear so much from our small competitors in the wire and cable business that they can't compete with the other companies, and I always get a thrill when one of them takes an account like that away from me, which he did do.

Q. I am glad to hear that, too, Mr. MacDonald. Now, I think that Counsel directed your attention to the so-called overlapping product board here, and I am not going to go into details, but he did inquire as to whether you get any competition from overseas in these products and I believe your answer was no, and then I believe he asked you did you expect some in the future, and I am not sure what your answer was.

A. My answer is as tariffs are reduced in the United States we certainly do expect competition on these products from overseas.

Q. Then there hasn't been any to date and you think it is because of the tariffs?

A. I think that is what is keeping it out as of today. Now, with the new reduction in the ad valorem from 15 to 12 per cent, my guess is that that might get these products into

that stage, if it gets any lower than the 12 per cent, I am [fol. 1915] definite it will be in that stage.

Q. You think this will be a strong competitive force?

A. I do.

Q. Do you think you will receive price competition from this foreign export?. Will it be on a price basis or some other basis?

A. It will have to be on a price basis.

Q. Couldn't be on a service basis very well?

A. No.

Q. For the reasons you enunciated earlier?

A. That's right.

Q. Does General Cable produce any aluminum conduit, Mr. MacDonald?

A. No, sir.

Q. All your discussion with counsel on direct had to do with steel conduit?

A. That's right.

Q. Have you people ever considered going into the aluminum conduit business?

A. We have made, as any company does, a series of studies—we got studies going on now—as to feasibility of going into the aluminum conduit. Whether we will ever or not, I couldn't at this date say.

[fol. 1916] Q. Are you presently considering it?

A. We are continuously considering.

Q. No decision has been made either way as yet?

A. No. That's right.

Q. Now, you mentioned in connection with your shipments of steel conduit out on the West Coast, and you discussed in connection therewith the freight problem and you indicated that you could ship by water from Sparrows Point around through the Canal up into some parts of the West Coast and compete price-wise with the West Coast producers?

A. If it is not made within the same area.

Q. Now, do you mean if the conduit is not made within the same area?

A. That's right.

Q. Of the pipe from which the conduit is made?

A. The conduit. The finished product.

Q. As a matter of fact, how is conduit, and I am refer-

ring to steel conduit, priced? Is it—well, you explain it to me. What is the pricing scheme that is used in the steel conduit that you ship out to the West Coast and the price that you charge? Do you include freight or exclude it? Is [fol. 1917] it f.o.b. West Coast or f.o.b. Clifton?

A. I will be honest, I don't know. We handle a great, great many products in the wire and cable field and practically all of them have a different pricing method. I don't believe I would know, unless you want to give me time to get the information to find out exactly.

Q. No, that is all right. But you do know that you can ship steel conduit into——

A. That's right.

Q. (Continuing) the Los Angeles area and compete with steel conduit being fabricated out there?

A. That's right.

Q. And you have done so regularly?

A. West Coast is one of our better markets for Clifton.

Q. How about St. Louis?

A. St. Louis is not a good market for us.

Q. Why?

A. Because of the freight problem. There are competitors in St. Louis and a competitor steel situation in St. Louis, which would make it prohibitive for us to ship from Baltimore to St. Louis.

Q. How about Denver, Colorado?

[fol. 1918] A. No.

Q. Any of the Rocky Mountain section?

A. Chicago.

Q. What part of the West Coast could you ship and be competitive price-wise?

A. Primarily to the West Coast.

Q. You mean the three states?

A. Yes.

Q. Just the three states?

A. Yes.

Q. Do you ship by rail to all, cross country, conduit?

A. Almost never. We do a little thin wall conduit, but not on the heavy side. Let me just add something here for what it is worth. To the best of our knowledge we are about 3 per cent of the market in conduit, so I don't think what

General Cable does or doesn't do is too big a factor in the conduit field.

Q. Are you talking about all conduit now or steel conduit?

A. I would say steel. If we put in everything else it would be 2 per cent. Clifton is a very small company.

Q. Does Clifton just have the one plant?

[fol. 1919] A. Yes, that's right.

Q. I don't know whether you know this or not, but I will ask you this, Mr. MacDonald. Do you know what your purchases of primary aluminum were in the year 1957? Would you have that information? You just have from '58 on.

A. I started with '58.

Q. Do you know what they were for the first nine months in '58, by chance?

A. No.

Q. I have a figure here and I wanted to check the accuracy of it, but if you don't have any figures——

A. I don't have a breakdown.

Q. But you stated that your total purchases in 1958 were seventeen and about three-quarter million pounds?

A. That's right.

Q. Can you give me an idea of what that would be in dollars, in round figures?

A. 28 cents, I guess, would be the best price for it. Multiply 28 by seventeen and three-quarter million pounds—say, 30 cents.

Q. We will make that computation later.

A. About five million, isn't it?

[fol. 1919a] Q. About five million dollars in '58. Yes.

Mr. Melchior: No further questions.

Mr. Bergson: No redirect, your Honor.

(Witness excused.)

The Court: Take a short recess.

(At this point a recess was taken after which the trial was continued.)

[fol. 1920] Mr. Bergson: Nesti.

ANTHONY J. NESTI, called as a witness on behalf of the defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Bergson:

Q. Mr. Nesti, will you state your name and address for the record?

A. Anthony J. Nesti, 48 Ruggles Street, Staten Island, New York.

Q. By whom are you employed, Mr. Nesti?

A. The National Electrical Manufacturers Association, 155 East 44th Street, New York City.

Q. For how long have you been employed by the National Electrical Manufacturers Association?

A. Approximately twenty-eight years.

Q. And in what capacities have you been so employed?

A. Various capacities, beginning with clerk, to my present position of chief statistician.

Q. How long have you held the position of chief statistician?

A. Since 1943.

[fol. 1921] Q. Would you describe for the Court what the National Electrical Manufacturers Association is?

A. Well, it is a trade association representing manufacturers of varied electrical products engaged in extending industry services of different kinds to these manufacturers.

Q. And is one of the services performed by the National Electrical Manufacturers Association the gathering of industry statistics?

A. It is.

Q. Now, is the National Electrical Manufacturers Association divided into sections?

A. It is first divided into eight divisions, and then each of the divisions has a number of product groups or sections as we call them, and in some cases the sections are further subdivided into groups. So that we wind up with about 80 or 90 product groups within the association.

Q. Well, now, is there a section in NEMA known as the conduit section?

A. Rigid conduit section.

Q. What does it embrace?

A. Well, it embraces the steel conduit, the aluminum conduit, the steel electrical metallic tubing and the electrical [fol. 1922] metallic tubing and the fittings that go along with those groups.

Q. Does—and I will use the name it is commonly known by—does NEMA furnish statistics to its various member companies on conduit?

A. It does. Both steel and aluminum conduit.

Q. I show you a document that has been marked for identification as defendant's Exhibit AR-6 which is entitled "A summary of net sales to domestic customers form SF-56" dated April 21st, 1961 and ask you if you are familiar with that document?

A. I am.

Q. Would you please describe it to the Court.

A. It is our summary of net sales to domestic customers for products within the scope of the rigid metallic conduit and electrical metallic tubing section of NEMA, and covers both the first half and second half of the year 1960, as well as the figures for the year 1960.

OFFERS IN EVIDENCE

Mr. Bergson: I offer defendant's Exhibit AR-6 for identification.

Mr. Melchior: No objection.

The Court: Received.

[fol. 1923] (Defendant's Exhibit AR-6 for identification received in evidence.)

Q. Now, Mr. Nesti, are you familiar with the Census of Manufacturers?

A. I am.

Q. In the course of the performance of your duties do you come in contact with the Census frequently?

A. We do.

Q. Would you please describe that relationship.

A. Yes. Well, that relationship—you want me to describe it from my personal experience or NEMA?

Q. From your personal experience.

A. That relationship, on a personal experience basis, goes back a good twenty or twenty-two years, and it in-

volves the discussions between ourselves and the Census people on the matter of proper classification of electrical products in their Census of Manufacturers and the accuracy of the resulting data, and these problems were discussed so that over the years the accuracy of Census figures could be improved, because they were, of course, important as what we call benchmark data for our industry.

[fol. 1923a] Q. Now, are you familiar with the Census category known as wiring devices and supplies?

A. Yes, I am.

[fol. 1924] Q. Do you recall when that category was first adopted?

A. Not exactly, but it has been part of the Census schedule for at least 15 years.

Q. When was conduit first included within that Census category?

A. At least beginning with the year 1954, in what was then a more nebulous definition or expression of conduit.

Q. Now, did the Census publish a report on conduit in 1958?

A. It published a report on conduit, but did not publish separate figures for conduit.

Q. And why was that, if you know?

A. Their notation on their advice to us primarily was that the information had been withheld from publication due to the possibility of disclosure of individual company data. We have not been able to learn more than just that.

Q. Now, are you familiar with the report that Census put out on conduit or including conduit in the year 1960?

A. Yes, I am.

Q. And have you examined that report, compared it with your own figures and your own analysis of conduit shipment?

[fol. 1925] A. We have done that.

Q. And what conclusion have you reached in regard to the Census for 1960 as a result of that study and analysis?

A. In this particular case our study of the Census figure in comparison with our own data and knowing who in the way of companies reported to us and what other companies we felt might also be manufacturers of this particular product, our opinion was that the Census figure was on the low side.

Q. Now, in making this evaluation of the factors did you take into consideration between your figures on the one hand and the Census figures on the other hand?

A. These are all factors that are generally applied to any comparisons between Census figures and Nema figures on low provisions. They start out with an evaluation of the clarity of the classification in the report form itself versus the clarity of the classification of the product in our own reports. We include the evaluation of the effect of a definition which is used on the Nema side, a definition of the product which goes further than this, the line statement in the Census report form. We recognize that Census cannot [fol. 1926] go much further than just the line of verbiage due to the tremendous size of the Census program, whereas we can, in Nema, establish a very definite product. This is a matter of evaluation so that we can appreciate how accurate the reports from a company may be under those two sets of circumstances. In addition, of course, we consider the relative difference in the specification that is reflected. In our case, we very definitely cover only sales to domestic customers in the open market. We do not cover exports in our figure referred to in this report which you handed to me. We do not cover interplant transfers. Whereas in the Census we appreciate that they cover total factory shipments whether they be for export or domestic and they also include interplant transfers. We evaluate all those things. And then there is another important item that we consider in our evaluation, and that is the existence or non-existence of so-called basket categories within the grouping of products in this particular field. If we find an all-over item and we find that that all-over item has a very high volume of shipments, then we consider that in our evaluation with the [fol. 1927] thought that perhaps some business might have slipped in carelessly into this basket categories instead of into one of the line items that was specified.

Q. Is there such a basket category in the current report of the Census report for 1960?

A. I would say there is to the tune of fifty three million dollars worth.

Q. And would any of that be conduit?

A. Definitely not all of that would be conduit.

Q. But in your judgment a certain percentage of it could well be conduit?

A. Well, we match our other factors with the fact that there is such a large basket category and assume that a good slice of it might represent conduit.

Q. Looking at Defendants' Exhibit AR-6, how many companies are shown as reporting to Nema?

A. Eighteen companies are shown as reporting to Nema on this particular summary, which was developed at the second half of 1960. However, it does show, too, that a nineteenth company, the Pittsburgh Standard Conduit Company, had reported in the first half of that year and it also shows that Harvey Aluminum Corporation came in only on the second half of that year. So if you take the year [fol. 1928] as a whole, we have nineteen companies reflected in this summar-, two of which are represented for only half a year's time.

Q. The fact that one was reflected for only the first half of the year, does that mean that that company went out of the conduit business for the second half of the year?

A. No. This report covers only members of the rigid metallic/conduit and electric conduit metallic tubing section of Nema. If a company chose to withdraw from membership, this report has no longer any reflection from them, and they would be no longer reflected in the summary.

Q. And if a company started reporting in July, does that mean that it was not producing?

A. No.

Q. (Continuing) earlier in the year?

A. No, it does not mean that.

Q. It means what?

A. Simply means they decided to join the Association.

Q. Now, to your knowledge do all producers of conduit belong to Nema?

A. It is our opinion that they do not.

[fol. 1929] Q. Do you know any conduit producers, and I mean producers not sellers, who do not report to Nema?

A. Well, again, in our work we must develop whatever information there is regarding the manufacture of these products. One of the sources that we go to for such information is the Underwriters Laboratories. And there in the Underwriters Laboratory there is provided a list of manu-

facturers of various types of electrical equipment, and in the case of rigid conduit and electrical metallic tubing there is a large list of such manufacturers who are not members of Nema and who were not reporting to Nema in this field. Now, from that list, of course, we can't deduce that they are all bona fide manufacturers of rigid conduit or electrical metallic tubing, but it is our impression that there are some who are.

Q. Let me ask you about some. Is Youngstown Sheet & Tube on your list?

A. Yes.

[fol. 1930] Q. Is Youngstown on the NEMA list of reporting companies?

A. No, Youngstown is not on the list of NEMA reporting companies.

Q. Do you know whether Youngstown is a substantial producer of conduit?

A. I have no idea.

Q. Is the Aluminum Rigid Conduit Corporation on your list?

A. No, it is not.

Q. Is Channel Master on your list?

A. No, it is not.

Q. Is Hazelwood Engineering on your list?

A. It is not.

Q. Hazelwood Conduit, I guess it is called.

A. Hazelwood Engineering Equipment.

Q. Is Jasco on your list?

A. Jasco is not.

Mr. Melchior: Counsel, may we interrupt a minute? What list is he referring to?

Mr. Bergson: The list of companies that he says——

Mr. Melchior:—report to NEMA?

[fol. 1931] Mr. Bergson: Yes.

Mr. Melchior: I just wanted to clarify that.

Q. And I think you testified earlier that Pittsburgh Standard was on your list for the first half of the year, but resigned its membership and is not on your list for the second half of the year.

A. Second half.

Q. Mr. Nesti, I would like to invite your attention to certain of the charts that the government has put in evidence in this case, and I invite your attention first to a chart entitled "Value of shipments of conduit in the United States, 1960."

The Court: What is the number of the exhibit?

Mr. Bergson: Exhibit No. 455. GX-455.

Q. Now, you will note that that chart originally had the industry total at 120 million dollars, and it was subsequently amended to $125,700,000 and some dollars. From your study of the NEMA statistics and your comparison with available material from the Census, is it your opinion that this figure adequately states the industry total for conduit in the [fol. 1932] United States?

A. I would say that neither the original figure, which incidentally is the last figure which we have—it is the original figure on this exhibit is the one that appeared in the official Census release of this industry—neither that figure nor this revised figure would in my opinion represent the total volume of business done in this field.

Q. Is it too high or too low?

A. I would say it is too low. Appreciably too low.

Q. Now, would you please turn to the next chart, which is government Exhibit 459 and the succeeding chart which is government Exhibit 460, both of which show an industry total as reported by NEMA for the year—for aluminum rigid conduit and EMT—for the year 1960. That shows a figure of $6,709,000, and that figure was taken from, I assume, defendant's Exhibit AR-6.

A. It is the same figure.

Q. Now, does that figure represent the industry total of aluminum conduit, so far as you know?

A. I would say it does not, because some of the manu- [fol. 1933] facturers whom we feel are active in the aluminum field are not reported in the NEMA figure.

Q. So that what NEMA figures purport to show are the total figures of companies reporting to NEMA, and not the total figure of the industry as a whole?

A. Exactly.

Q. And there are companies—or, are there companies who

are in the aluminum conduit business who do not report to NEMA?

A. It is our feeling that there are.

Q. Well, does Channel Master report to NEMA?

A. No, Channel Master does not.

Q. Does Aluminum Rigid Conduit report to NEMA?

A. No, they do not.

Q. Does Hazelwood report to NEMA?

A. They do not.

Q. Does Jasco report to NEMA?

A. They do not.

Q. Are there any others I may have overlooked?

A. You are speaking specifically of aluminum now?

Q. Yes.

[fol. 1934] A. No. That is, in the sense that you have covered them originally. Actually, there are many more companies in this Underwriters list, but again we can't say.

Q. But you don't know whether they are actually in production?

A. Can't say.

Q. Now, Mr. Nesti, I invite your attention to government Exhibit 461 which purports to show the sales of steel conduit, rigid and EMT, in the United States by Rome Cable Company and the industry. I am asking you to direct your attention solely to industry figures alone. Is the total shown in that chart for the year 1958 and the first half of the year 1959 the total industry sales of such products in the United States?

A. I would say it is not.

Q. And why is it not so?

A. Well, I don't have all the reports here for that year, but this exhibit does say it is the industry total reported by NEMA, which again could only be the total of companies reporting to NEMA and not the total industry, for the same reasons we have just given.

[fol. 1935] Q. Would you know whether Youngstown reported in 1958?

A. I am sure they did not. Nor any of these other four or five companies that you called out. And in addition, Harvey Aluminum, of course, did not report in 1958 because they did not come into NEMA until the second half.

Q. Well, I think the evidence was that Harvey Aluminum wasn't producing at that time.

A. I see.

Q. Now, I invite your attention to government Exhibits 456 and 457. This chart purports to show the sales of steel and aluminum rigid and EMT in the United States by Alcoa, Rome and the industry as does chart government Exhibit 457. There the total sales reported by NEMA is $116,697,000. Would you say that this accurately portrays the amount of these products sold in the United States?

A. No, it does not.

Q. And why is that?

A. Because, again, the figures cover only the total of the data reported by companies who are members of NEMA.

Q. Now, Mr. Nesti, in the course of examining these [fol. 1936] statistics and making the comparison with the Census figures, did you undertake to find out how many companies reported to Census for 1960?

A. Yes, we did. We asked about the number of companies. It is a well known fact that the Census Bureau cannot, under existing law, divulge the names of the companies reporting, but they can tell you in most cases the number of companies that reported. And in this case for the year 1960 they indicated that 19 companies had reported to them under their census figure for rigid conduit.

Q. And you had in your figures——?

A. By chance, exactly the same number of companies.

Q. So that would you conclude from that that less than all of the companies reported to the Census in 1960?

A. Well, I would conclude two things. One that very definitely less than all the companies reported to the Census; and in addition I would raise a question as to whether those 19 were identical companies, which of course we cannot determine.

Q. In making up your statistics for NEMA, do you in- [fol. 1937] clude foreign sales?

A. We do not.

Q. Does the Census include foreign sales?

A. May I direct my answer specifically to the summary I have before me?

Q. Certainly.

A. The figure we are discussing—this report covers only

domestic sales. We have other production statistics that do, some of them, get into export sales.

Q. Does the Census figure include foreign sales?

A. The Census figure includes total factory shipments, regardless of where they go.

Q. That means foreign sales?

A. Including export.

Q. Inter-plant shipments?

A. Yes.

Q. Do your figures include inter-plant transfers?

A. Our figures do not.

Q. So that to the extent that your figures may be lower than the Census figures, this could be attributed to three facts; one, the number of companies reporting to NEMA; [fol. 1937a] two, the Census does not report inter-plant—you don't report inter-plant transfers and third, you don't report export sales.

A. Exports.

[fol. 1938] Q. Now having reviewed these charts and discussed this, I ask you again whether it is your opinion that the Census figures that we have read from these charts are accurate or inaccurate?

A. It is my information that in this particular case, this particular product, the Census figure is not accurate. It is on the low side.

Mr. Bergson: Your witness.

Cross-examination.

By Mr. Melchior:

Q. Mr. Nesti, you don't have much faith in the statistics that Nema has come up with in the conduit field, I take it?

A. I have a great deal of faith in the Nema figures overall, including those in the conduit.

Q. Now, I am talking about this specifically, these conduit figures.

A. I have a great deal of faith in them.

Q. And you think they are accurate?

A. I think they are.

Q. You think they are complete?

A. They are complete, as far as I know.

Q. I didn't think this was the import of your testimony on direct examination.

[fol. 1939] Mr. Bergson: I think that he said, Mr. Melchior, was, that they were complete in so far as the companies reporting to Nema are concerned.

Q. But they don't include what you consider to be the whole industry, I take it?

A. No.

Q. They fall short of them, Nema does?

A. That's right.

Q. You testified with respect to Census figures?

A. Yes.

Q. And you find there are some disagreements between the Census totals and your totals?

A. I do.

Q. And you don't think your totals are complete?

A. That's right.

Q. In fact, you know they are not complete?

A. That's right.

Q. And you say comparing your figures which are not complete and Census' figures which are complete, yet you say that Census figures are not accurate?

Mr. Bergson: I object to that.

The Court: Sustained.

The Witness: No, that is a wrong inference. It is not in the overall collection and compilation in comparison of [fol. 1940] Census figures. There are some Census data that are very accurate.

Q. I would like to talk only about conduit.

A. In this case Census measures have not yet achieved the accuracy that we feel they should.

Q. And this is your opinion?

A. This is my opinion only.

Q. Let me ask you this, Mr. Nesti, you said over the years you have been dinscussing with Census' representatives statistics which your Association collect; is that right?

A. That's right.

Q. And you have discussed among other things conduit statistics?

A. Steel conduit.

Q. Steel conduit and aluminum conduit statistics?

A. We have.

Q. And a wide variety of other statistics which are collected by your organization?

A. We have, yes.

Q. Do you approach Census to discuss this or do they approach you?

A. This works both ways. They approach us at times and we approach them.

[fol. 1941] Q. They use you as a source of information, as a matter of fact, don't they?

A. Yes.

Q. They use other trade associations and other statistical covering organizations, too; don't they?

A. Yes, they do.

Q. And they do this periodically?

A. They do.

Q. Each time they come out with a new total they canvas the industry and people like yourself for what purpose?

A. Towards long range improvement of all statistics.

Q. To determine whether or not their statistics are complete; is that one of the things?

A. That is one of the stages.

Q. When was the last time you spoke with Census' representatives concerning the conduit statistics?

A. I did not personally discuss it with them, but a representative of our department attended sessions with the Bureau of Census when they developed the report form for the year 1960.

Q. Who is your representative?

A. My assistant in my department, Howard Hoover.

Q. Howard Hoover?

[fol. 1942] A. Howard Hover.

Q. Did Mr. Hoover inform you the import of his discussion with Census the last time he discussed conduit statistics with them?

A. At the time he discussed this particular form with them, unfortunately the need for discussion was on the matter of the wire device products in this form and not on the rigid conduit. It was our understanding that this being a new annual commodity survey and not a regular Census report that it was only to cover wiring devices.

Q. My question was: when was the last time you discussed with Census conduit statistics and you informed me Mr. Hoover discussed them.

A. We talked about the final discussion with Census on the form which includes the conduit items. But specifically we have no recommendations or discussions on the conduit items on that form.

Q. I ask you again, when was the last time you or any of your representatives discussed conduit statistics with Census?

A. That would be for 1958.

Q. You did not discuss the 1960 Census with them then, with respect to conduit?

[fol. 1943] A. You mean since it was released?

Q. Since it was released.

A. No, we have not.

Q. Did you discuss the conduit statistics before they were released with the Census people?

A. In 1960?

Q. In 1960.

A. No, we did not.

Q. The 1960, which is contained on——

A. We did not.

Q. You did not. No one in your organization did?

A. We did not.

Q. For the record, I am referring to the form entitled "Wiring devices and supplies, 1960, which, I guess it is not marked——

The Court: If I understand it right, this man Hoover discussed that form which included conduit; that's right, is it?

A. May I clarify it further, Your Honor?

The Court: Yes. Sure.

The Witness: This 1960 form is not part of the regular census of manufacturers. It is a new separate and distinct form called an annual commodity survey. And we were led to believe that the annual commodity survey for the [fol. 1944] year 1960 was to cover wiring devices, which is only about the first half of that form. Unfortunately, I, as manager of my department, discovered too late that the form when it came out included all of the wiring supplies,

including rigid conduit as well as the wiring devices. At that stage it was entirely too late to make any recommendations.

The Court: All right.

The Witness: However, this only has to do with the report form. Now, the figures have only become available in recent period. They don't come out that fast.

By Mr. Melchior:

Q. You are familiar with wiring devices and supplies for 1960?

A. I am.

Q. GX-497 for Identification: Are you familar with that form?

A. May I see it?

Q. Surely (hands document to witness).

A. I am.

Q. Is that the one you have before you?

A. Yes, that is the only have before me.

[fol. 1945] Mr. Melchior: Make that 498, Mr. Reporter.

Mr. Bergson: GX-498?

Mr. Melchior: For identification.

Q. Now, I ask you to turn to the second page of that total and down in the middle of the page they have a category entitled "Electrical conduit and electrical fittings," and under that they have two sub-headings. What are these two major subheadings?

A. Steel and——

Q. No, no, before that.

A. Rigid conduit and electrical metallic tubing.

Q. Now, under each one of those subheadings under electrical conduit and electrical fittings, there are two major headings, one is rigid conduit and the other electrical metallic tubing?

A. That is correct.

Q. Under the subheading rigid conduit there are two other subheadings, and what are they?

A. Steel and Other.

Q. And these two subheadings appear under electrical metallic tubing also?

A. They do.

Q. If you know, will you state what basis is used for determining what goes into the category steel and what goes [fol. 1946] into the category "Other," under rigid conduit. Now, this is the Census report.

A. These are not sub-categories on our reports. They are sub-categories of the Census report.

Q. I am asking if you know.

A. I do not know.

Q. Now, I direct your attention to electrical metallic tubing, where they have two categories, one called Steel and the other one called "Other," and I ask you if you know what goes into these two categories on the part of Census?

A. Are you asking me what I know or what I think?

Q. Only what you know, Mr. Nesti.

A. I would not know.

Q. You do not know. Now, I direct your attention to AR-6 for identification.

Mr. Bergson: AR-6 is in evidence.

Q. AR-6 in evidence.

A. Which is that?

Q. This is the summary of net sales to domestic customers FS-56?

A. Yes.

Q. Do you have one of them before you. This is a publication of your association?

[fol. 1947] A. It is.

Q. Now, I ask you, if you know, what is included in your category "Aluminum group"?

A. I do.

Q. Would you state for the record what is included in that category where you have a total for the second half of the year of 6,709 in seven companies?

Mr. Bergson: Six million seven hundred and nine thousand.

Q. Six million seven hundred and nine thousand dollars in seven companies. What is included therein?

A. Included in that group are six items, specifically: Original aluminum conduit, elbows, threaded couplings, nipples, the last three of which are commonly furnished on or

with rigid aluminum conduit. Also aluminum electrical metallic tubing and also elbows customarily furnished on or with aluminum electrical metallic tubing.

Q. Now, what is the seven C-o-s mean, following under the six million dollar figure?

A. That means seven companies.

Q. What do you mean by seven companies?

A. It means that seven Nema member companies report the figure in this particular category.

[fol. 1947a] Q. Can you identify the seven companies that report?

A. Yes. They are Harvey Aluminum, Incorporated; Kaiser Aluminum and Chemical Sales, Incorporated; National Electrical Division of H. K. Porter Company, Inc.; National Supply Company, the tubular division; Reynolds Metals Company; Rome Cable Corporation and Wheatland Electrical Products Company.

[fol. 1948] Q. Was the first one you mentioned Harvey? I didn't hear.

A. Harvey Aluminum.

Q. Harvey Aluminum. Now what do these seven companies report to you? Precisely what?

A. They report to us their net domestic sales of these products which I read off.

Q. Net domestic sales?

A. Net domestic sales.

Q. Now, if you know, are all the sales made by these seven companies of conduit—is it conduit produced by these seven companies? Do you understand the question?

A. I do not.

Q. I will rephrase the question. You have seven companies here which have reported to you sales of aluminum conduit and these other aluminum things you have referred to, EMT and certain accessories. Do you know whether these companies manufactured these products themselves or did they purchase them for resale? Do your forms indicate this information?

A. No, our forms do not indicate that information. However, our instructions specifically ask for the report of sales [fol. 1949] of products under their nameplate or trade name, whether or not it was manufactured for them.

Q. Can you tell from your forms that are mailed in to your organization whether these companies manufactured them themselves or whether they purchased them for resale, in each case?

A. We can only assume they have followed our instructions, which are on the first two pages of our report form, where specifically we lay out instructions so as to avoid duplication in reporting volume of business.

Q. Would you read the instructions into the record, please?

A. For this particular question the instructions read this way: "Include in your report products manufactured and sold by you."

Q. Manufactured and sold?

A. And under that heading, "Include in your report all products manufactured by you which bear your trade or identifying mark on the product and which you sell in the open market." In addition, these instructions include this one: "Include in your report products manufactured by you and sold by other manufacturers under your trade [fol. 1950] name." And this is further explained: "Include in your report all products manufactured by you which bear your trade or identifying mark on the product, and which are sold by any other manufacturer, provided he does no further processing or assembly work on them."

There is a further instruction: "Products manufactured by you which are sold by a company which is not an electrical manufacturer and which bear such company's trade or identifying mark on the product." This is to be included in the report.

Finally, "Products purchased from any other manufacturer and resold with your trade or identifying mark on the product." This type of operation is referred to in the NEMA by-laws as promoting the manufacturer.

Q. Now I ask you, Mr. Nesti, under that set of instructions would it be possible that the same conduit would be reported by two or more companies?

A. Bearing in mind that these figures form the basis for dues charges to the sections and to the individual companies, I would say that it would be highly improbable.

[fol. 1951] Q. What is your answer? No?

The Court: Highly improbable.

Q. Are you familiar with the——

The Court: We better recess until 2:10.

(Whereupon, at 12:50 p.m. an adjournment was taken until 2:10 p.m.)

[fol. 1952] AFTERNOON SESSION

APPEARANCES: Same at Morning Session.

The Court: All right, gentlemen.

ANTHONY NESTI, resumed the stand and testified further, as follows:

Cross-examination. (Continuing)

By Mr. Melchior:

Q. Mr. Nesti, on direct examination this morning you indicated several reasons why you thought that the Census totals with respect to conduit were low. Would you reiterate those again, please?

A. The reasons that I provided were that in comparison with our figure we felt that there was an additional amount that would be accounted for by manufacturers of conduit who were not represented in our data and should be represented in the Census date. That was one. The other factor was one of companies which we know are not included in our data but which we know should be included in the Census data.

The third factor has to do with interplant transfers where again we do not include it in the Nema figures but they are [fol. 1953] supposed to be included in the Census figures. So those were the three factors.

Q. Did you not mention something about Underwriters' lists?

A. In referring to the Underwriters' lists, I referred only as a reference as to what other manufacturers there might be of conduit.

Q. Are you familiar with the Underwriters' lists?

A. To the extent that it covers this particular product, I am.

Q. This particular product?

A. Yes.

Q. Yes. I show you Government's Exhibit 415 for Identification and ask if you recognize it. This purports to be a —well, you state what it is, if you recognize it.

A. I don't recognize this particular one. I have extracted a list of companies from Underwriters' lists. Whether they are the same Underwriters,' bulletin or not, I can't be sure. It does not start out with this heading.

Q. Would you take a look at this and see what this purports to be, it is just four or five pages, and see if it is not [fol. 1954] the same list that you got your list from. If you would rather look at the original of this, maybe this would be a little more familiar to you. Would you like to look at this one? Would that help you? That is the whole thing.

A. I will see in a moment. I believe that part of it that begins somewhere around the bottom of page 7, beginning with rigid conduit, is more familiar.

Q. Rigid conduit?

A. The first part of this covers liquid type flexible metallic conduit. I am not familiar with that.

Q. Let's start with conduit, rigid ferrous metallic.

A. As I say, that is back here, on page 57.

Q. That is the part you are familiar with?

A. And it goes on to page 58. And I would say that this again may not—I am not sure whether it is the same issue of the bulletin, but this has some familiarity to me.

Q. All I want to ask you about that, Mr. Nesti, does this list include the names of companies—strike that. What does the Underwriters' Laboratories' list purport to be?

A. A list of manufacturers who purchase labels under [fol. 1955] Underwriters' labels services for various types of products.

Q. And with respect to electrical conduit what does it purport to be?

A. List of manufacturers who purportedly purchase labels for use on rigid conduit.

Q. Is the list limited to manufacturers of conduit?

A. No. Not necessarily.

Q. It includes others?

A. I should correct that to say companies which manufacture and sell and/or sell conduit.

[fol. 1956] Q. In other words, there are included in the list a number of resellers of conduit?

A. Yes.

Q. Are there a substantial number of resellers?

A. I don't know.

Q. Are you familiar with the companies that manufacture conduit and those that resell conduit?

A. I am familiar with the companies who are in our association. I am somewhat familiar with a few of the companies who are on this list. I am not at all familiar with the balance of them which is the bulk of them.

Q. But you do know this list includes a number of companies who are merely resellers of conduit as opposed to fabricators?

A. It is possible.

Q. You don't know?

A. I am not sure.

Q. All right, let me ask you this about the companies that have reported to your association. I believe you listed—and with particular respect to aluminum conduit—I believe you listed seven reporting companies, is that correct?

[fol. 1957] A. That's right.

Q. Which if any of those seven companies that reported to you are resellers as opposed to fabricators?

A. We do not obtain specific information as to whether a company manufactures and sells or sells only.

Q. You don't know that?

A. No, sir.

Q. As a matter of fact, all seven of them could be resellers as far as you know?

A. If could be.

Q. It could be. Now, I show you defendant's answer to Interrogatory 56, which purports to list a number of companies engaged in the rigid aluminum conduit business, and there are indications following the name of each company, and it indicates for September, 1960 and for April, 1959 whether these companies are producers as indicated by a "P", or sellers only as indicated by a "S". Now, I ask you if you would look at that list for the name of Wheatland

Electrical Products Company, which is one of your reporting companies, and let me know in the year 1960 whether [fol. 1958] it is listed as a producer or a seller.

A. Is this a list for the year 1960?

Q. There is a column which indicates 1960 at the top.

A. This list marks them as a producer.

Q. Wheatland? In 1960?

A. Well now, you say current date—I asked whether this list was for the year 1960.

Q. No, I asked you to look in the column——

A. Up above?

Q. ——entitled 1960.

A. You mean September 1st, 1960?

Q. Yes.

A. What does the "current date" stand for?

Q. Current date I am sure would be the date of the interrogatory; but we are interested in 1960.

Mr. Bergson: The current date is April, 1961.

Q. April, 1961. But we are interested in the year 1960. What does it show for Wheatland?

A. What does "M" stand for? No, there is nothing at all in 1960.

Q. It doesn't indicate they are a producer in 1960?

[fol. 1959] A. No, it does not.

Q. Now, I ask you to look up the name National Supply which is a division of Armco.

A. National Supply? On this list it is indicated by an "S" which I presume means seller.

Q. Seller. That's correct. In other words, Mr. Nesti, if we take the total figure that AR-6—which is your FS-56—indicates for the second half of the year 1960, of the seven companies who reported, if those interrogatory answers are correct from which you have just read, two out of the seven were not producers?

A. I only—my only comment there was there is no "P" and no "S" on that list. I don't know whether that means they are producers or sellers.

Q. Or neither.

The Witness: Your Honor, could I have this clarified?

The Court: Yes, if you can.

The Witness: Am I to assume from that list if there is

no mark of a "P" or an "S" that it would be one or the other?

[fol. 1960] Mr. Melchior: This is what——

The Court: I don't know. The fact is there is no mark either way. I don't know what you are to assume.

Mr. Melchior: The fact that—I will have to answer—it is a defendant's answer to our interrogatory. The fact that there is no "P" indicates that they are not a producer. The fact that there is no "S" indicates that they are not a seller. I will stand corrected by counsel—is that correct, Mr. Bergson?

Mr. Bergson: You are right.

The Court: Maybe they just ran a restaurant. I join with the witness.

By Mr. Melchior:

Q. Now, Mr. Nesti, I am not too clear as to certain of your testimony this morning, when you were referring to a basket category. Would you go over that testimony again? To what were you referring when you talked about a basket category?

A. May I choose my words, your Honor, to clarify this?

[fol. 1961] A. We need to go beyond just a direct answer, if I may be allowed. The work of clarifying Census classifications and Census statistics is a long, long term job. It is only when you have a large volume shown in an "all other" item. And there are different kinds of "all other" items. Not elsewhere classified. Not separately provided for. Not elsewhere specified. Language of that kind. If it shows a large volume of shipments after a survey has been completed, this brings the attention of both industry and the government on a problem area, because generally "all other" should not have large volume figures. They should, comparatively speaking, have lower volume figures, and so it indicates if you do have a large volume figure there is a classification or an instruction problem or an editing problem on the part of the Census report. And these are the areas where we give special attention in order to improve the Census report which is something both the industry and the Census Bureau wish to do. So these classes of "all other", regardless of how they are indicated on the Census, have become known as the basket category, the place where

[fol. 1962] a figure might be reported because of the lack of more detailed information on the part of the company, or where there wasn't sufficient information available to the Census editing clerk to peg it at some particular spot. That's why it is called basket. It is thrown into the basket.
[fol. 1963] Q. Now, did you characterize any of these Census categories on Government's Exhibit 498 as a basket category?

A. There were two such categories. One reads: "Other electrical conduit including underground conduit and fittings, molding angles, molding outlets and molding junction boxes." The second item reads: "Fittings other than those listed above, conduit and electric metallic tubing connectors. Service entrance, et cetera, and service cables." These two items were separate items on the report form. In the summary they are combined and there is a figure of fifty three million dollars. And this is what we refer to as a basket category because of the terminology, "Other than those listed," et cetera, and things of that kind.

Q. Now, directing your attention to rigid and EMT conduit of both steel, steel and aluminum together?

A. Yes.

Q. Now, are you suggesting or is it your testimony that figures with respect to EMT and rigid conduit, either steel or aluminum, may be included in this basket category?
[fol. 1964] A. We have no way of knowing, but it is our feeling that for some reason or other there may be some volume in that basket category.

Q. But you have no way of knowing?

A. We have no way of knowing.

Q. Is there anything that leads you to believe that it might be in there?

A. The thing that leads me to believe that it is a combination of factors which I described in my earlier testimony as to the relative merits of the two figures that purport to measure this business.

Q. But if it could be demonstrated to you that all conduit, steel and aluminum, both rigid and EMT are included in some other category, then your term "basket category" would have no relevancy at all to this testimony with respect to conduit; would it?

A. If it could be proved, yes.

Q. I see, fine. Now, I would like to ask you again about this same form or this same report, Government Exhibit 498 for Identification. And another thing I didn't get from your testimony this morning too clear, I believe you made some remarks to the effect that the classification or the [fol. 1965] language used in the reporting form with respect to conduit by Census was not too clear. Would you enlarge on that a little bit so I can get that point clearly in my mind.

A. All I said was that in Census classifications they do not have the specific definition behind each item. Whereas in the Nema items we have a specific definition which I read into the testimony or into my testimony.

Q. You feel that the Nema explanation is clearer and simpler than the Census?

A. I think so.

Q. Would you read into the record from Government Exhibit 499 for Identification, which is the reporting form what is called for under the rigid and EMT categories. First, let me ask you if you think these are the, if you think I have bracketed properly the items of conduit we have under discussion today, which are EMT and rigid, both aluminum and steel. I have tried to bracket that and only that. Now, do you think I have bracketed that proper, and, if so, would you read into the record what is called for by this form? [fol. 1966] A. I will. And may I point out that this is not only the conduit but the fittings.

Q. It includes fittings. I see. Now, if you will read that into the record.

A. "Also electrical conduit and conduit fittings, rigid conduit, standard weight, including couplings, nipples, bends and elbows," and under that "Steel and Other."

"Electrical metallic tubing (thin wall conduit) including couplings, nipples, bends and elbows. Steel and Other."

Q. Now, let me ask you this, Mr. Nesti, if you were reporting steel rigid conduit would you know where to report that?

A. Yes, I should know.

Q. If you were asked to report EMT steel conduit, would you know where to report on the Census form?

A. Yes, I should know.

Q. If you were asked to report aluminum rigid conduit, would you know where to report it?

A. There I would raise a question. And the reason I would raise a question, it would depend on what kind of a company I was. If I was primarily an aluminum product manufacturer, I receive one Census form for my industry. [fol. 1967] If I am a small manufacturer of aluminum conduit, by that I mean a small volume, I would not receive this Census form. Therefore, as that manufacturer, I would report my aluminum conduit in the all-over item which appears at the end of my report form. This is one of the complications of reporting. I would submit my report. If my figure is sizable the Census Bureau will then send me this report to fill out so as to get a further total breakdown.

Q. My question was——

A. If it is not sizable I wouldn't get such a form and I wouldn't know where that figure would go.

Q. My question had to do with this form. If you were reporting aluminum rigid conduit, would you know where to report it on that form?

A. With my knowledge of the form and our discussions with the Census, I personally would know.

Q. You would know?

A. Yes.

Q. Would you know where to report EMT aluminum conduit on that form?

A. Yes.

Q. And would all of these reports you are making be [fol. 1968] in the material that you read into the record?

A. I am not sure what difference this kind of language would make that goes in, that goes in with our definition. You are asking what I would report and therefore, I must refer to what I know about our own definition, which shows the volume of products customarily furnished on or with rigid steel conduit. And the same is true with aluminum furnished on or with. There is no comparable language in the Census report. If I sold them separately, then I would report them. If I sold them on the conduit, I might feel I should not report them.

Q. What are these other products?

A. I am talking about the language inherent in our definition, which not only lists the items but specifies they are to be reported whether they are furnished on or with.

Q. Are you talking about your Nema form or Census report?

A. You were asking what I would do.

Q. On the Census form?

A. Yes. But I would have to interpret what I would do along the lines of my understanding of these products which include the additional knowledge of what we have as in-

[fol. 1969] structions.

Q. Again I ask you if you were reporting EMT aluminum conduit under this form, where would you report it?

A. The conduit I would report under this conduit item which I read.

Q. Fine.

A. The fittings——

Q. I didn't ask you about the fittings but I will, if you would like me to. We are talking about conduit, not fittings. Since you raise the question, where would you report fittings under the Census report?

A. Here I would not report until I raised the question as to what fittings I should include.

Q. All right. I didn't ask about fittings.

A. This is perfectly permissible.

Q. In other words, you wouldn't know where to report fittings; is that it?

A. I would verify whether I should report fittings.

Q. All right. You think it is possible that some of the aluminum conduit and steel conduit manufacturers report fittings under this heading that we read into the record. Do you think that is possible?

A. I think they have reported.

[fol. 1970] Q. Do you think it is probable? You think they have, as a matter of fact?

A. I would say some of it has and some of it has not. My feeling is that some of these fittings have been reported under the basket category and I draw your attention specifically to the fact that one of these basket categories has the confusing language of the metallic tubing connectors. This might lead the manufacturer to report the volume there instead of in one of these items.

Q. Now, are there any other types of electric tubing other than aluminum and steel, to your knowledge?

A. I don't know.

Q. You don't know. Now, have you read into the record, Mr. Nesti, the instructions you used for your Nema form?

A. Yes.

[fol. 1971] Q. Was that the lengthy one this morning—those were your instructions?

A. That's right.

Q. They are much simpler you think than the Census instructions?

A. I didn't say that, and I don't think——

Q. What did you say?

A. I don't think they are—I didn't make any observation as to whether they were simpler or not.

Q. Do you care to make any observation by way of comparison?

A. I don't think any instructions, when you want to clarify statistics, are ever simple. I just think they are more clear as to the elimination of duplicate reporting.

Q. Do you know whether the Census form includes or excludes inter-plant transfers—and I am referring specifically to GX-499 for identification?

A. It includes inter-plant transfers.

Q. Now, do you know, with respect to aluminum and steel rigid conduit, what sort of inter-plant transfers there might be?

A. I do not know.

[fol. 1972] Q. You do not know. This morning you mentioned, and I missed this testimony—the figure 19—not only with respect to the number of reporting companies to NEMA, but also with respect to—I thought you said a number of reporting Census——?

A. That's right.

Q. Where did you get that number 19 from?

A. We got it from the staff of the Bureau of the Census.

Q. When did you get this?

A. Recently.

Q. Who was the "we" that got it from them?

A. My staff did.

Q. Who on your staff?

A. Either Mr. Hoover or Mr. Caspozak.

Q. I may have misunderstood your testimony this morning, because I was trying to find this fact out and I thought

you told me you never specifically discussed conduit. Maybe I misunderstood you.

The Court: We have spent an awful lot of time on that which was very simple. He indicated conduit form and went [fol. 1973] into great length to talk about it, and it would seem to be a hassle between the two as to whether the discussion of conduit form constituted a discussion of conduit.

Q. That's right, because this is not conduit form. This is a wiring device form and includes a number of things. In other words, you have discussed recently with the Census data with respect to conduit that appears on this form?

A. Not data. We simply wanted to know how many companies reported in the Census figures. That's what we asked.

Q. For both steel and aluminum; is that right?

A. Total.

Q. And the total was 19?

A. 19.

Q. Did you also determine how many aluminum conduit reporters there were?

A. In the Census figures, you mean?

Q. Yes, for the year 1960 as the totals appear on GX-498 for identification.

A. The information we got from Census had to do with the number of companies and the number of establishments [fol. 1974] that reported under each of their three headings, rigid conduit steel, electrical metallic tubing steel, and other EMT, and for each of these three we got the number of companies and the number of establishments. 19 was the number for the rigid conduit steel. 14 was the number for electrical metallic tubing steel, 7 was the number for other EMT.

Q. Did they give you the number of establishments engaged in the production of aluminum rigid and EMT conduit?

A. Number of establishments were 22 for the total rigid conduit steel, 16 for the electrical metallic tubing steel, and 9 for other EMT.

Mr. Melchior: Well, I am going to mark at the present time government Exhibit 500 for identification and I am

informed that we failed to mark 499 for identification—so if it would be possible for the reporter to reconstruct that——

(Government Exhibit 500 marked for identification.)

Q. Now, Mr. Nesti, I hand you GX-500 for identification and ask you if you will read into the record at the beginning [fol. 1975] of the letter. Perhaps I should check whether there is any objection before you do that.

What does GX-500 for identification purport to be, Mr. Nesti, if you can tell?

A. Is this it?

Q. Yes, this is it.

A. Air mail special delivery letter to you from Richard M. Scammon, director, Bureau of the Census.

The Court: Dated what?

The Witness: February 13th, 1962.

Mr. Melchior: I offer at this time GX-500 for identification, if you will permit the government to offer it on the defendant's case.

Mr. Bergson: No objection.

The Court: Received.

(Government's Exhibit 500 for identification received in evidence.)

Q. Would you read into the record the contents of that letter, if you will, Mr. Nesti?

The Court: Do you want him to read the whole letter? [fol. 1976] Mr. Melchior: I would like to, because I would like to ask him to comment on it.

The Court: All right.

A. (Reading) "This is in further reference to your telephone conversations of February 9 and 12 with Mr. Owen C. Gretton, assistant chief of our industry division, regarding figures on electric conduit and conduit fittings as reported in our Current Industrial Reports Series M36K for 1960.

"In response to your request, the attached table presents the number of companies and the number of establishments reporting 1960 data for Codes 3644221, 3644222, 3644223

and 3644224 (steel and other metallic electric conduit, both rigid and electrical metallic tubing). Within these codes no non-metallic conduit is included, and the 'other' categories include all metal conduit (other than steel). Under Census law we are not permitted to give you the names of the companies reporting to us on any of our surveys.

"The companies and establishments included on the attached table cover the revised quantity and value of shipments of these codes as submitted in my letter of February [fol. 1977] 1 to Mr. Lee Loevinger. The revisions came about as the result of our further review in these areas, which brought out the fact that some new companies had entered these fields but were not previously canvassed. The coverage of the items now reflects any new companies in this field as reported to the Bureau of Old Age and Survivors Insurance, which is the major mailing list source for the Census Bureau's surveys, as well as existing companies entering the conduit field as shown in the Annual Survey of Manufacturers Reports.

"This survey was conducted under authority of an act of Congress (13 USC) which required respondents to submit a report. The figures, as revised, represent reports received from all known producers of the items covered. We are satisfied with the results of the survey and are convinced of the reliability of the figures we have published as revised in the Bureau's letter of February 1.

"As to whether some duplication may exist in our published figures due to resales, the original mailing list for this survey was made up of those manufacturers who in [fol. 1978] the 1958 Census of Manufacturers reported actual shipments of these products. In the 1958 Census a separate line for resales was provided, and those manufacturers who simply reported resales of these items were not canvassed. In addition, the following instruction appears on Census Report Form MA-36K: "Do not include the quantity and value of complete wiring devices received from other manufacturing establishments which are repackaged for resale by you."

"If we may be of any further service, please contact us again. Sincerely yours."

The table?

Q. Maybe you can testify that there is a table attached. It is not necessary to read that.

A. There is a table attached showing the number of companies and number of establishments.

Mr. Melchior: Thank you. No further questions.

Redirect examination.

By Mr. Bergson:

Q. Mr. Nesti, does the fact that on October 19th, 1961 the [fol. 1979] Census issued Current Industrial Report 1960 for wiring devices and supplies with figures specified thereon and were subsequently amended by the Census by letter dated February 1, 1962 increasing quantities mentioned in the current industrial report indicate to you that there might have been any infirmities in the original report?

A. Well, they certainly do indicate that, but your Honor, may I clarify this Census relationship?

The Court: I guess you better. You have got me so balled up——

A. (Continuing) I am afraid the questions and the answers I was asked to give might cast a reflection on the Census Bureau and its work. This job of measuring business in any area is a tough job and we have worked cooperatively with the Bureau of the Census since way back, trying to improve these measures so that they can be accepted as reasonable benchmarks. To the extent that we have been able to devote time to this project through the years, and the more years that we have been able to devote to it and the more figures that are released that are ques- [fol. 1980] tionable, the more headway we have been able to make. Unfortunately, in this particular area—and this is no reflection on the Bureau—but in that area we feel we have not had time to tackle problems that surround the proper reporting and compilation of census figures, so I am not surprised that since the release of what is supposed to be a final summary, a subsequent review has brought a further revision. This has happened before. As a matter of fact, I wouldn't be a bit surprised if we pinned the Bureau down further, there would still be another revision

following the one you received. If you read the notes, especially in this particular compilation wire supply field, you will find 18 notes at the bottom of the table, all of which indicate some of the problems involved.

For example, on one, other wiring devices, they have a note saying that 60 percent of this figure included precious metal. We all know these are not wiring devices. The Census had to put that note in there subsequent to a restudy.

Q. Mr. Nesti, I invite your attention to government ex-
[fol. 1981] hibit 498 for identification.

Mr. Bergson: I don't think you offered this, did you?
Mr. Melchior: No, I didn't.

Q. I ask you where on that form you find a request for the reporting of aluminum rigid conduit.

A. You mean specifically?

Q. Yes.

A. There is no specific request for it.

Q. Is aluminum rigid conduit reported under rigid conduit?

A. The intent, I am sure, was that it should be reported there.

Q. Well, what does footnote 5——

A. Well, note 5 that is being referred to, your Honor, reads "In 1960 data for other rigid conduit is included with other electrical metallic tubing," but that is only a matter of summarization. Apparently for some reason the Census was not able to set that figure out separately.

Q. Do you recall whether in the reporting form they asked for a specific—they had a specific item for aluminum rigid conduit?

A. No, this is one of the differentials between our in-
[fol. 1982] structions and the Census item. In our instructions we specifically ask for aluminum. In the Census they use terminology "other." As I say, I'm sure the intention was to cover aluminum there, but it doesn't specifically call for it.

[fol. 1983] Mr. Bergson: It is not clear as it might be.

Q. Now, let me ask you this one final question. You were at GX-500. You read it into the record.

A. Yes.

Q. This was a letter from the Bureau of Census to Mr. Melchior, dated February 13, 1962. After having read that letter, is there anything in that letter which causes you to change the opinion that you expressed this morning regarding the statement of the accuracy of the Census figures?

A. No, there is not.

Q. Is there anything in that statement that convinces you that the Census figures were not as you stated this morning, "understated"?

A. No.

Mr. Bergson: No further questions.

The Court: Just before the witness goes—go ahead, Mr. Melchior.

Mr. Melchior: I just want to ask one thing. I think the witness explained very adequately the difficulties involved in any collection agency in coming up with statistics 100 per cent accurate.

[fol. 1984] Recross-examination.

By Mr. Melchior:

Q. Over the last 20 years it has been your experience, Mr. Nesti, when gathering statistics that are national in scope, quite often you find that the figures are not necessarily right. If you ran the survey again, you would come up with something different.

A. It could be.

Q. I think that was the import. And that the newer the industry is the more difficult it is to get adequate precise national statistics?

A. I agree with that.

Colloquy Between Court and Counsel

The Court: I would like to clarify in my own mind this witness' testimony, therefore, I am going to ask him to stay here for just a moment.

Now, Mr. Bergson, this witness, I take it, was called among other reasons to show that the Universe figures in some of the Government's charts lack accuracy.

Mr. Bergson: Are unreliable and understated.

Q. Now, I think you stated that 455, that is the chart, here, it is headed "Value of shipments of conduit in the United States," and its source is apparently taken from the [fol. 1985] Census report, if I understand it right.

Mr. Bergson: As amended by that letter, Government's Exhibit 496, I think it is.

The Court: This last one is GX-520.

Mr. Bergson: But the handwritten figures on that chart came from Government's Exhibit 496.

The Court: 496. That is the February 1st——

Mr. Bergson: The February 1st letter.

The Court: Now, all right. What is bothering me just a little bit is that some of these charts are based on Nema figures and some are based on Census figures.

Mr. Bergson: That's right. And what we are trying to prove through this witness, your Honor, is that neither the Census or Nema figures accurately portray the whole industry. Nema reports only as far as the reporting companies are concerned and there were several companies that did not report to Nema. And the Census, by his extrapolation is too small.

The Court: Of course, if that is true, then the percent-[fol. 1986] ages in most of these charts, what they are offered for, is to show the percentage of Rome and Alcoa in the particular product that is described in the chart. If that is true, then those percentages are wrong.

Mr. Bergson: That's right. They are too high.

Mr. Melchior: Well, on that I better make comment there.

The Court: Yes, I wish you would. Go ahead.

Mr. Melchior: Our purpose, originally, your Honor, was to offer merely Census statistics. We have all of our conduit figures based entirely on Census figures. At a very late date we came upon Nema statistics. There seem to be a great deal of similarity between the percentages in Nema and Census. After discussions with counsel we concluded that Nema statistics were probably closer and since they were so close and because this was such a new industry, we felt that we would offer Nema statistics also. Now, we find from defense counsel and from the witness from Nema that [fol. 1987] they apparently do not feel their statistics are complete.

Now, by testimony of the witnesses we have shown why they are not complete, that there are certain errors which would downgrade the Nema statistics. We still feel, however, that the Census figures are accurate figures, accurate and precise, as the situation warrants. We feel it is entirely possible that if Census did make another survey, they may come out with some slight divisions. But the percentage of the change we don't feel would be material. We feel percentages here are sufficient to indicate the relative position of Rome and Alcoa in this field as a whole.

As you will note, we don't have figures for other companies as we do in the case of wire and cable. It was easy to collect figures for wire and cable, although the difficulties inherent in that are apparent from the footnotes we had to use. In the field of conduit, we didn't try it. We gave the most reputable universe that we could find, which was Census, and Rome and Alcoa figures are based on that.

[fol. 1988] The Court: It seems, and here is the way I am thinking and trying to get something out of this witness' testimony, it seems rather obvious to me that Nema's figures do not include the whole industry.

Mr. Melchior: They certainly don't.

The Court: Now, if Nema's figures don't include the whole industry, and your figures are substantially the same——

Mr. Melchior: They are not. There is a difference. Three million dollars.

The Court: And your figures are substantially the same, then doesn't the same defect carry over into the Census figures?

Mr. Melchior: I don't think so, your Honor, because we have demonstrated where the Nema figures are in error. The Nema figures are presently lower than the Census figures particularly in the field of aluminum. In the field of aluminum conduit. We have demonstrated through the testimony of the witnesses that Nema's figures are in error by including resellers.

The Court: So are your figures in error.

[fol. 1989] Mr. Melchior: There is no evidence in the record that they are in any way, and we have this letter from Census——

The Court: Just a minute. You take all the time in the world. I think slowly. What about the proposition, for instance, of interplant transfers. Your charts are headed, I think, "Value of shipments in this country." Now, if I understand the witness right, the Census figures would include foreign shipments.

Mr. Melchior: That's right. There are two different ways of collecting it. Census collected it one way and Nema collected it another way.

The Court: That is not what I am talking about. You say there were errors in the Nema figures because they didn't all report. But there are also obvious errors in the Census, because they apparently include foreign shipments, for instance, and interplant transfers. So that would be erroneous, too.

Mr. Melchior: Except we don't think they are errors. Merely because the Census decides to include interplant [fol. 1990] transfers doesn't make the figure wrong.

The Court: No, but it makes your caption wrong, doesn't it? Because you were talking about in your chart the sales or shipments, I don't know how it went, how each one is separately designated, but the shipments in the United States.

Mr. Bergson: Your Honor, I think maybe I can throw a little light on this.

The Court: All right. You help me.

Mr. Bergson: If Nema included foreign sales and interplant shipments in its figures even of the reporting companies, those figures would be higher and be closer to the Census. Or might even surpass the Census. But even under those circumstances Nema says our figures are incomplete because we don't have all the reporting companies. Now, the purpose of this testimony has been to show that by comparing Nema's way of reporting with the Census way of reporting, and if you would add to Nema the interplant transfers and would add to Nema the foreign shipments, Nema's total would be higher and still there would be a [fol. 1991] percentage above that that was unreported. And this casts reflection on the Census figures. They show the import, the purport, and the purpose of this testimony.

The Court: That is what I am getting at, but I am having difficulty. If we start out with the concession that Nema is

too low because they don't include these things and Nema is only slightly lower than the Census, and the Census includes some items Nema doesn't have, it seems that the taint spreads over onto Census, also.

Mr. Melchior.: I think we have shown by testimony with respect to the Nema totals, and let's direct our attention to just aluminum conduit.

The Court: Now, what charts are these?

Mr. Melchior: Well, you can look at, I direct your attention to Government's Exhibit 458, which purports to show——

The Court: It is headed "Value of shipments of aluminum conduit."

Mr. Melchior: Just aluminum.

[fol. 1992] The Court: That means as far as any shipments in the United States.

Mr. Melchior: That would include shipments in the United States plus whatever else there was included in, and the Census quotation which happened to be interplant transfers also includes exports. But, in addition, your Honor, and let me show you another problem here, it also includes accessories. In other words, the industry figure for aluminum conduit as secured from Census, the sixteen million dollar figure there, also includes accessories.

Now, we have no way of getting accessories out of there, so we are willing to leave the figures stand including accessories, knowing that it is an inflexible figure. This is the best we can get. Now, we have measured this figure against Rome and Alcoa figures which include only conduit. So if, somehow, we could get out of the sixteen million dollar figure, the accessories, the percentages there would be larger. We admit that this is not a precise figure. We submit, however, that it should be lower. We have no way of knowing how much lower it is.

[fol. 1993] Mr. Bergson: But it might be larger if all companies were included.

Mr. Melchior: We submit all companies are included. We have this letter from Census dated February 13, that they have recently canvassed the situation, and as the witness testified they talked to other associations, collection agencies and people in the field, and they feel that they have

every company. The witness doesn't know which they have. He has no way of knowing because it would be in violation of law if Census made that information available.

Mr. Bergson: Census said they canvassed the old age pension list and some manufacturers association. There is nothing in the Census letter as I read it that indicates that we have every company in here.

Mr. Melchior: I submit that is what they are saying, and I think the fact that they put this report out is obvious that they think it is a complete total. There is no evidence in the record that they are wrong, and this figure stands.

[fol. 1994] Mr. Bergson: What do you think the witness has been testifying to?

Mr. Melchior: He is giving his opinion that he doesn't think that they have everybody. But there is not a shred of evidence that they have not.

The Court: Well, that is about all we can do, I suppose. I suppose all we can do is take the opinion of these people who know and its strikes me as being, well it follows, that if Nema's figures are too low, because of failure of companies to report, that there is nothing much that bolsters the Census figures as containing something that the Nema figures do not contain.

Mr. Melchior: The Census figures, your Honor, as also seven million dollars higher than the Nema figures.

The Court: Well, it might be in some places and in some other places I don't think they are. That is in a quick glance.

Mr. Melchior: Well, in the aluminum field they are.

[fol. 1995] Mr. Bergson: Your Honor, if you will recall this witness testified that seven aluminum companies reported to Nema.

The Court: Yes.

Mr. Bergson: This letter from the Bureau of the Census said also that seven companies reported to the Bureau of Census. The witness also testified that there were several companies that did not report to Nema who were in the manufacture of this. Now, obviously, if only seven companies reported to Nema and only seven companies reported to the Census, and there were several companies that didn't report to either, the Census figure must be incom-

plete. I don't see how you can escape it. And the Government has introduced these charts solely for the purpose, if you will recall, of trying to bolster up their Census charts. And what they are doing here is taking a chart that is admittedly incomplete, or a series of charts that are admittedly incomplete, and trying to use them to bolster up the validity, of which we have questioned.

Mr. Melchior: I would like to mention two points that [fol. 1996] Mr. Bergson just made. He said there is a similarity in that both Census and Nema had seven reporting companies in the aluminum field. This is true. But we have the letter from Census which indicated that there were seven reporting companies which do not include re-sellers. They are all producers or fabricators. Whereas this witness testified that of the seven companies that reported to him, to his organization, two of them are re-sellers. So he only has five fabricators reporting. So there is no way of knowing which are the others.

The Court: Now, what is the chart that would show what you are talking about now. When I look at these charts I get awfully confused. They show the sale of steel and aluminum conduit, rigid and EMT in the United States. Then the next thing we get is that they include foreign shipments. I don't know, maybe the heading of your chart may be wrong. I just don't quite understand it, I will admit. [fol. 1997] Mr. Melchior: Sometimes we had some reservations on that ourselves, your Honor.

Mr. Bergson: Then why don't you withdraw them?

Mr. Melchior: But there is no way for us to find out how much was exported so we can get the export figures out.

The Court: Then you should not label your charts as being limited to the United States.

Mr. Melchior: For instance, looking at GX-458.

The Court: I happen to be looking at 457 and that shows that exactly, "in the United States."

Mr. Melchior: I think that's right, because that happens to be first with respect to Alcoa and Rome, this information was given to us in that form by the Defendants. Then with respect to the Nema, it is the next figures on Nema. The witness has testified that he doesn't collect export information. Now, if we would turn to page, to Exhibit 458, GX-458, which is Value of shipment for aluminum conduit, we do

[fol. 1998] not say they are just to the United States, because we realize that these are based on Census figures, and that Census does include exports. But we do not know how much. We have no way of getting it out. But in any case, your Honor, if we could get the exports out, the percentage for the two individual companies would increase instead of decrease.

Now, if we turn to the next page, GX-459, this again has to do with aluminum conduit. And if you will notice there we entitled it "United States," and the reason is that here we have Alcoa and Rome figures which are given to us in that fashion, and we have the Nema figures which are collected in that fashion. So, as far as aluminum conduit is concerned, these two charts are the two key ones, GX-458 and GX-459. GX-458 gives the percentage based on Census which comes to about 26.3 per cent.

The Court: All right. Let's quit right there. That obviously is incorrect, isn't it?

[fol. 1999] Mr. Melchior: You mean because of——

The Court: Because of the failure of the accuracy of the industry total.

Mr. Melchior: No, sir, I don't think I can perceive that, your Honor. There is no evidence in the record that it is incorrect. We have the letter from the Census which says there——

The Court: You are not using the Census. We just discussed——

Mr. Melchior: This one is Census.

Mr. Bergson: I don't see how counsel can say there is no evidence in the record when we spent the morning——

The Court: Oh, it is in the record, definitely.

Mr. Melchior: The witness doesn't know, your Honor.

The Court: The witness knows that his companies, the NEMA reports do not contain the whole story. Now, then, he goes on of course and says that in his opinion the Census does not—and he uses several reasons for it. It seems to me [fol. 2000] that is true. Well, now, none of these charts that are in here that are based on NEMA are any good.

Mr. Melchior: Your Honor, I find it very difficult to argue these are effective totals when the witness and the collector says they are no good. I admit that. I think the materiality and the weight of the NEMA totals is very small; I will

concede that; but I will not make any such concession on the Census figures.

Mr. Bergson: Why don't we move to strike the NEMA charts.

The Court: No, I will look at them. Because it seems to me that if the NEMA is no good, if I understood all of this evidence this morning, and I'll admit I didn't understand some of it, it is spread over into the other. All right.

The Witness: Your Honor, may I——

The Court: Yes.

The Witness: Just because of your last words, I wouldn't be a twenty-eight-year service man at NEMA if I walked out of here and let your last words of "no good"—I think [fol. 2001] I'm sure what you meant as an overall industry total, the NEMA figure is not that figure.

The Court: What we are doing here, you see, if I understand right, we are getting down to pretty small percentages, so the accuracy may become rather important and I didn't mean that. The fact that I said we'd throw them all out the window. What I should have said was they weren't complete.

The Witness: Thank you, your Honor.

The Court: All right.

Frank L. Magee, called as a witness on behalf of the defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Bergson:

Q. Mr. Magee, will you please state your name and address?

A. Frank L. Magee, 30 South Linden Avenue, Pittsburgh, Pennsylvania.

[fol. 2002] Q. By whom are you employed?

A. Aluminum Company of America.

Q. In what capacity?

A. Chairman of the board.

Q. Are you the chief executive officer?

A. I am.

Q. How long have you been chairman of the board?

A. Second year.

Q. Prior to that what position did you hold?

A. President.

Q. For how long were you president of the Aluminum Company?

A. I believe since 1957.

Q. And prior to your becoming president, what position did you hold?

A. Executive vice president.

Q. For how long were you executive vice president?

A. I think it was about five years.

Q. When first did you become employed by Aluminum Company of America?

A. 1917.

Q. Have you worked for Alcoa continuously since that [fol. 2003] time?

A. Ever since.

Q. During the course of your employment did you have anything to do with the sale of aluminum wire and cable?

A. Yes, quite a bit.

Q. Now, Mr. Magee, how many primary producers of aluminum are there in the United States?

A. Today there are six actual producers.

Q. Do you know whether or not there are any companies planning to enter the production of aluminum?

A. One has officially announced its intention—Consolidated Aluminum Company. There are about four that have been reported in the press at various times of investigating the production of aluminum, and we have quite reliable reports that they are definitely looking into it. Some of them have options on property, and one thing or another.

(Defendant's Exhibit AR-75 marked for identification.)

Q. I show you document that has been marked defendant's Exhibit AR-75 for identification, and ask you to describe that document.

[fol. 2004] A. This is a report by the Bureau of Mines of the United States Department of the Interior. It is the preliminary annual report on aluminum and bauxite in 1961.

Q. When was it promulgated, do you know?

A. It was issued—is there no date on that? I see no date, do you? Oh, yes. December 19, 1961.

OFFERS IN EVIDENCE

Mr. Bergson: I offer defendant's Exhibit AR-75 for identification.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-75 for identification received in evidence.)

Q. Directing your attention to the second paragraph of that document AR-75, would you please read into the record what is stated therein.

A. The second paragraph reads as follows: "Rated annual aluminum production capacity of United States plants increased 45,000 tons during the year to 2,483,750 tons when Harvey Aluminum, Incorporated announced the completion of 60 new electrolytic cells at its reduction plant at The Dalles, Oregon. A further increase in domestic aluminum [fol. 2005] production capacity was forecast. Cerro Corporation was considering building a production plant along the Columbia River at Wauna, Oregon. Cerro, as a result of its acquisition of the United Pacific Aluminum Corp. had a contract with Bonneville Power Administration to receive 90,000 kilowatts of electrical power for the plant, with delivery to start September 1, 1963. This amount of power would permit operation of a plant rated at about 55,000 ton capacity. Consolidated Aluminum Corp. acknowledged that a 27 million basic aluminum plant would be built near New Johnsonville, Tennessee. Howe Sound Company was considering three sites for a new 45 million dollar aluminum plant. Harvey also announced possible construction of a new 75,000 ton plant in the Pacific Northwest."

Q. Now, from the period between 1950 and 1960, what has happened to Alcoa's position as a producer and seller of aluminum?

A. Starting in 1950, the production of aluminum by Alcoa as a percentage of the total capacity produced in this coun-

try, has gradually decreased. I forget the percentage in 1950; I think it is in the 30's.

[fol. 2006] Q. Here is defendant's Exhibit AR-7, and I ask you whether that helps refresh your recollection as to Alcoa's position?

A. Yes, as a percent of the supply we decreased from 46 percent in 1948 to 34 percent in 1960. Based on actual production, which is a more logical figure, perhaps, to look at, production of the United States and Canada combined—the drop between those two periods, 49 percent to 36 percent. Capacity, of course, is another figure which is not quite as meaningful to us as production, but it is in the exhibit here. 43 to 35.

Q. Talking about capacity, does Alcoa have any plans presently to enter construction?

A. Not in the United States, no. No plants at the present time actually under construction.

Q. Do you have plans for construction of additional capacity?

A. In the United States?

Q. Yes.

A. No, no specific plans at the present time for construction of a new plant in the United States.

Q. Do you have any plans, or have you had any plans over the last several years, for a possible increase in the [fol. 2007] capacity of existing plants?

A. Oh, yes, we always have. We are always planning ahead, of course, to try to forecast the future and make tentative plans, but the only specific program that was developed in recent years was the new plant at Warrick, Indiana, Southern Indiana, which was completed only to the extent of one pot line, and then construction ceased at that time when we ran into the so-called depression.

Q. You say "depression." You mean over-supply of aluminum, do you?

A. Depression in the aluminum industry, or over-supply.

Q. How long has that condition of over-supply existed?

A. Well, I can almost pinpoint it to July 1st, 1956, when the first real evidence of the over-supply began to be felt.

Q. Now, Mr. Magee, do you encounter in your sale of primary aluminum in the United States the competition of any foreign companies?

A. Yes, quite substantial. Very worrisome.

Q. Could you name some of those countries?

A. Yes, the major country shipping into the United [fol. 2008] States, of course, by far the biggest is the Canadian company—I should say the Canadian companies. I know the Norwegian producers and the French producers—largely those.

Q. Now, at the present time how would you characterize the aluminum supply situation?

A. More than ample to supply the demand.

Q. And do you expect any shortage in the foreseeable future?

A. I do not, and I think it is quite obvious that it would be very difficult, save a war, and even another war of the type we would expect to obtain, would not in itself in our humble opinion today forecast a shortage of aluminum.

Q. Now, in the unlikely event that the aluminum supply and demand picture should become more closely in balance, are there any steps that could be taken to expand the supply of aluminum?

A. Comparatively simple steps. We have, of course, our own plant and our own ideas about it. We believe very firmly that we must keep the supply ahead of the demand. I'm sure that has been well stated in the press by others in the industry, that we could well expect they would also [fol. 2009] attempt to move in the additional capacity very promptly as the demand increases.

Q. Are plant sites available?

A. Yes, as a matter of fact, the Warrick plant I mentioned was planned to be a very sizable plant. We started out to build five pot lines, as we term them in the industry. These are very large lines nowadays, these modern plants. They are in the area of about let's say 50 to 60 million pounds, 25,000 to 30,000 tons. We have all of the electrical power facilities in that particular plant. The fuel facilities, coal, everything else set up to complete the five lines. We only completed the one line. We have additional pot lines at all of the other plants except Massena, New York at the present time, which could be reactivated very quickly, and we could easily expand some of our other plants, adding pot lines here and there. Almost every plant we could modernize and increase its capacity. We have fuel supplies on

the Ohio and Mississippi River system so that we could increase our capacity.

Q. Are there adequate supplies of bauxite available?

[fol. 2010] A. Yes. The supply of bauxite today, as is the case with iron ore, perhaps—most people know about that, but in the case of bauxite the discoveries have been very, very substantial since the end of World War II. I would say that the supplies of bauxite today are so far beyond anybody's concept prior to World War II that it is—bauxite now is a very, very substantial commodity as far as availability all over the world is concerned, particularly in the Western Hemisphere I might add.

Q. Now, you have talked about Alcoa's potentialities of expansion. Do your competitors have potentialities of expansion, if you know?

A. Well, I do happen to know. I know of one company, for example—is it all right to mention them by name?

Q. Sure.

A. It is public knowledge that Olin has an arrangement for supply of alumina and they never did get to the point as a result of the over-supply situation of building their large second aluminum plant in this country. This has been—the fact that they were unable to do this—we know that [fol. 2011] our larger competitors almost without exception—I would say without exception—have plans for increasing capacity. This has all been indicated in the public press.

Q. And if the demand should warrant it, this capacity could come into being?

A. They all seem to be pretty healthy, these competitors of ours, and I am sure they could easily move ahead.

The Court: Is the Reynolds plant open at Massena?

The Witness: Yes, it is running.

The Court: Is it producing?

The Witness: Yes, it is producing.

The Court: When was it opened for production, do you know?

The Witness: It seems to me it is now three years. I'd like to have that verified. It's close to that. Time basis—I have a little trouble.

Q. If the demand required it, would it be Alcoa's policy to increase capacity to meet that demand?

A. I'm sure it would. We live for the day.

[fol. 2012] Q. Would an increase in demand for aluminum be likely to encourage any new producers to come into the business?

A. Yes, I would say very definitely. As a matter of fact, as I mentioned before, there are a number considering it right now and I think the increased demand would stimulate that activity.

Q. Now, Mr. Magee, you have been talking from the period July, 1956 to date—I think you said that.

A. Largely, that is.

Q. Now, periods of government allocation apart—periods of controls apart—have there been any periods when aluminum was in short supply?

A. Yes, this has been a difficult situation, but I would like to make clear that—of course, the government allocation period is automatic—the government takes over the supply and allocates it. But periods of short supply in my knowledge have been largely as the result of either wartime situations—in other words, the period of short supply, the first period we experienced I suppose—I cannot speak of the period back in World War I very well—it was in short sup-

[fol. 2013] ply and allocations at that time, but coming into recent periods, the first period of short supply was in 1937, and then there was a short recession in 1938, then short supply again in 1939. But both 1937 and 1939 short supply periods were stimulated largely by the demand for aluminum as a result of the preparation for war. And this went on until we had government controls in World War II. We had exactly the same thing prior to Korea and coming out of each war period we had the stimulation that resulted from the pent up demand which caused the shortages, post-war in each of these, if you want to call Korea "war." Also in 1937 the shortage was somewhat stimulated by a pent up demand as a result of the famous depression, I might add, added to the increased demand for airplanes under the lend-lease programs which got under way.

Q. In these——

A. I wanted to make clear that the periods of shortage—this is what I am trying to make clear—that under normal conditions the law of supply and demand, short of military

problems, short of national problems stimulated by war effort, there hasn't really in my humble opinion ever been [fol. 2014] any real shortage. The aluminum industry kept ahead of the demand, except in those cases where extraordinary conditions arose of that type.

Q. Well, now, in these extraordinary periods were there any periods when government controls were not in effect?

A. Yes.

Q. Now, when government controls were not in effect and aluminum was in short supply for the reasons that you have mentioned, what was Alcoa's policy in regard to making aluminum available to non-integrated producers?

A. We attempted to do the best job we could. Many times in cooperation with the government officials as a matter of fact. Because even in those periods that we were not under controls, we always had to recognize the military—government got its first take. After that we attempted to allocate our production on the basis of a background of experience with our customers. In other words, if we didn't have enough aluminum to supply everyone, we attempted to allocate on the basis of their past experience over a term of years with us. In other words, our past shipments to these respective [fol. 2015] customers. We allocated to our own fabricating plants in exactly the same manner. On the basis of past experience.

Q. Did you favor your own fabricating division?

A. Not at all. We bent over backwards just because we wanted to be extremely careful we could never be accused of not taking care of our customers on a perfectly equitable basis.

I should mention in those particular periods, these are difficult periods, because when you get into these tight situations of course the requirements of customers many times are multiplied, so that you cannot base it on anything but past experience.

Q. And when you did that, did it become necessary for you to operate your own fabricating facilities at less than desired capacity?

A. Yes, we did that.

Q. Now, Alcoa is both a primary producer of metal and a fabricator of aluminum products?

A. Yes, sir.

Q. What is Alcoa's policy with regard to the pricing of pig and ingot to its various fabricating divisions?

[fol. 2016] A. Well, it has always been our policy to charge our fabricating facilities with the price—same price that we sell our ingot on the market. I might mention that today this product which is made by the smelting plants is commonly termed ingot.

Q. I stand corrected.

A. Just an upgraded term for what was at one time called pig. The pig came from the old terminology of pig iron. It wasn't a very fancy name.

Q. Now, in pricing your fabricated products what considerations do you take into effect?

A. Well, obviously the first one is cost. We attempt to work in the case of all our products, fabricated products, military products to base, we hope; on what we believe to be efficient production facilities. In most cases at least. We attempt to establish prices which we would propose to charge in any particular product first on the basis of cost, as indicated, and then on the basis of a proper, what we would consider to be a proper and fair return on the investment of the facilities involved in the production of that product.

[fol. 2017] Of course, this is obviously and always an attempt to establish fair and equitable prices in the marketplace. We must, of course, at the same time take into account the market we are aiming at. It is possible that a proper return on a product for one market might not be possible in another market. This might be due to two potential situations. One could be the situation where the market just wouldn't stand as much of a markup on the investment as another market. If you had your own free way to establish the price. But more importantly, the condition that faces us most of the time is the competitive situation. In other words, what will the competitive situation allow the price to be? The competition situation on this could be in aluminum, it could be in steel, plastics, wood or anything.

Q. Or in the very product that you are fabricating?

A. Exactly. So in the final analysis, the price is made in the marketplace, and there ultimately comes a time when

certain markets cannot be reached, just because we are unable to compete in that market on the costs that are indicated.

[fol. 2017a] The Court: Is this a good place to stop?

(Whereupon at 3:45 p.m. a recess was taken.)

[fol. 2018] (After Recess.)

By Mr. Bergson:

Q. Mr. Magee, as we recessed you were saying that competition in aluminum products affected the price that you were ultimately able to charge for your products. Is this true in wire and cable products as well?

A. Yes, very definitely. It is a very highly competitive field at the present time.

Q. Mr. Magee, is there any competition in the wire and cable field from foreign sources?

A. Yes. We are getting some effect of it from abroad. There was a very specific large production here in New York State. In fact the New York State Power Authority had a very substantial series of lines that they built. I remember that was a bid from Belgium and we had an opportunity fortunately to meet it. As a New York State manufacturer we did meet it, but we expect there will be more of this. Of course, in just plain wires and rods and bare sheet, of course, competition is very pronounced. It would take a fairly large job for a foreign cable manufacturer to come in here, because he has the matter of shipping of reels, and [fol. 2019] the incentive to come over for small jobs is not there. But we conceive strong possibility that there will be more and more competition from abroad in the electrical conductors. Particularly the bare. I don't know enough about the insulated wire. That might also follow.

Q. Now, Mr. Magee, going back to 1950 or 1951, directing your attention to that period, what wire and cable products were being introduced by Alcoa?

A. In 1951 we were confining our production, in 1951, I am sure, primarily to bare all aluminum cable, steel reinforced conductors. As I recollect we were making no insulation, insulating conductors, of any kind in that period.

Q. Who invented ACSR?

A. Well, he happened to be——

Q. Not the individual, what company?

A. It happened to be Billy Hoopes, in our company, who invented it, in 1907.

Q. In 1951 did Alcoa have any experience or competence in the insulation of aluminum wire and cable or in wire and cable?

A. We didn't think we had, no. As a matter of fact, we had none.

[fol. 2020] Q. Did you take any steps to get into the insulated wire and cable field?

A. Well, of course, we were faced more and more with the fact that there was a potential for aluminum in the insulated field. Quite a few years ago we tried to interest the people, the copper conductor people who insulated copper conductors to insulate aluminum, and we were rather successful with one company, the United States Rubber Company, to be exact, and this was even back in the days when I was selling electrical conductors. But it was pretty difficult for these people to see any combination of aluminum in insulations. Because copper, of course, has always been pretty much standard. Ultimately, of course, United States Rubber was bought out by Kaiser, but really there was not much success in encouraging the insulated wire and cable manufacturers to move aluminum insulated wire and cable, as we were anxious to see done. Because we believed there was a future there.

Q. Did you take any steps to get into the insulating or covering of wire cable yourselves at that time?

A. Well, some time early in the 1950's, and it seems to me it was around 1952 or 3, that we——

[fol. 2021] Q. I think the records indicate it was '52.

A. '52, that we arranged to have the Rome Company toll. I believe it was both polyethylene and neoprene insulated conductors. In other words, we sent them the wire from Massena. They insulated it and then we either took it back to Massena or sent it to warehouses or had it shipped directly from Rome to our customers. In other words, it was an insulating tolling arrangement.

Q. Now, were there any other reasons other than the one that you just gave as to why Alcoa felt it ought to get into the insulating wire and cable business?

A. Yes, sir. As a matter of diversification in this industry. After all the all aluminum and aluminum cable and steel reinforced conductors had finally obtained their places in the sun in the overhead conductors of the transmission lines, which was sold largely directly to utilities. The other conductors such as the insulated and the smaller secondary conductors and of course so many of the various types of insulated wire, service drop, and so forth, a good deal of that business is handled through distributors, like Graybar, [fol. 2022] or national distributors or local distributors who handle electrical products. So there was a competitive proposition.

First of all, if we were going to supply these companies with a full line of conductors, as our competitors were doing, we had to have a bigger line of conductors than just bare. Because many times, first of all the utilities, buy on an annual basis or contractual basis and they buy the whole line. People like General Cable, who were here this morning, which take the whole line, and they go for the complete line of conductor materials, bare, copper and aluminum.

Even more, you have the distributor who distributed not just to the large utilities but to the contractors who build houses, contractors who build lines for utilities, to industrial companies. These distributors occupy a pretty important place, and they must have the whole line. And, of course, the companies who are able to supply the full line were in the preferred position with the distributor. He could hardly carry just a part of the line for us and then ignore that same part of the line for the competitor. For [fol. 2023] that reason, plus another important reason from our standpoint, as competition in the aluminum grew, as our percentage of the aluminum industry kept going dowards, we felt in our management that we had to, also we have the ups and downs of the metal business, to a great extent the gyrations of general business, that diversification was becoming an important thing for us to take into account. And here was the area where we had some reasonable hope of diversification in insulated conductors, both copper and aluminum, which would be highly desirable from our standpoint. And we spent lots of time studying that potential situation.

I should also state in that direction, Mr. Counsel, that it

is a matter of record, that because of our inroads, because of the inroads of aluminum into the high tension wires, the copper companies had gone into the aluminum and the electrical conductor, bare, business, and then it was only natural, I want to point out, that they were the ones who sat in the more healthy position, being able to produce both bare aluminum and the insulated copper.

[fol. 2024] Q. So that there came a time, then, after your tolling arrangement with Rome had been entered into where only aluminum insulated wire and cable were tolled for you, that you felt that you had to get into a more diversified line?

A. Exactly, because there are areas obviously where copper has its place, and while I don't agree entirely with the witness this morning that aluminum cannot move a little heavier into the copper fields, the fact still remains that there are many people who will buy insulated copper conductors where we think insulated aluminum would serve as well. We also recognize there are areas where insulated copper conductors have a very definite place in the industrial picture.

Q. Now, when you came to that conclusion that you ought to diversify into a broader line, what course of conduct did you take into consideration?

A. You mean——

Q. What were the possible steps?

A. Oh. Well, of course, having studied this for a good many years, it wasn't a momentary decision, as you might imagine, but coming out of World War II, there was a great deal of attention given to this problem as to whether or not [fol. 2025] we could consider going into the manufacture of these articles ourselves. It wasn't any—well, there were lots of problems in connection with it, but we had some ideas of how we might move. But in considering the manufacture on our own, obviously we had a marketing situation; we had a manufacturing problem. Our present bare wire plants in Massena and Vancouver, which are topped by the smelting plants and the fact of consumption being taken into consideration in the industry, so we were faced with the probability that we would have to invest in some

brand new manufacturing facilities for making insulated conductor, and then if we wanted to get the whole line, which seemed to be quite necessary, and to get into the copper insulated conductor, this would add an additional complication and cost to the problem. This meant a very substantial investment.

As far as going on our own was concerned, and the time element had become more and more pressing, and important as the competitive situation got more difficult.

The other route, of course, is quite obvious and logical, [fol. 2026] and that is the route of acquiring a company already equipped, such as Rome, already equipped with the ability, the technique and the facilities to produce these products.

Q. When you talk about ability and technique, would the problem of ability and technique be a problem that you would have faced had you gone into this on your own?

A. Very definitely. This was a new one for us. This was a new kind of thing. Insulations have changed enormously in recent years. They are changing daily from what I understand, and there are new plastics coming out all the time. New types of conductors. This would have required a new set of technical people. We would have to start from the ground up, so to speak.

Q. Would they have been easy to obtain?

A. Well, I don't know. This business of easy to obtain good people is one of the real problems of the manufacturing company these days. I wouldn't say it was easy to obtain them, no. I am sure we would have been able to do it, given time.

Q. You say given time.

A. These people don't grow on trees.

[fol. 2027] How long do you think it would have taken you to get into this position in the way that you wanted to?

A. A program of the type we got with our Rome Association certainly would have taken ten years without any doubt. Now, we would have obtained a very good start on some of the conductors say in roughly five years. This is just an estimate, of course, but it would have taken a substantial period of time to get to where we are today.

Q. And during that period of time is it possible that your competitors would be moving ahead?

A. Unfortunately, I don't like to think about it, but it is always a condition that time is pressing in these days on these matters.

Q. Now, Mr. Magee, I show you a document which has been marked as Government's Exhibit 161, which is a memorandum from Mr. P. T. Coffin to W. K. Unverzagt, the first paragraph of which shows a copy of this letter as being sent to you. And I invite your attention to page 5 of that document, paragraph 7, where Mr. Coffin uses in quotation the phrase, "Industry rocking in regard to the Kaiser-[fol. 2028] U.S. Rubber deal and the Olin Mathieson-Southern Electrical Combination," and ask you if you knew, I ask you what that statement meant to you?

A. The "Industry rocking"?

Q. Yes.

A. In quotations.

Q. Yes.

A. Well, since it refers specifically to the Kaiser-U.S. Rubber deal and the Olin Mathieson-Southern Electric deal, it certainly would be interpreted to me, knowing about the general situation, that Mr. Coffin was talking specifically about the acquisition by these two companies, Kaiser and Olin, of insulating, manufacturing facilities for the production of insulating conductors. Not bare, obviously, because it wouldn't have been industry rocking if it had been bare.

Q. Would it have been industry rocking if it had been insulated aluminum conductor?

A. Oh, yes, very definitely. In other words, it is industry rocking in either case. As long as they acquired by these acquisitions they were able to move right into the aluminum [fol. 2029] and copper insulated conductor business.

Q. Which were they in at that time, aluminum and copper?

A. Aluminum and copper insulations.

The Court: What is the number of that exhibit?

Mr. Bergson: 161.

The Court: 161.

By Mr. Bergson:

Q. Now, Mr. Magee, do you recall that some time during 1957 there were some discussions with Rome Cable concerning its acquisition?

A. Yes, I do.

Q. Can you tell us what you recall regarding that?

A. The relationships with the Rome Company, of course, have been very close for many years. Many of the officials of the two companies were close friends. As a matter of fact, just by circumstance, in some ways, and it had nothing to do in many ways with the fact that they were in somewhat similar industries. But many of our people because of the close relationships, because Rome was located not too far from Massena, because we had a great respect for the organization, the people in the Rome Company, it is only [fol. 2030] logical when we were looking at these two possible keels where we might go on a diversified line of electrical conductors, that we would think of Rome. And, as a matter of fact, there was some very frank conversations between the two companies. There was never any mystery, as I understand it, about the fact that we were going down this route. As a matter of fact, it is my recollection that when we asked them to toll, fabricate the insulations on our conductors, that there were no bones made about the fact that this was a road that we might well travel some day, and in asking them to insulate for us that there would be no misunderstanding about the matter if later we went into the insulating business ourselves.

Q. Now, when you first had discussions with Rome in 1957, did you make an offer to acquire Rome Cable?

A. Yes, after some initial conversations, which usually take place in situations of that kind, there was an offer made in shares of Aluminum Company stock to the Rome management.

Q. Of what value; do you recall?

A. My recollection was that the approximation, and this may be a little ways off, that the approximate value in Aluminum Company shares based on the market of Aluminum stock at that time was in the area of twenty-four million dollars.

[fol. 2031] Q. What happened to that offer?

A. That offer was rejected.

Q. Now, after that offer was rejected did Alcoa take any other steps to acquire a company engaged in the insulating of wire and cable?

A. Well, somewhat reluctantly, I guess it was, because we had a great feeling about Rome, friendly feeling, we arranged to have a—well, we did two things as I recollect. We decided to have another survey made to see whether we were right in our decision that we should diversify our line of electrical conductors, and we asked Ebasco Services in New York, a very prominent firm of engineers, independent people of course, to give us some idea of the buying habits of utilities and asked them a great deal of information that might help us again reach a decision. Almost coincidental to that, or shortly thereafter, we also asked them, because of their knowledge of the electrical market, of the whole electrical industry, we asked them whether or not there were not some companies that might be considered in the category of those we could acquire with the specification again that we were interested only in companies which had [fol. 2032] qualification of producing these rather highly technical insulated conductors.

Q. And did Ebasco make this study for you?

A. Yes, they did, and they completed the study and it was helpful. It didn't change our opinion. We then asked them to make some discreet inquiries about the possibility of some of the companies mentioned, as to their potential acquisition.

Q. And what was the result of those discreet inquiries?

A. The result was zero. No soap. No business.

Q. After it looked as though Ebasco was coming to the end of the line, did you again re-evaluate your situation as to what you should do about getting into the diversified line of electrical conductor products?

A. Yes, I suppose a company like ours should be able to make up its mind, but this was an important step and involved substantial sums of money; it involved reorientation of our whole commercial organization; our distributing organization; markets that would have to be developed; and so we asked—as a matter of fact, I personally reached the point where I was very impatient about this, and I be-

[fol. 2033] lieve by that time somebody made me president and I had some responsibility along this line, so I kept hammering away, trying to get some real picture of what was involved for us to go our own route. This was very important and very difficult, of course, to ask any organization to draw a complete picture of it.

Q. I show you government exhibit 168, which is a letter dated October 3rd, 1958, from you to Mr. Davies, and I ask you if that document describes the events you were just talking about?

A. Yes, I guess it does; it obviously indicates my impatience and that of my good associate Ralph Davies as well, I take it.

Q. Now, would you explain what you had in mind when you wrote that letter?

A. Well, I definitely felt that we had reached the end of our rope as far as acquisition of a company which had the technique and the organization that we needed, so that it did seem that we should have an alternative program of going on our own, and the cost of it—what our people had proposed to do a good job—and as you notice here—I should state this letter indicates that I was referring to a rounded [fol. 2034] out program well beyond the neoprene stage and a program which would keep us in what I termed here "the number one spot in the aluminum conductor field, and if necessary a sufficient factor in the copper field to help us maintain the number one position in the aluminum field." By the aluminum field, of course, I meant the bare aluminum conductor field, which is primarily what we were in at that time.

Q. And also did this not refer to the possibility of using this study as a check to determine whether or not you would be paying a fair price if you should find a company to acquire?

A. Yes, obviously we had this 24 million dollar offer. We had some observation of what it might take to buy some other companies, and it was quite necessary and desirable that we have some idea of what it would cost us.

Q. Now, after that memorandum was written, were negotiations with Rome resumed?

A. Yes, I believe—I don't know whether the study that I asked for in this memorandum had been completed or

whether it was just in the course of preparation, but in that [fol. 2035] period of time—this is October 3rd, 1958—it seemed again because of our past good relationships with Rome, and again our real high regard for them and their organization, and also because of the close relationship we had and their understanding of what our program was going to be, that certainly they should not be surprised if we went ahead on our own, and certainly we had the obligation, it seemed to us, of at least going once more and saying have you changed your mind or are you where you were a couple of years previous, so we approached them again on their possible interest in joining up with Alcoa.

Q. Now, at that time did Rome make an offer to Alcoa?

A. My recollection is that it was proposed since we had made the last offer that Rome should make us an offer, and they agreed to do this and they did make us an offer after consideration again of their board and various officers in Rome.

Q. And was that offer acceptable to Alcoa?

A. As I recollect, no. This was getting to be, I suppose you would call it the horse trading stage, and my recollec- [fol. 2036] tion was that their price was higher than we were willing to pay. It seems to me it was four shares of Alcoa for five of Rome, something in that nature. Four to five, yes, as I recollect it.

Q. And did Alcoa reject that offer?

A. We rejected that offer and made a counter offer, and as I recollect again that was three to five.

Q. And was that offer accepted?

A. It was accepted subject to certain qualifications which Messrs. Dyett and Fraser and the whole board of Rome made, and the major qualification was—had to do with the question of how we would operate from Rome. This was as important apparently to them—it was important to us too—almost as important as what we were willing to pay for Rome. Quite understandable, I might say, because the Rome Company had been put together and developed from scratch by this group of men, Mr. Dyett, Mr. Fraser and others who started this company, built the personnel and had achieved quite a substantial success in this electrical conductor field, and they were very proud of what they had accomplished, [fol. 2037] and proud of their organization

Q. Are the topics that were discussed as far as Rome's desires for the continued operation of Rome was concerned embodied in this letter of yours to Mr. Fraser dated January 21st, 1959, which is government exhibit 6?

A. Yes, those are the conditions to which I was previously referring. We set them down in this form so that Mr. Fraser could take them back to his board as a finite part of the negotiations. As an understanding between the two companies. This was just as important as the exchange of stock. I mean, it was just as firm you might say.

Q. What does paragraph number 1 say?

A. "All manufacturing and selling activities of Rome Cable Company conducted at Rome, New York will be continued in that location."

Q. What does paragraph three say?

A. "We would expect to consolidate in the new company all electrical wire cable and conduit activities of both Rome and Alcoa. This will greatly expand the scope of activity and consequently the responsibility and opportunity of the Rome organization. For example, the transfer to it of [fol. 2038] Alcoa's bare conductor business alone will greatly enlarge its operation. We would expect to move into the new company additional products in the electrical conductor field or related areas as we gain experience in working together. Insofar as products new to Rome are moved into its orbit, it will probably be advisable to transfer experienced Alcoa personnel to the Rome operation."

Q. What does paragraph five say?

A. "We would expect the new company to continue the present sales organization of Rome, subject only to such modification as experience might indicate to be in the common interest. Insofar as Rome selling activity is expanded by merchandising Alcoa products experienced Alcoa personnel will be available for transfer to the Rome company. We regard the effective consolidation of the marketing organization of the two companies as one of our major problems if we are to gain the full benefit of our proposed agreement. However, we are certain that this can be achieved, as our Pittsburgh discussions indicated."

[fol. 2039] Q. Now, have those policies, as enumerated in that letter of January 21, 1959 been put into operation?

A. We believe they have. We have tried very sincerely to see that that has been done.

Q. And is it your expectation that it will continue that way?

A. We have no reason to change. We have put the responsibility for this operations on their own management and they have accepted it and as far as I can understand this is a very effective way of working together, we have found.

Q. Now, referring back to the memorandum or the letter, government Exhibit 168, of October 3, 1958, did Alcoa ever reach a point where a management decision had been made to go it alone?

A. No, we never reached this decision.

Q. Do you have any idea as to the magnitude of the undertaking that would be involved if Alcoa had decided to go it alone?

A. Yes, and then this was confirmed by this study which I asked for. Quite—some pretty fairly large figures as to what it really meant to us to move out on our own.

Q. Would it have been fairly substantial?

A. Yes, it would have been. It would have been sub-
[fol. 2040] stantial. And we are rather use to spending some sizable sums of money.

Q. Mr. Magee, are you familiar with the acquisition by Alcoa of the transformer division of Automations Instruments Company?

A. Yes, I am.

Q. Would you—do you recall when that acquisition took place?

A. I can't get it very clearly—I would have to guess at around 1956 or '57, but I am only guessing. It may have been before that.

Q. Do you recall what Alcoa paid for the Transformer Division of Automation Instruments, Incorporated?

A. It was something less than a hundred thousand dollars; ninety thousand sticks in my mind, or thereabouts.

Q. Do you recall what Alcoa acquired when it acquired the Transformer Division of Automation Instruments, Inc.

A. Yes, it was almost completely technique. This was a very interesting individual by the name of Shafer, who had an idea which we thought was quite unique, and it involved

a potential new use for aluminum, or a potential use that [fol. 2041] was not—we hope to develop it some time, which was simply in the embryonic stage. That had to do with the potential of aluminum transformers and other electrical equipment, windings and these fellows in Denver, this division had done quite a lot of work on it, but really didn't have the capital or the equipment to get anywhere with it, and our attention had been called to it—they approached us because of our interest in aluminum—they saw the possibilities, and after considerable investigation of this potential, it was obvious they wanted to sell out and as a matter of fact, we bought a lot of their home-made equipment; it was largely—they had developed themselves, which we had to rebuild, of course, into more modern equipment or up-to-date facilities. But it was more of a research project than it was—it wasn't a production facility at all, as a matter of fact, it was research development on the part of this man Shafer, who, by the way, came with us; a very good research man. I believe right now—you see this was almost preliminary to the idea of the magnet wire business. This was windings. And, well, magnet wire is an important product [fol. 2042] if we could get aluminum and transformers, windings, and large electrical machinery windings as a replacement for copper, this is a real big potential market, and these fellows had the right idea, and Mr. Shafer is now with Rea, who also had the same idea with regard to magnet wire.

Q. Did you acquire any other personnel at the time?

A. Seems to me one or two other fellows; clever, inventive type men. But I don't recollect their names.

Q. You acquired machinery that you paid approximately ninety thousand dollars and two or three individuals—Yes, it was really sort of a homemade research equipment.

A. More of a glorified laboratory that we picked up. It was not a production facility at all.

Q. Mr. Magee, I hate to end your testimony on a sad note, but we began your testimony discussing what had happened to Alcoa's position as a producer of primary aluminum. Now, I would like to ask you, if you know, what Alcoa's return on gross revenues was in 1950?

A. On the gross revenue in 1950, it was 9.7 per cent.

Q. And what was it in 1961?

[fol. 2043] A. In 1961, 5 per cent on gross revenue.

Q. What was Alcoa's return on shareholders equity in 1950?

A. 13.7 per cent.

Q. And what was it in 1961?

A. 5.6 per cent.

Q. What was Alcoa's return on invested capital in 1950?

A. 9.3 per cent.

Q. And what was it in 1961?

A. 3.7 per cent.

Q. Your witness, Mr. Melchior.

Cross-examination.

By Mr. Melchior:

Q. Mr. Magee, in the beginning of your testimony you discussed at some length the plans, I believe, that perhaps some of the companies in the industry and your own company may have for expansion. I wonder if you would tell us a little bit, if you know, and I have the impression that you do, what are some of the problems involved in constructing a reduction plant? What would be your major problems?

[fol. 2044] A. You talking about Alcoa's, for example?

Q. Yes. If Alcoa were to construct a new plant at the moment, if it didn't have so much present over capacity, apparently it has, if it wanted to construction a new plant, would the site be the problem?

A. It could be one problem. I was going to say the problem of economic location of a plant to supply the market would probably be one problem. They are quite complex. You would have a labor problem, you would have a fuel problem. You would have power supply problem. There are no one single problems paramount over another. No mystery about building a smelting plant these days, as far as the technical difficulties or the available equipment, and that phase of it is concerned. It is largely a matter of good judgment in selecting the location and site and getting a good power supply and so forth.

Q. Well, do you generally try and locate a plant close to raw materials, or would it be close to the source of power?

A. Of course, the logical thing is that I didn't—the situation where you could locate it all, if you had everything all [fol. 2045] in one place; the bauxite and the power and the fuel and the market. But——

Q. There aren't any more places like that, are there?

A. Well, no, you are just about right. So you have got to compromise and each company, depending on its own individual situation, will locate its smelting plants, depending entirely on its own geographical problem, I would say.

Q. Well, is the source of power a major problem, an inexpensive source of power, or is there ample electric power available?

A. There seems to be ample electrical power, if we are talking about the United States.

[fol. 2046] Q. I was thinking of the United States.

A. Yes, there seems to be no difficulty about that as you probably know today. One of the real problems in the electrical industry is the fact that the electrical power supply has caught up with the demand and there is a great surplus of power at the moment in the United States.

Q. I see. How long has this been the case?

A. Just the last few years. Of course, utilities have overbuilt and we have had sort of a setback, so that the big generating facilities of the big electrical companies today are not very busy. They would like to have more business. Take the Northwest for example. There has been a great surplus of power up there at the present time. But the electrical power, this is proverbial, they are building ahead so there is no problem of power supply today as there used to be. The great interconnected utility systems have made a big difference in this situation as far as aluminum is concerned.

[fol. 2047] Q. At one time this used to be a major problem but you don't consider it to be one any more?

A. I really don't. Not like it used to be. Again it is a matter of judgment where you might make the best kind of a program, an electrical power program. One fellow will take a certain type of preference; another might go a different route.

Q. These companies seem to change from time to time; sometimes one is short and another time another is short?

A. Exactly.

Q. Is that the way it has been in your experience?

A. Exactly.

Q. Has Alcoa—you might have given these figures and if you don't have them precisely you can just say so, since the ending of Korea has Alcoa expanded its capacity to a pretty substantial extent?

A. The only real expansion since the end of Korea has been the Warwich Plant which I mentioned earlier. That is the proposed plant for soft coal on the Ohio River and Southern Indiana.

Q. Was there any government assistance involved in this expansion?

A. No.

Q. None at all?

A. No.

Q. This is entirely on your own?

A. Entirely our own, yes.

[fol. 2048] Q. With respect to the construction since Korea by any of the other existing primary producers of your own knowledge, do you know whether there was any federal government assistance in their construction?

A. Yes. Since the end of Korea in the United States, we have on record in the industry that there has been some outside the United States parenthetically, but it is the Harvey Aluminum I believe that had government assistance. The Anaconda program had none, I believe. I don't think there was any in the case of the Olin-Mathieson. It was just in the Harvey that there was government assistance.

Q. How about the period between World War II and Korea, the period during World War II and subsequent to World War II up to 50 and 51, Alcoa I believe extended somewhat during that period?

A. Yes sir. The only real expansion in that period was the Korea program on the part of several producers.

Q. Was there some federal assistance involved directly or indirectly?

A. Only through the stockpiling arrangements. And of course in those days it was controlled materials. In other words the government gave priorities to control materials as it did to other facilities. But simply the stockpile arrangements that the government made in return. And I don't

know whether you call this government assistance or not. Because the industry at that time spent its own private capital and in return agreed to put aluminum in the govern-
[fol. 2049] ment's stock pile. Now you can decide whether that was a benefit or otherwise.

Q. Yes.

A. Sometimes we think it was otherwise.

Q. Did you receive an indication from the federal government what the purpose was, from their standpoint?

A. Yes. We were only allowed to build two plants. They specified exactly what capacity you could build and that was it.

Q. And their purpose was to build a stockpile for future war time emergency?

A. That is exactly the program. Rather than buying it abroad. Also to build up some competition for Alcoa.

Q. What do you mean by that?

A. Well actually the specifications as to the productive capacity that was allowed to be built by the respective companies was gauged on the basis of what the government decided our competitors could build and what we could build. And we were permitted to build a specific amount and the others were permitted to build some greater amounts.

Q. They were smaller than you at that time, of course?

A. Exactly. This was the government's decision.

Q. Now since World War II and particularly since Korea and during Korea I think you said there were times when there was some temporary shortages of aluminum and there was some government programs of allocating primary alu-
[fol. 2050] minum to non-integrated companies. You are generally familiar with that program?

A. Yes sir.

Q. I believe you spoke on direct that in some of those cases you used the historical method of allocating the short supply of aluminum to your customers. Could you very briefly tell me how that worked?

A. Yes. It obviously had to be somewhat arbitrary because there were no rules of the game that anybody, that any authority set up. Many companies did this same kind of thing because they had to. It was not just aluminum that was in short supply.

Speaking of the Korea period, it was largely passed Korea, subsequent to World War II and coming into Korea there was for a while an over-surplus of aluminum and there were never any real shortage periods there that were of significance. So it was past Korea that we ran into problems of allocation and just prior to Korea when we ran into problems of allocation when the government controls went on.

If for example in any particular area, if I recollect, and I am not sure I do the details of it, but certainly we had a definite record of the amount of tonnage that we shipped say over a period of five years. I believe it was a five year period that was chosen prior to this time. And that record would total up to a certain sum of aluminum produced by us and that was shipped, let's say to 100 customers and then [fol. 2051] allocated, and of course in the various products of ours you had a similar situation—so that we totalled the whole thing up and simply put a percentage on it, and that was the allocation in effect. That is the simplicity of it.

Q. And the word historical means based on what they produced in the plant——

A. Based on what they purchased in the past and on a percentage basis summing up the total, and that was it.

Q. How about those companies that didn't have a historical basis—new companies in the industry?

A. Those became a real problem because you were faced with the situation about the fellow who came into the industry at this time and wanted a supply of aluminum and at the same time pressures from the company who for all practical purposes had every right to expect to be taken care of because of past experience. So almost without exception we had to very frankly say to the newcomer "we are sorry but we must take care of our customers with whom we have done business before." Assuming it was not a military customer.

Q. Oh yes.

A. Bear in mind many times a good many of those people had particular allocations and therefore could get a control material application—the new ones.

Q. Well as a matter of fact I guess it was to take care of those people without the historical background that the [fol. 2052] federal government arranged some sort of a

set-aside program for non-integrated and small business concerns?

A. Exactly. And this is the problem we faced in Washington. Very frankly we always sat down with the people in Washington and pointed out the real problem, that here was a man who through no fault of his own arrived in business at a period like this and obviously needed aluminum, and particularly if he was a small business concern. Many times he could get a government allocation of some type or other. Of course at that time there were these competitors of ours going into the business and many of those fellows were taken care of by the new aluminum companies going into the business.

Q. I was interested in your testimony this morning as to the need prior to the Rome merger, when you felt the need for diversifying your wire and cable products. I am also interested in your comment about the testimony of an earlier witness—I guess you were referring to the president of General Cable.

A. I was.

Q. You recall I asked him if he thought aluminum would ever replace copper and he explained to me that he didn't think a large area of the wire and cable field would be taken over. I think you commented on it in your direct testimony. What success do you think, that the aluminum wire and cable factor, will have in replacing copper for most of its conductor use?

[fol. 2053] A. Well perhaps we are too optimistic but we believe that we still have some inroad to make in the copper business, in the copper electrical conductor business.

Perhaps I should qualify this immediately by pointing out to you, we talked about this transformer business, the windings of electrical machinery. The only way you can really eventually build aluminum into these markets where no material has been in existence is through some research and development work, some trial work on the part of your customers. You don't do it overnight. You may have confidence that aluminum will work but it doesn't always do it. But we have been reasonably successful and I have no bone to pick with my friend this morning but that is a very strong wire and cable company, and I really should defer to his better judgment perhaps, but I think we will make more inroads in

the electrical conductor business with aluminum than indicated this morning. I am sure whoever gets paid the salary in my job, whether it be Magee or my successor they got to be battling away on this because this is our stock in trade. We believe we will be successful. Of course if everything should settle down in Africa and they find some big copper mine and the price of copper goes down, this would be an adverse factor. My statement is based on the fact that copper is a reasonable commodity based on what it was some years ago.

Q. Do you feel that the reason aluminum is making such [fol. 2054] great inroads into copper, in the copper field today, is a question of price?

A. Yes, a lot of it, particularly in this insulated wire field. In the bare wire field of course we have some very definite advantages—long span with a steel core and so on. But largely you have the price factor involved, yes. We think aluminum has some other advantages which we tried to sell.

Q. You think aluminum does have some peculiar advantages?

A. We think it does in many places, yes.

Q. Now I would like to direct your attention to the comments on Rome and Alcoa getting together in 1952 and the breakdown of negotiations, and the fact that negotiations were subsequently revived and the merger was completed. Did you consider Rome to be the most desirable of the independent companies to add to your organization? You apparently canvassed the field. We can tell by some of the documents that you looked at several of the companies and came back to Rome. What was it about Rome that you people in Alcoa considered so desirable?

A. I suppose there are always intangibles. I wouldn't say it was necessarily the best possible acquisition. That would depend on the judgment of various people. When you analyze it you might determine some other company might be more valuable to us. There was the personal factor. Our relations over the years; our confidence in the people.

[fol. 2055] Q. Was it because they were in the copper wire and cable field and you were in the wire and cable field in aluminum?

A. They had a very fine research organization that was moving ahead in the insulating field where we had no background at all.

Q. And I believe you gave some estimate of the time and money you thought it would take if you did the job yourself?

A. Yes.

Q. Mr. Magee do you know of your own knowledge about what percentage of all domestic pig and ingot aluminum is actually imported into this country, in round figures?

A. What percentage is imported?

Q. About what percentage is used in a year's time?

A. There are some actual statistics and it has been varying lately. Oh yes, I guess this is what it is. This is Alcoa's production, its percentage of yearly supply, this is Alcoa's percentage, production percentage, of the total yearly U. S. primary and the U.S. imports in 1960—it was 34 percent. But you asked me the percentage of imports. Let me see—U. S. primary production is four billion pounds in 1960 and the imports about three hundred ten million. So we got there roughly plus ten percent in that particular year. If we take the year before, it varied.

Q. Yes.

A. For example in 1958 it was 510 million over three billion. So there it went up quite substantially. That is the [fol. 2056] year that I guess we were all hit with some—a lot of people were hit with some contracts that carried over from the active years of '56 and '57.

Q. Do you know what the import duty is on primary aluminum?

A. About 1¼ cents today.

Q. 1¼ cents a pound?

A. 1¼ cents per pound on Canadian aluminum.

Q. On Canadian aluminum?

A. Yes.

The Court: It seems to have jumped up back in '53 I guess it is—'52 or '53.

The Witness: That was the effect of the Korean situation. That was the Canadian aluminum which came in largely to help the production facilities in this country for the Korean period. Canada is a very substantial exporter into this country. It is the biggest.

By Mr. Melchior:

Q. You mentioned—I don't believe you used the term "commodity pricing" but I had the impression you were describing something of that nature in your direct testimony. Do you know what commodity pricing is? You ever hear of the term?

A. Well it is a term used in the trade. I think it is an old term in a lot of industries. It is the price—if I under- [fol. 2057] stand the term correctly—it is the price on some product that applies to some particular commodity. For example, I suppose a commodity price could be one that is on furniture sheet or furniture tubing. In other words used in the furniture trade. And the price established for the particular product that goes in the furniture, let's say.

Q. In other words if this same product went into a different line of production, the price going into the other line may be different—your price may be different; is that it?

A. It may be. But largely the specification, let's say, for this product is the individual specification very often. It may be finished; it may be tempered; an alloy, but usually it is a competitively derived price.

Q. One of the earlier witnesses testified,—I don't believe you heard him testify—I believe to the effect that in some cases aluminum pipe which is used for aluminum conduit may be characterized as selling for commodity price. Would you know what he meant by that?

Mr. Bergson: I don't recall any such testimony, Your Honor.

Mr. Melchior: I will rephrase the question. I think there was but I will rephrase the question.

Q. Are you familiar with the use of the term "commodity pricing" in connection with aluminum pipe to be used for [fol. 2058] aluminum conduit?

A. No. I wouldn't exactly call it a commodity price. I guess these terms are used rather loosely in the tratle.

Q. Yes.

A. But there is a price on aluminum conduit but whether that could be termed a commodity price or not, I don't know. It depends on the viewpoint of the individual. Aluminum conduit is a specific product made for a specific purpose and

use. Specifications are set up, has to be passed by the underwriters; lacquered inside and all this kind of monkey business.

Q. Is aluminum conduit a commodity price item for Alcoa, would you say?

A. I don't see where the "commodity" adds anything to it. I don't see the significance. All I am saying is there is an industry price or there are prices. Aluminum conduit is a commodity—I suppose you might call it a commodity. We call it a product. It is a product that is manufactured and there is a price on it. But the price is based on what you could sell it for. What the trade is willing to pay for it. But conduit is a specific product. Just as a soft sheet or a rod or a piece of pipe. We have pipe. We have tubing. We have conduit.

Q. It is a specific product which you can distinguish?

A. Yes. And I don't quite follow the commodity angle, because I don't see where commodity fits this particular term.

[fol. 2059] Q. Well I won't pursue it.

A. I don't see that it makes any difference.

Mr. Melchior: No further questions.

Mr. Bergson: No redirect.

(Witness excused.)

The Court: Recess until tomorrow morning ten o'clock.

The Clerk: Court is in recess until tomorrow morning ten o'clock.

(Whereupon at 5.10 p.m. o'clock an adjournment was taken to February 28, 1962, at ten o'clock a.m.)

Transcript of hearing—February 28, 1962

. . . . . .

[fol. 2062] Mr. Bergson: Shall I proceed, your Honor?

The Court: Yes.

Mr. Bergson: Mr. Davies.

RALPH V. DAVIES, called as a witness in behalf of the Defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Bergson:

Q. Mr. Davies, will you please state your name and address?

A. Ralph V. Davies; 5040 Warwick Terrace, Pittsburgh, Pennsylvania.

Q. Mr. Davies, were you formerly employed by the Aluminum Company of America?

A. I was.

Q. Are you presently in a retired status?

A. Yes, for a little over two years.

Q. Are you presently a director of the Aluminum Company of America?

A. I am.

Q. How long have you been a director?

A. I think since 1958. I think that's right.

[fol. 2063] Q. When were you first employed by the Aluminum Company?

A. In 1919.

Q. And will you please state for the record your successive stages of employment up to the time of your retirement?

A. Well, I started in the Old Technical Treatment Bureau, and then I transferred to the Sales Department and was in sales offices in Rochester, New York, Buffalo,

New York, Washington, D.C., New York City, and then came to Pittsburgh in 1943.

Q. Now, when you were in New York City were you in charge of the New York office?

A. I was manager of the New York office, yes, sir.

Q. And you came to Pittsburgh in 1940?

A. '43.

Q. '43. And what were your duties in Pittsburgh then?

A. You mean when I first came?

Q. From '43, yes.

A. From '43 on. When I first went there I went as the sales manager for what we called pig in those days. I was only on that job a relatively short time when I was made [fol. 2064] assistant general salesmanager in charge of sales development. And in 1947 I succeeded George Stanley as vice-president in charge of sales.

Q. And how long did you hold the position of Vice-President in Charge of Sales?

A. Until my retirement.

Q. Now, as vice-president in charge of sales did your duties encompass the sale of wire and cable products?

A. Yes.

Q. Now, when you first became manager or vice-president in charge of sales what wire and cable products was Alcoa selling?

A. Bare ACSR and all aluminum. Those were the principal products we were selling. Oh, there was a textile covered cable, triple braid weatherproof, I think they called it, but the sales of that were really insignificant.

Q. Did there come a time when you considered the advisability of Alcoa's selling covered or insulated conductor?

A. Yes. I think the pressure began to come in from, well, through the staff men in Pittsburgh, who in turn were getting it from the sales offices to the effect that we should [fol. 2065] certainly diversify because we were not competitive. We were dragging behind in the parade at that stage.

Q. Now, when did you make the first effort to do something about this problem?

A. My first effort, as I recall it, I called Mr. H. T. Dyett, whom I had known for a number of years and for whom I had high regard.

Q. Would you identify Mr. Dyett?

A. Mr. Dyett was then Chairman of the Board of Rome Cable Corporation.

Q. And can you fix the time when you called him?

A. Yes. That was late in 1951; the fall of 1951, I would say. Late fall.

Q. Now, what did you do when you called Mr. Dyett?

A. I asked him, I guess I told him we were lamentably behind, I guess he would know that, in covered insulated wire and cable and asked him if we could make some arrangement whereby they, Rome Cable, would supply us with technical assistance and know how.

[fol. 2066] Q. So that you could make your own insulated wire and cable?

A. Yes, sir.

Q. Now, as a result of that telephone call did further events ensue?

A. Yes, I believe Mr. Dyett said he would be in touch with me in the near future. The next happening, I think Mr. Fraser called me and we made a date to meet and at that time he put out the proposition of a toll arrangement whereby they would cover or insulate or whatever was necessary to be done the material which we would furnish them.

Q. And what was your reaction to this proposal?

A. At that time, you mean?

Q. Yes.

A. Well, I thought that that was all right, that that certainly—well; it took us off of dead center; put it that way.

Q. Now, at the time you entered into the toll arrangement, was there any discussion as to the possibility that Alcoa might at a subsequent date insulate or cover its own aluminum line wire and multiplex?

[fol. 2067] A. Oh, yes. I would say right from the start we made statements to that effect. In fact, we were frank throughout the whole period of time that sooner or later we might feel it necessary to take some action on our own. There was never any misunderstanding on that score.

Q. And did there come a time during the course of the arrangement when you did take some action?

A. Yes.

Q. And when was that, if you recall?

A. Oh, that was about 1955. We decided to install equipment for the polyethelene covering.

Q. And did you go ahead with that?

A. We went ahead with that, yes, sir.

Q. Do you recall what equipment was involved?

A. Well, I know it required an extruder. I am not very technical on this.

Q. Well, let's pass it then.

A. All right.

Q. What prompted you to commence the manufacture of your own polyethelene line wire and triplex?

A. I think there were several reasons. Our sales depart- [fol. 2068] ment—of course, they are always pressuring us on these kind of things—they weren't satisfied. They were being told by customers that we weren't really contributing much, we were just selling someone else's product. We also —I think we had a strong feeling that we were still, oh, just nibbling around the edges. We weren't really getting in like we had hoped we would; and time was passing.

Q. Now, did you find, after you put in the polyethelene extruder, that you had made any substantial step in your diversification program?

A. We had made a step, but I don't know whether I would call it substantial.

Q. Now, did there come a time in '57 when you gave consideration to broadening your activities in the wire and cable field, insulated wire and cable field?

A. Yes. In '57 we decided now we had taken one step on polyethelene, we should go ahead with the neoprene coating, and we made studies and so on and put costs together as to what would be involved in that.

Q. Now, that neoprene coating would have been limited [fol. 2069] again to the aluminum line wire and triplex construction or multiplex construction?

A. Yes.

Q. And you made an investigation as to determine whether or not you should do that?

A. Yes, sir.

Q. Now, did you take any other steps at the same time in regard to your activities in the insulated wire and cable field?

A. At the same time we were looking into the neoprene proposition?

Q. Or shortly afterward.

A. Or shortly afterward. Yes, that was when we started negotiations with Rome Cable Company, discussing a merger with them.

Q. And what was your purpose in discussing merger with Rome at that time?

A. Well, several things had happened. It comes back in a way to the effect that we had to diversify more to become competitive in the marketplace. We also had the thought that if we were more active in this picture we could—we were quite optimistic, as we should have been, that we could substitute quite a little aluminum for copper and we thought [fol. 2070] we just had to have more knowledge of the whole subject to increase the consumption of aluminum in that field as well as to make diversified so as to make ourselves ompetitive with what was happening in the field at that time.

Q. What was happening in the field at that time?

A. Well, of course, for some period of time the copper companies were all going into the aluminum business, more or less, and then the next thing that happened was that a couple of the aluminum companies decided to go into the copper business: so you might say we were catching it both ways. The copper people were in our back yard, and now the aluminum people were going into the copper back yard, so we were becoming less and less competitive.

[fol. 2071] Q. Now, when you talk about copper people, who do you have in mind? What companies do you have in mind?

A. Well, there were a number of them. I don't know if I recall them all. There is Anaconda, Nehring, Essex, I guess General Cable, Southwire, Central; I think one or two others.

Q. All of those companies were getting into both aluminum and copper or were in both aluminum and copper?

A. Either were in or were getting into both, yes, sir.

Q. You mentioned also that some of the aluminum companies were getting into copper. Which aluminum companies do you have in mind there?

A. Well, Kaiser Aluminum and Chemical acquired the wire and cable division of U.S. Rubber and Olin Mathieson acquired Southern Electrical.

Q. Mr. Davies, I show you Government's Exhibit 161, which is a letter from Mr. P. T. Coffin to Mr. W. K. Unverzagt, copy of which was sent to you, and I invite your attention to paragraph numbered 7 of that document, on page 5, and ask you to refer or to note the phrase "Most Industry rocking announcement and certainly the most threatening [fol. 2072] to Alcoa's position," and ask you what message that memorandum conveyed to you?

A. Well, I think that in a way conveyed—well, it conveyed what I have been discussing in a way what had happened during that period, the position it put us in. Here we had dual roles and of course Coffin was a prominent advocate, he had been very strong in urging people in the organization to go ahead for quite a while.

Q. Did you personally, to what industry was Mr. Coffin referring, so far as you know, when he used the phrase "industry rocking"?

A. Well, I think that was, well, he is speaking about the wire and cable industry, but he is really pushing his point that now the need for diversification and threat of competition is more serious.

Q. Now, did you consider the acquisition, you personally, consider Kaiser's acquisition of U.S. Rubber or Olin Mathieson's acquisition of Southern Electrical "industry rocking"?

A. No, I wouldn't consider it industry rocking.

Q. Do you know what position U.S. Rubber occupied in aluminum Wire & Cable?

A. I would say a relatively small position.

[fol. 2073] Q. Let me show you the Government's charts——

A. May be very small, not relatively small, to keep it right.

The Court: What is that number, Mr. Bergson?

Mr. Bergson: 435. Government's Exhibit 435.

Q. Do you know when Kaiser acquired U.S. Rubber?

A. It was early in 1957. I would say March or April. It was March—February, March, April, around in that period.

Q. Now, what does the Government's chart show was the U.S. Rubber Plant's production of ACSR and aluminum cable, bare, in 1956, the year immediately prior to the acquisition?

A. It shows zero per cent.

Q. Now, addressing yourself to Government's Exhibit 436, which relates to shipments of aluminum wire and cable insulated or covered, what percentage does it show that U.S. Rubber had in 1956, the year prior to the acquisition?

A. 3.2 per cent.

Q. If you were considering the aluminum wire and cable industry, would you, would it be your opinion that this [fol. 2074] acquisition had any, effect on the aluminum wire and cable industry?

A. Oh, no. Not at all.

Q. Again directing your attention to Government's Exhibit 435, which is the chart entitled "Shipments of ACSR aluminum cable, bare," I ask you to look at Olin Mathieson Corporation and ask you if you recall what year Olin Mathieson acquired Southern Electrical?

A. That was in 1957.

Q. And what was Olin Mathieson's production of ACSR or aluminum cable in 1956?

A. Zero.

Q. And again addressing your attention to Government's Chart 436, I invite your attention to Olin Mathieson in 1956, and ask you what their production of aluminum wire and cable, insulated or covered, was?

A. Zero.

Q. So in your opinion, would that acquisition have any effect on aluminum wire and cable business?

A. No, it would not.

Q. So that what you were concerned with and apparently what Mr. Coffin was concerned with, was the effect of these acquisitions in the general field of wire and cable?

[fol. 2075] A. That's right, in the general field, plus mostly copper business.

Q. Now, you said that you, that these events plus the fact that the copper producers were going into aluminum led you

to the conclusion that Alcoa should do something about diversifying its product line in wire and cable?

A. Yes, sir.

Q. And I think you said just before I started asking these questions that you commenced negotiations with Rome Cable?

A. That is correct.

Q. And why were you interested in Rome Cable?

A. Well, for several reasons. We knew them well. We felt they were competent people. We felt that they knew their business. They had technical knowledge and facilities, of which Alcoa had none. Alcoa was just not qualified at all in that field. And everything we had heard about Rome Cable in the trade was complimentary. We knew their people and liked their people.

[fol. 2076] Q. Were you interested in Rome Cable because part of their product line included these so-called overlap products which are on the product board, the photographic copy of which is in evidence as defendant's Exhibit 20?

A. These aluminum products?

Q. Yes.

A. Oh, no, not at all. They were not really a factor at all in that. We knew that.

Q. Now, were you interested in them because they were engaged in the conduit business?

A. No. If my memory is correct, in spite of the fact that I had known the Rome people for a number of years and been at the Rome plant and talked with their people over a period of time, I don't think I even knew they were in the conduit business until we started negotiating. At least, that is my recollection. It certainly wasn't interesting at all. That wasn't the purpose. Maybe it was interesting, if you have something else thrown in; that is fine, too, but that didn't enter into the picture at all.

Q. Well, now, when did these negotiations with Rome Cable take place?

[fol. 2077] A. Through—these first negotiations?

Q. Yes.

A. Through the summer, summer and fall of 1957.

Q. During the course of these negotiations did Alcoa make an offer to purchase Rome Cable?

Q. Yes.

Q. Do you recall what that offer was?

A. The offer was in the form of common stock, a certain number of shares of common stock. As I recall it, the market price of the Alcoa common stock at that time—it would come to approximately $24 million.

Q. Did Rome accept that offer?

A. They certainly did not.

Q. Did they make a counter offer at that time?

A. They did not.

Q. And what happened to the negotiations?

A. We discontinued negotiating, I think, in about October of '57.

Q. Now, in October of '57 or after the Rome negotiations terminated, what action, if any, did Alcoa take to pursue its plan to diversify its product line?

[fol. 2078] A. Well, of course, first we talked a lot about it. Then we decided to see if we couldn't get someone in the consulting field to be of assistance to us.

Q. And did you act on that decision?

A. Yes, we acted on that.

Q. And what did you do?

A. We retained Ebasco Services.

Q. For what purpose, Mr. Davies?

A. Well, at the start we asked for advice, and then we asked them to act for us, make an investigation as to what firms might be available for purchase and that they should act on our behalf to see whether there was any interest.

Q. Why did you ask them to act on your behalf?

A. Well, in a case like that, it wouldn't have been very good for us to run around to one another. Of course, rumors spread fast; there were rumors at that time that other mergers—that some of our competitors were looking into other firms, and all we had to do was to go near one, and it would spread throughout the industry that Alcoa was out looking for somebody. I think that would hamper negotiations; it would certainly raise the price.

[fol. 2079] Q. Now, did Ebasco perform these services for you?

A. Yes, they did.
Q. Will you tell us what the first step was?
A. First they made up a list——
Q. Before we get to that—excuse me.
A. I beg your pardon.

Mr. Bergson: Will you mark this as defendant's Exhibit AR-77 for identification?

(Defendant's Exhibit AR-77 marked for identification.)

By Mr. Bergson: (Continuing)

Q. Mr. Davies, I show you defendant's Exhibit AR-77 for identification which is a letter from the president of Ebasco Services to you, dated April 3, 1958, and I ask you what that letter purports to be.

A. Well, this expresses in better language what I started to say a couple of minutes ago, I think. In other words, Mr. Gardner is outlining the procedure which they would follow.

Q. And did Mr. Gardner say—read the second paragraph into the record.

[fol. 2080] A. This one right here?

Q. The second paragraph.

A. "As we discussed, the first step would be to prepare a list of companies in the insulated cable and wire manufacturing field from published and other available sources. Pertinent data would be compiled on each, including size, sales volume, products, earnings record, capitalization, stock ownership, markets served, location and size of plants, affiliations or connections with other companies, banking connections and the like. From this preliminary data a number of companies will be selected by consultation with you as being most suitable for further study and more complete data will be obtained on these companies."

OFFERS IN EVIDENCE

Mr. Bergson: I offer defendant's Exhibit AR-77.
Mr. Mahaffie: No objection.
The Court: Received.

(Defendant's Exhibit AR-77 for identification received in evidence.)

By Mr. Bergson:

Q. Now, at the time you retained Ebasco Services to make this study for you, did you tell Ebasco what you wanted [fol. 2081] them to look for for you in the way of a company?

A. Yes.

Q. Can you tell us what you asked them to look for?

A. Well, in general it would be the same qualities which I mentioned before which we thought Rome had; in other words, a company well equipped technically, making products of good quality, having good management, having good trade acceptance and people with whom we thought we might be compatible. I think those are the essential qualities.

Mr. Bergson: Will you mark as defendant's Exhibit AR-78 for identification a memorandum dated June 16, 1958 to Mr. Richter from Mr. Huebner, both of Ebasco Services, Inc.

(Defendant's Exhibit AR-78 marked for identification.)

[fol. 2082] Q. I show you Defendants' Exhibit 78, which purports to be a list of considerations to be taken into account in examining prospective companies for Alcoa and ask you if that fairly and accurately states the considerations that you had in mind?

A. Yes, I think that is well stated.

Mr. Bergson: I offer Defendants' Exhibit AR-78 into evidence.

Mr. Melchior: No objection.

The Court: Received.

(Defendants' Exhibit AR-78 for identification received in evidence.)

Q. Now, you retained the Ebasco. What did Ebasco do for you?

A. I think they came up with a list of some hundred and twenty-five or thirty companies.

I think they examined that many and then out of that number of firms which they found in the business they made us a smaller list which contained quite a little data on the companies. I think they had brought that list down to some,

if I remember correctly, it was 28; it might have been 30, but I think it was 28. And then we talked it over with them and selected a certain number of firms which we felt [fol. 2083] might best serve our purpose.

Q. You say a certain number of firms. How many firms was Alcoa interested in acquiring?

A. Oh, we only wanted one.

Q. Now, do you recall which firms you agreed with Ebasco should be further investigated?

A. Yes.

Q. Would you state which firms those were?

A. Okonite, Simplex, Kerite; Triangle, Walker Brothers, Crescent Wire & Cable.

Q. Now, did you select any of those companies because they were engaged in the business of manufacturing any of these overlap products?

A. No. Not at all, because I don't think any of those firms were any factor in that business at all.

Q. Well, let's see what they were. Let's look at Government's Exhibit 435, and I ask you whether you find on the list of companies shipping ACSR and aluminum cable, bare, the Okonite Company?

A. I do not.

Q. Simplex?

A. No.

Q. Kerite?

A. No.

[fol. 2084] Q. Triangle?

A. No.

Q. Walker Brothers?

A. No.

Q. Crescent?

A. No.

Q. Now, directing your attention to Government's Exhibit 436, which relates to shipments of aluminum wire and cable insulated or covered, do you find on that list any of the companies mentioned? Let's take Okonite first.

A. Yes, I find Okonite.

Q. And how much of a factor were they in the business in 1958?

A. Two-tenths of one per cent.

Q. Now, do you find Simplex on that chart?

A. No.
Q. Do you find Triangle on that chart?
A. No.
Q. Do you find Walker Brothers on that chart?
A. Yes.
Q. And how much was Walker Brothers producing?
A. Six-tenths of one per cent.
Q. Do you find Crescent on that chart?
[fol. 2085] A. No.
Q. Now, are any of these six companies engaged in the conduit business, to the best of your knowledge?
A. I would just assume that Triangle was because they have that in their name. I didn't know that they did, I assume from their name that they must be in the conduit business.
Q. Did you know at the time whether any of the others were in the conduit business?
A. No, I wasn't interested.
Q. Now, after the six companies were selected what transpired?
A. Quite a period of time was consumed in running them down through various sources to see whether there was any interest on their part.
Q. And what was the result?
A. We drew a blank.
Q. I beg your pardon?
A. We drew a blank. No interest.
Q. I didn't hear because that truck was going by. So that that program apparently came to an end?
A. Correct.
Q. Now, did there come a time in October of 1958 when this program was at an end that Alcoa again examined [fol. 2086] what it should do?
A. Yes, they certainly did.
Q. Now, what did Alcoa do at that time?
A. Well, of course, again we had a lot of conversation. A study was started about that time, too, as to what would be involved into going ahead on our own, assuming we could make, could not acquire what we needed, and also to get an idea of what it might cost, what would be entailed, what it might cost, say, if we decided to go ahead on our own.

Q. And what problems did you consider in connection with this undertaking?

A. Well, it was full of problems. For one thing, I guess, as I said, we had no one with the proper technical knowledge and experience, which meant leaving out plants and plant sites and all that. We had to acquire personnel somehow. Right there was a large problem presented.

And, of course, the next question is where would you put it. That is a real question, too. And how much would it cost, because Alcoa always has so many places to spend its money that you have to consider that pretty seriously.

Q. Did you also consider the time factor?

[fol. 2087] A. Oh, yes, the time factor was very important because here we were, I guess I used the expression before, we were lagging behind the parade, and to go into this on ourselves was going to be a long time proposition. Just the planning and engineering alone was going to be a long time before you get down to business. So we felt that that was one of the very serious disadvantages, as well as the fact that, well, when you get going on these plants, no matter what you think you are going to spend, you always spend a lot more.

Q. About how long do you think it might have taken you to get into the wire and cable business, in the manner that you desired?

A. Well, before you—I might, when you say get in, and then of course you have got to consider, you get into something, of course, a lot of times faster than you make a satisfactory product. Then after you make a satisfactory product, it is quite a long while after that before you begin to make money out of it. So I would say in view of the fact that we felt the engineering would take a year before we got anything else done, I would say five to ten years, depending on what luck we had in acquiring people and deliveries.

[fol. 2088] Had Alcoa had any previous experience in building new establishments?

A. Oh, yes, we built a lot of them. That is why I was kind of leery about this one.

Q. Can you give us an illustration of a situation where Alcoa went forward with a new production facility?

A. Yes, I can. Take the example of the Davenport, Iowa sheet mill. When we went into that it was supposed to be a

twenty-five million dollar plant. Before we got through, I am not talking about today, now, I am still talking about, really you may say before that plant, it was a seventy-five million dollar job because after we started, people wanted to do this and that, they said, "Oh, well, there is no use putting up that plant unless you do this and do that," and so on. And in that case we knew our business, or we thought we did. We picked experienced foremen, experienced rollers from our other plants, and sent them out to Alcoa, to Davenport. Well, we, in the sales department, became very impatient because when they finally had this very expensive plant finished, the first thing that happened the quality [fol. 2089] wasn't too good, and so our delivery suffered. We were allocating metal there and then we would fall down on shipment. Then we didn't make any money, so, of course, that was worse. But I will say I don't mean to paint that too black, because that turned out to be, when everything was going right, to be a fine plant.

Q. How long did it take you to get that facility in operation, in a satisfactory fashion?

A. Operation? In making money? I think that took five years. And that is where we were supposed to know what we were doing.

Q. Now, Mr. Davies, if Alcoa decided to go ahead on its own, or if there were recommendations to go ahead on its own, would that recommendation require your approval?

A. Well, I would be one of several to approve. Of course, I wouldn't make the final approval.

[fol. 2090] Q. On the basis of the facts known to you in 1958, would you have approved such a program?

A. No, I would not.

Q. Why?

A. Well, for several reasons. One would be that the amount of money which seemed to be involved would kind of put a roadblock in my mind.

Q. How much money would have been involved?

A. I think we were talking thirty-five or forty million dollars and with the feeling that before we got through it would be more than that; and the time factor was still—between the money and the time—no, I wouldn't have been in favor of spending that much money.

Q. Now, did you in October of 1958 pursue any other course in order to get Alcoa into these other products?

A. Yes, I talked to—well, it just so happened Mr. Fraser of the Rome Cable Corporation was going to be in Pittsburgh. He came periodically to talk over our relationship and how things were going and so on, and so I opened the question up with him.

Q. I'm sorry, I didn't hear you.

A. I opened the question up with him again in October [fol. 2091] of '58.

Q. When you say you opened the question again with him, what did you do?

A. Well, I don't recall the exact conversation, but I think, as near as I can recall, I asked him whether there would be any interest in talking more about a merger.

Q. And what was Mr. Fraser's reaction?

A. Well, he certainly wasn't unfavorable to it. He said he would go back and talk it over with his people and be in touch with me later.

Q. And did he do that?

A. Yes, he did.

Q. And when did he get in touch with you?

A. Well, I would say within a reasonable time he called up and we made a date to get together again with himself and Mr. H. T. Dyett.

Q. Do you remember the date and where the meeting was to take place?

A. Yes. That was October 29th in the St. Regis hotel in New York.

Q. Now, prior to October 29th did you communicate with Ebasco Services to let them know that you were resuming negotiations with Rome Cable?

[fol. 2092] A. Yes, I did.

Q. What did you do?

A. I called Mr. Schlesinger there. I called him there—really, I was doing this as to what I thought was the courteous thing to do. In other words, they had been working for us and I think they were really probably still wondering, well, where do we go from here, just like we were. So I thought it was courtesy to call and tell him that we were

about to start further negotiations with the Rome Cable Corporation.

Q. Did you ask him for any advice as to how you should conduct the negotiations with Rome Cable?

A. No, I didn't ask him for any advice. I think I did say, in the course of the conversation, "If you have any helpful ideas, let me know," and he wrote me a letter, I think, two or three weeks—sometime later—analyzing some figures.

Q. I show you government Exhibit 407 which is a file memorandum dated October 28th, 1958, from Mr. Schlesinger to the files, and I invite your attention to the second paragraph or the first sentence of the second paragraph of that letter. I ask you to read that sentence into the record.

[fol. 2093] A. "Suggested that he point up to Fraser that Alcoa proposes to get into this business one way or the other and that he outline their philosophy of operating Rome if it should be acquired."

Q. Now, do you know what Mr. Schlesinger meant by "one way or another"?

A. No, I don't recall that part of the conversation because that wasn't in line——

Q. Did he suggest to you——

A. Beg pardon?

Q. Did he suggest to you to state to the Rome Cable people that, "if you don't sell out to us, we are going to go into business anyway"?

A. No.

The Court: What is the number of that exhibit?

Mr. Bergson: 407.

The Court: All right.

Mr. Bergson: At this time, your Honor, I would like to offer certain pages of the deposition of Mr. Schlesinger, whose deposition was taken by the plaintiff and who was examined about this document, and I think it is desirable for [fol. 2094] his responses regarding the document to be in the record, so I offer, without taking the time to read it into the record at this time, pages 88 to 100 of Mr. Schlesinger's deposition which was taken by plaintiff pursuant to notice dated June 30th, 1960 at the U. S. District Court, Southern District of New York, on July 18, 1960.

Mr. Mahaffie: No objection.

The Court: Received. That will be——

Mr. Bergson: I think we had better make this 78-A or 83 because I had planned to read it into the record. I don't have a consecutive exhibit number.

The Court: So that you people don't get mixed up, mark it whatever you wish.

Mr. Bergson: Why don't we make it 83.

Mr. Mahaffie: 83? What pages are you offering again?

Mr. Bergson: 88 to 100.

Mr. Mahaffie: That is all you are offering?

Mr. Bergson: That's all.

[fol. 2095] The Court: Received.

(Defendant's Exhibit AR-83 marked received in evidence.)

By Mr. Bergson:

Q. Mr. Davies, you had this meeting or did you have this meeting that was set up for October 29th?

A. We did.

Q. And who was present at that meeting?

A. Let me see. Mr. H. T. Dyett, Mr. Fraser, Mr. Hickman and myself.

Q. And during the course of those negotiations did Rome Cable make an offer to Alcoa?

A. In the St. Regis?

Q. Yes.

A. Yes.

Q. And what was their offer?

A. The offer was on the basis of four shares of Rome Cable stock—no, four shares of Alcoa stock for five shares of Rome stock.

Q. And what action did the Alcoa officials take on that offer?

A. That offer was turned down.

Q. At that meeting?

A. I think it was at that meeting.

[fol. 2096] Q. Then what was the next event in the negotiations?

A. I think this meeting of October 29th was in New York because Mr. Dyett was on his way to Florida, and I think the next thing that happened was that he called me from Florida to talk about it a little more, and as a result of that

conversation it was agreed that we should have a further meeting and negotiations.

Q. And was such a meeting held?

A. Yes, it was.

Q. Where was that meeting held?

A. That meeting was held in Pittsburgh.

Q. Do you recall when it was held?

A. It was around the middle of January.

Q. 1959.

A. Of '59, yes.

Q. And at that meeting did Alcoa make a counter offer to Rome?

A. Yes.

Q. And what was that counter offer?

A. That was on the basis of a five to three instead of a five to four basis.

Q. Now, were there any discussions—strike that, please. [fol. 2097] What action did the Rome officials take at that meeting in regard to that offer?

A. Well, I think they took a favorable attitude and said that they would present it to their board.

Q. Was there any discussion at that meeting as to how Rome Cable would fit into the Alcoa organization?

A. Oh, yes.

Q. If Rome Cable decided to accept the offer?

A. Oh, yes. Quite a point was made of that. Quite a point had been made of it before as to just how it would fit and how the organization would go and so on, and there was quite a lot of conversation on that score because the gentlemen who were there in the Pittsburgh meeting, as I recall it, were Mr. Fraser and Mr. John Dyett, and it was pretty well outlined to them what the policy of Alcoa would be if this merger went through. I am not sure whether Mr. Magee wrote a letter then or shortly thereafter.

Q. What happened thereafter?

A. Well, the directors of Rome accepted the proposition. There was some modification on the five to three offer.

[fol. 2097a] Q. I show you government Exhibit 6, which is a copy of a letter dated January 21st, 1959, to Mr. Fraser

from Mr. Magee and ask you whether that letter embodies the agreement as to how Rome Cable should be operated if Rome Cable accepted Alcoa's offer.

A. Yes, it does.

[fol. 2098] Q. Now, the next step, I think you said, was that Mr. Fraser took the offer back to Rome and then what happened?

A. Well, I believe it was presented to Rome; presented and accepted by Rome's Board of Directors.

Q. Now, were you present at all of the negotiations between Alcoa and Rome?

A. I believe I was, yes.

Q. During the course of these negotiations did Alcoa at any time use any type of threat to induce——

A. (Interrupting) Oh, no.

Q. (Continuing)—Rome to accept this offer?

A. Most definitely not.

Q. Do you know, Mr. Davies, and I know you have been retired since 1960, whether or not the provisions of the letter of January 21 have been followed out in the operation of Rome Cable?

A. Well, it is my understanding that they have been.

Q. Just one further question, Mr. Davies. I show you to Government Exhibit 110, which is a letter from you to Mr. Fraser regarding Alcoa's supplying aluminum to Rome in 1955.

A. Yes.

Q. Was 1955 a year of shortage?

A. Yes, I guess it was.

[fol. 2099] Q. Was this a temporary situation or a permanent one?

A. This was a temporary situation. It only lasted into the middle of the next year or so.

Mr. Bergson: Your witness.

The Court: Maybe we can take a short recess now. That a short recess.

(Whereupon at this point a short recess was taken after which the trial was resumed.)

Cross-examination.

By Mr. Mahaffie:

Q. Mr. Davies, directing your attention back to 1951 and 1952?

A. Yes, sir.

Q. You testified to the initiation of the tolling agreement between Alcoa and Rome covering aluminum wire and cable?

A. Yes.

Q. Was it the purpose of the toll agreement in so far as Alcoa was concerned, to more or less get Alcoa into the covered or insulated wire business?

A. As a starter, yes.

Q. It was a start?

A. Yes.

[fol. 2100] Q. Along that line. And if you know, Mr. Davies, can you state whether it was the purpose of Rome in entering into that agreement to get into the aluminum wire business?

A. My understanding of my recollection, of course, I am going back eleven years, it had this advantage to Rome, that they would get fuller utilization of their equipment.

Q. I see.

A. I would say it was a good business measure from their standpoint.

Q. You think as far as you know——

Q. Yes.

Q. (Continuing)—that was the principal purpose of Rome. Now, going up to 1955, you testified to Alcoa's decision to go into polyethylene covering on its own. Now, just to clarify that further, that was a definite decision of the company at that time in 1955; was it not?

A. Yes.

Q. To enter that field?

A. Yes.

Q. And Alcoa did enter the field at that time?

A. Yes. Well, it started in in 1955. It really wasn't in [fol. 2101] it in '55.

Q. Well, by the time of the merger of Alcoa and Rome, was Alcoa definitely in the polyethylene covering business?

A. Oh, yes, to a limited extent, of course.

Q. Well, you mean in terms of products?

A. In terms of products?

Q. You mean to a limited extent to the polyethylene products it made?

A. Yes.

Q. So was Alcoa in 1958 still taking any polyethylene products from Rome; if you recall?

A. My recollection is they were.

Q. Was it a substantial amount?

A. I assume it was not substantial. It would be just these things that we were not equipped to make. As far as evaluating it numerically, I couldn't. I don't know.

Q. Was the purpose of Alcoa to become completely independent of Rome in the polyethylene business?

A. No. I think we told them at the time we entered that of course we would still count on them for a certain amount of polyethylene covering.

Q. Would this be in respect to——

[fol. 2101a] A. I think our equipment was rather limited, and I think our knowledge was more limited even than that, so we were bound to want to acquire some products from them.

[fol. 2102] Q. But in 1958 the principal amount of the polyethelene covered products sold by Alcoa were made by Alcoa; would that be correct, sir?

A. I think that would be correct.

Q. Now, going up to 1957, this is when you testified the company, Alcoa, began at least investigating the possibility of using its own facilities to produce neoprene covered products?

A. Yes.

Q. Was a definite decision made in 1957 or '58 that Alcoa would go into neoprene covering on its own?

A. No.

Q. What was the status of that project, let's say, as of 1958?

A. I would say that was sort of in abeyance, maybe.

Q. During 1958?

A. '58. Now, let me think. I have got to get these years—I get mixed up on these years, '57, '58 and '59.

Q. Maybe it would be easier if I put it this way. What

was the status of Alcoa's neoprene planning on the eve of the Alcoa-Rome merger?

[fol. 2103] A. Oh, we had given it up.

Q. You had given up the neoprene planning?

A. Yes, that is my recollection.

Q. And you had determined to continue to rely on Rome for neoprene products?

A. Up until that time, yes, sir.

Q. Up until——

A. Well, you said until the merger, didn't you, up until the discussion of the merger? You might—I am not quite clear on your question there.

Q. Yes. Well, I am talking about January, 1959 or the end of 1958, the beginning of 1959. Now, Alcoa had determined in 1957 to enter into the neoprene business?

A. No, I wouldn't say they had determined to enter it. They had considered entering it and we had made studies of the equipment, what it would cost and so on, but no affirmative decision had been made.

Q. Do you know if funds had been appropriated for the purchase of equipment?

A. My present recollection is that what we call an authorization for money had been prepared but had not been received for final approval.

[fol. 2104] Q. Now, did you at any time in '57 or thereafter advise Mr. Fraser of Alcoa's intentions to enter into neoprene covering?

A. Yes, I think it was before that. I had told him that we were looking into that and might very well go ahead. That was just in line with what we had told him right from the start, that is, before we decided to make any further move, we would give them ample notice.

Q. What happened to your plans following the merger of Alcoa and Rome?

The Court: You mean——

Q. —plans for the setting up of facilities to cover or to apply neoprene covering to wire.

A. I don't think I understand.

Q. Following the merger of Alcoa——

A. You said after the merger of Rome?

Q. Yes. What happened to the plans you had after the merger with Rome, following the merger with Rome?

A. These plans were all dropped. Is that what you mean?

Q. Yes.

A. I didn't get the import of that.

[fol. 2105] Q. I am sorry, that is my fault. Now, with respect to this document that's been marked AR-78, the Ebasco document, would you tell me, sir, how the Rome corporation ranked with respect to each of those factors?

A. Well, of course, we thought from the start that Rome ranked very well in our minds as to having what we desired. Do you mean, could I go down these individually? I am not clear.

Q. Yes, sir. Would you say that——

A. The product line was good; technical manufacturing was good; performance good; plant location I wouldn't say was so good. The rest would be good. That would be the only thing I would say——

Q. As a result of your own studies and as a result of the work that Ebasco did for you, would you say that any other independent wire and cable manufacturer would have ranked any better than Rome?

A. No, I don't think so.

Q. In other words, it would be fair to say that in your view the Rome was about the best acquisition Alcoa could have made for the purpose it had in mind?

[fol. 2106] A. I think it would be as good as any, yes.

Q. Now, sir, you listed six companies which were more or less the final selection.

A. Yes.

Q. Following the failure of the '57 negotiations with Rome.

A. Yes.

Q. You listed Okonite, Simplex, Triangle, Walker Brothers and Crescent. That is Crescent Insulated Wire and Cable Company; isn't it?

A. Yes.

Q. Were any of these companies approached by Alcoa or by Ebasco?

A. Directly?

Q. Yes.

A. Well, I can answer, by Alcoa directly, no. I have to think a little about Ebasco directly. I don't think any of them were approached directly. I don't think that—no, I don't think they were approached directly.

Q. By directly, do you mean approached by Ebasco Company?

A. By an Ebasco representative going to the company.

[fol. 2107] Q. What about the Okonite Company? Was that high on your list?

A. Yes.

Q. What happened to your attempts to acquire Okonite, if you made such?

A. To acquire Okonite?

Q. Yes.

A. Well, I think we were really sort of getting the run-around and it took us a while to realize it.

Q. Isn't it a fact, sir, they were acquired by somebody else before you could acquire them?

A. Yes, but we did not know that at this time, although there were rumors floating around about not only Okonite but others, but——

Q. Who acquired Okonite?

A. Beg pardon?

Q. Who acquired Okonite Company?

A. Kennecott.

Q. Kennecott Copper Corporation?

A. Right.

[fol. 2108] Q. Now, Mr. Davies, you testified about Alcoa's alternate plan, if it could not make an acquisition?

A. Yes.

Q. To go it alone or get into the field on its own. Now, with respect to these plans, can you state generally what Alcoa's intent was? Was it intending to make a full line of copper products, a limited line of copper products; just what did it have in mind?

A. What we had in mind was that a considerable diversification and sufficient diversification so that we would be in a competitive position, and we had been in a non-competitive position for quite a long while. We also had in mind the fact that if we could establish this broader line of diversification, both aluminum and copper, that we hopefully

thought that being in that position we could increase the use of aluminum in the broad field.

Q. What you had in mind, then, sir, was substantially a full coverage of the wire and cable field, insulated wire and cable field?

A. Well, when you say "full coverage," I don't think we could have gone full coverage. I mean there are some things that maybe we would have to grow into. In other words, [fol. 2109] let's say some specific product. Maybe we wouldn't go into that. But quite a broad line. I am not technical enough to distinguish between various kinds of cables and wires and so on.

Q. Perhaps we can get into it this way. Was it your plan to manufacture building wire?

A. Yes.

Q. Communications wire?

A. Yes, I would say yes to that.

Q. Generally a pretty broad line although you are not sure of it?

A. I would say a pretty broad line, yes. We would have to get into a broad line to be competitive in the industry.

Q. Now, what stage were these plans in at the time of the acquisition of Rome? How far along were they?

A. The plans for our expansion on our own?

Q. Yes, sir.

A. Oh, they were in the—say a preliminary stage.

Q. Would you describe it as the survey stage?

A. Well, yes, maybe a little beyond that. I mean, to the standpoint of trying to estimate what would be required and what it would cost. Certainly what it would cost is a [fol. 2110] very important factor to be determined.

Q. Who within the company suggested this initially, if there was anyone individually?

A. Suggested this further study?

Q. Yes, sir.

A. Well, I heard Mr. Magee say yesterday that he was kind of impatient with me. I guess it was he.

Q. You testified that if it had been entirely up to you you think you would have recommended not proceeding at this point?

A. Yes, I did.

Q. Did you have any idea what Mr. Magee's views were on that?

Mr. Bergson: I think you should have asked Mr. Magee that when he was here yesterday.

The Court: Well, we let a lot of stuff get into this already so we will let Mr. Davies give us what Mr. Magee's idea was.

Mr. Mahaffie: If he knows, your Honor.

The Court: You asked if he had any idea what Mr. Magee's views were.

A. I think if I had been he, I would have had a tough job [fol. 2111] selling him on that. And that was cash, thirty-five to forty million cash, and a long period of time. I think it would have taken a lot of selling on him. It would on me.

Q. You actually spent about what for Rome Cable Corporation? Between twenty-five and thirty million?

A. Yes. I kind of forget the—you see, this is various times and places and stock.

Q. Yes. We worked out a stock range, the total price range between twenty-seven million and forty-one million over a period of a full year. Does that sound right to you?

Mr. Bergson: I think that price range, your Honor, is kind of ridiculous. It is the price at the time of the transfer and not what it might have been during the next succeeding eleven months. Although I do think that Mr. Fraser testified that the price was about thirty-three million dollars.

Mr. Mahaffie: All right. I will back down on that.

Q. Does the figure of thirty-three million dollars sound right to you?

[fol. 2112] A. Are you asking me the question?

Q. Yes. Does the figure, thirty-three million dollars, sound about right to you?

A. Yes. I think that is substantially correct. The value of the common stock at that time.

Mr. Mahaffie: Yes, sir. No further questions.

Redirect examination.

By Mr. Bergson:

Q. Just one question. You acquired Rome for the treasury stock of Alcoa?

A. That's right.

Q. And not cash?

A. Oh, no, not cash. It is quite a difference.

(Witness excused.)

Mr. Bergson: Mr. Reece.

[fol. 2113] Kemp W. Reece, called as a witness in behalf of the Defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Bergson:

Q. Mr. Reece, will you please state your name and address?

A. Kemp W. Reece; 35 Stonehouse Road, Scarsdale, New York.

Q. By whom are you employed, Mr. Reece?

A. Ebasco Services, Incorporated.

Q. What is your position at Ebasco?

A. I am Executive Vice-President and a Director of the Company.

Q. How long have you been executive vice-president?

A. Since about the first part of 1956.

Q. And prior to that what was your position?

A. I was vice-president and a director in charge of engineering and construction for our company.

Q. For how long?

A. From 1952 to 1956.

Q. Now, Mr. Reece, what business is Ebasco Services, Inc. engaged in?

A. In management consulting services, engineering and [fol. 2114] construction for the utilities, electric and gas utilities, to industry and to governmental agencies.

Q. Now, Mr. Reece, directing your attention to the period in the early spring of 1958, did you have any meetings with any representatives of Alcoa?

A. Yes. In March, I believe the latter part of March, 1958, we had a meeting with Mr. Ralph Davies and Mr. Philip Coffin.

Q. And what was the purpose of that meeting?

A. Mr. Davies came in to talk with us about Alcoa's interest in getting into the insulated wire and cable field. He pointed out that in their opinion the insulated wire and cable segment of the utility industry had become of increasing importance and that Alcoa was not in this field and they were interested in getting, considering getting into it from the standpoint of their commercial position.

Q. Did you discuss with Mr. Davies and Mr. Coffin various ways by which Alcoa might get into the insulated wire and cable field?

A. Mr. Davies asked if we had any suggestions as to the methods or method which we thought might be most appropriate in getting into that field. We told him that in our [fol. 2115] opinion there were two methods that should be given major consideration.

One would be to set up a separate division, a new division of Alcoa in which they would engage the necessary qualified and experienced personnel; probably set up necessary research facilities and the physical manufacturing facilities to manufacture insulated wire and cable.

We suggested that a second approach, which we felt was more, may well be more practical and less expensive, would be to acquire a company that was already established and well recognized in the insulated wire and cable field. While we had made no study and talking from our general opinion, offhand experience, that the cost to the company would probably be less on this basis and certainly the time element of getting into such business would be very much less. We, in discussing this matter, we told them we had had a little experience on our own in which we several years ago had decided to go into the industrial engineering and construction field. Our previous experience had been primarily in

electrical utility and heavy engineering and construction field; that we had found that it was quite difficult to obtain [fol. 2115a] the qualified people that you needed to get into such field, and that we were considering acquiring or attempting to acquire a company that was well established in that field, as our experience indicated that such a procedure would enable us to better service industry.

[fol. 2116] Q. Did you try to go with your own?

A. Yes, we did. We set up an industrial and engineering department which was, I would say, reasonably successful, but we did not get the complete coverage of industry that we were seeking to get—in other words, to provide a broader range of services than we had actually developed.

Q. And did you ultimately acquire a company?

A. Yes, we did.

Q. Now, did you at the time indicate to them how long you thought it might be or how long you thought it might take for them to get into the wire, insulated wire and cable business if they proceeded on their own?

A. No, I don't recall that we did.

Q. Now, what ensued as a result of that meeting?

A. We were authorized in April, early April, 1958 by Mr. Davies to assist them in locating a company in the insulated wire and cable field that would meet certain general specifications that he gave us at the time. Those specifications were that the company should be an established, going organization, well accepted in the field, a company that was serv- [fol. 2117] ing the electric utility industry; a company that had well engineered products and products that were of high quality and so recognized in the industry, and a company who had seasoned and experienced management and a management that would fit in well with the Alcoa organization. I believe the word they used would be an organization that would be compatible with Alcoa.

Q. Did he indicate to you whether Alcoa was interested in acquiring more than one company?

A. Oh, no. They were interested in acquiring the know-how, really the know-how in the insulated wire and cable field, and there was no indication ever that they were interested in other than one company that was established in this field.

Q. Did he tell you that they had previous negotiations with Rome Cable that had been unsuccessful?

A. Yes. He mentioned that they had had discussions and, I believe, negotiations and that at the time he was talking with us they had decided the figure Rome was insisting upon was too high and that they wanted to explore other companies in the insulated wire and cable field.

[fol 2118] Q. Now, did you proceed with an exploration as a result of this meeting and the confirmation thereof that you just mentioned?

A. Yes, we started this exploration quite promptly.

Q. And generally, what did you do?

A. Well, this work was assigned to our people who were experienced in this field, and we compiled a list of quite a large number of companies in the insulated wire and cable field. In fact, I believe we tried to put together as near a complete list as we could of companies that were in this field of manufacture. After putting those companies together and getting preliminary information, we reduced the number of companies down to considerably less than the total to review with Alcoa.

Q. Do you have any recollection as to what the number was reduced to?

A. I believe it was 28.

Q. Now, after you selected these 28 companies, did you meet again with the Alcoa people?

A. Yes, our people met with the Alcoa people.

Q. And as a result of that meeting, what transpired?

[fol. 2119] A. It was decided that we would explore in more detail the availability of six of these companies, not only the availability but first the extent to which they met the specifications which Alcoa was interested in.

Q. And those six companies, are they the six companies that Mr. Davies referred to in his testimony this morning?

A. I am sure they were.

Q. Did you pursue the exploration of those six companies?

A. Yes. Our people checked into these companies rather completely through various sources, and Alcoa was kept advised of the developments.

Q. What was the ultimate result?

A. The ultimate result was that none of these companies were available or interested in merging or acquisition.

Q. Now, subsequent to that time did Alcoa advise you that it was resuming negotiations with Rome Cable?

A. Yes. Some of our people that were handling this work directly were advised by Alcoa that they were going to resume their discussions with Rome.

[fol. 2120] Q. Did Ebasco participate in any way with those discussions with Rome?

A. They did not.

Q. So that your participation in this program ended when the last company was found to be unavailable?

A. Yes. With respect to exploring any of the other companies, I believe that Mr. Davies asked some of our people for some general ideas with respect to Rome. I believe that there was a memorandum prepared covering those comments. I am not familiar with the details.

Q. Do you know whether or not those comments were directed primarily to the price that Alcoa should pay for Rome if it acquired it?

A. I am not familiar with the details of that memorandum.

Mr. Bergson: No further questions.

Mr. Wertheimer: No cross-examination.

(Witness excused.)

Mr. Bergson: Mr. Hickman.

[fol. 2121] Leon E. Hickman, called as a witness on behalf of the defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Bergson:

Q. Mr. Hickman, will you please state your name and address?

A. Leon E. Hickman, 829 Osage Road, Pittsburgh, Pennsylvania.

Q. By whom are you employed, Mr. Hickman?

A. I am employed by the Aluminum Company of America.

Q. What is your position at the Aluminum Company?

A. I am an executive vice president.

Q. How long have you been executive vice president?

A. Since April, 1959.

Q. And how long have you been employed by the Aluminum Company?

A. Since April, 1951.

Q. And prior to—what was your position at the time of your employment?

A. I was elected vice president, counsel and a director in [fol. 2122] 1951.

Q. And you continued in that capacity until you became elected executive vice president?

A. Even a little longer after that. I remained as general counsel until February 1st, 1960.

Q. And you have been a director of Alcoa since '51?

A. Yes.

Q. Now, Mr. Hickman, in 1958 or 1959 did Alcoa have a merger program?

A. No, they did not.

Q. Alcoa did, in 1959, however, acquire Rome Cable Corporation?

A. They did, sir, under the circumstances that have been detailed by the preceding witnesses.

Q. But this was not part of any merger program?

A. No, quite the contrary. Alcoa has had no mergers or acquisitions over its entire history until this Rome matter came along.

Q. Now, after Alcoa acquired Rome, Alcoa subsequently acquired Rea Magnet Wire Company; is that correct?

A. Yes, sir. In January, 1960.

Q. Will you tell us how this came about?

[fol. 2123] A. This came about through a suggestion of Mr. Ross Fraser in the fall of 1959. He said that information had come to him that the Rea family of Fort Wayne, which controlled the Rea Magnet Wire Company, was considering selling to the company for family reasons, tax reasons and the like, and there had been some death of the senior member of the family, and it might possibly be on the market if we were interested in it. We knew—we, in Alcoa,

knew something about the Rea Magnet Wire Company. It was a fine company, somewhat smaller than Rome, engaged in an entirely different business, although a copper fabricating business. It was in the business of doing the wiring, largely or entirely in copper, for electrical machinery, transformers, coils, that sort of thing. There were no overlaps with Rome at all. It was in the small copper wire business in the electrical machinery field, whereas Rome was in the larger sizes and in the transmission of electricity, by and large.

There had been a basic change in Alcoa's position in the late 1950's in that more and more the aluminum business was becoming an end product business. Alcoa through the [fol. 2124] years had been largely in the wholesale aluminum business, selling to others who did the fabricating, but we were finding, as the other witnesses have detailed, that we were more and more handicapped by not having a fuller line of end product materials than we did. So we were interested in Mr. Fraser's suggestion that this company was on the market, and negotiations followed with them.

Q. And as a result of those negotiations, did you acquire Rea Magnet Wire?

A. Yes, sir.

[fol. 2125] Q. Now, Mr. Hickman, after you acquired Rome Cable in 1959, were any acquisitions of other wire and cable companies considered?

A. Aside from Rea?

Q. Aside from Rea.

A. Definitely not. And never have been.

Q. Now, I show you Government Exhibit 254, which is a letter from you to Mr. Magee, dated May 1, 1959, regarding the Narragansett Wire Company. Would you explain that situation?

A. After we arranged the merger with the Rome Cable Corporation apparently the word got around that our money was available to people who had companies to sell, and we had a good many suggestions made to us of other companies that were on the market, and this Narragansett Wire Company was one of them. As I recall it, our Boston district manager told us that the Narragansett Company had contacted him and said that they would be glad to sell out to us. I was new to this business. I had a natural curiosity as to

who this Narragansett Company was and also what the impact on the industry of that company changing hands might be. And I asked Mr. Fraser to tell me something about this company on the assumption that he in Rome [fol. 2126] would know about it, it being in the wire and cable industry, and he reported to me on it, as this letter indicates. And I replied to Mr. Palmer that we had no interest. But this, as a matter of fact, was just informing myself. At no time did either the people in Rome or the people in Alcoa entertain any thought of acting on the suggestion that this company might be purchased.

Q. Did the possibility that Alcoa might be sued by the Government for acquiring Rome Cable Corporation have anything to do with your decision not to go forward with the Narragansett acquisition?

A. Not the slightest. We found the girl. We were satisfied.

Q. Now, I show you Government Exhibit 265, which is a letter dated April 13, 1960, from Mr. Fraser to you regarding the Hitemp Company and ask you if you could tell us the circumstance surrounding the writing of that letter?

A. This Hitemp situation, that is H-i-t-e-m-p, was basically another one of the same sort of thing. A man by the name of Everstat told one of our officials that this company could be purchased, and the matter was referred to me be- [fol. 2127] cause I am the Alcoa contact with Rome, and I followed the same procedure. I asked Ross Fraser to tell me a little about the Hitemp Company and in due course he investigated and told me about it. We turned the matter down. Mr. Fraser does make the observation in here "In view of the fact we had been sued two weeks previous by the Department of Justice, it was obvious we couldn't consider the matter." But I am sure it was just as obvious to me, and I assume to Mr. Fraser, that it wouldn't be considered in any event. Because, as stated by the previous witness, Alcoa was seeking know how in this insulated wire business and we were satisfied Rome had it and we were not about to buy it twice.

Q. Now, I show you a series of documents, Government's Exhibits 261, 264 and 266, all of which relate to the Supre-

nant Manufacturing Company and ask you to tell us the circumstances surrounding those letters.

A. Upon a reading of these letter I find that the possibility of buying this Suprenant, that is S-u-p-r-e-n-a-n-t, was the one that was brought to our attention by Mr. Palmer, the manager of our Boston District Sales Office. And those [fol. 2128] things as a matter of routine in Pittsburgh were funneled to me by this time—and, as I say, there were a good many of them—and I followed the same procedure with them at this time. I wrote to both Mr. Fraser and Mr. Rea, of the Rea Magnet Wire Company, which we had then acquired, not knowing what field this Suprenant Company was in, and I asked each of them to let me know whether there was anything of interest in this company and said we should not give consideration to the matter before or unless one or both of you strongly urges to do so, even though legal conditions may be a complete consideration.

We, in Pittsburgh, had not the slightest interest and neither did the people in Rome or Rea, and we turned it down.

Q. And was this turned down primarily for business reasons and not because of the pendency of the lawsuit?

A. No. I would have to be perfectly candid in saying that we wouldn't be about to buy a company in the cable and wire business two weeks after the Justice Department sued us for acquiring Rome. On the other hand, quite apart from [fol. 2129] the lawsuit, we never had the slightest interest and wouldn't have the slightest interest if there had not been a lawsuit.

Mr. Bergson: Your witness.

Mr. Melchior: No cross-examination.

(Witness excused.)

The Court: We will recess until two o'clock.

(Whereupon, at 12:40 p. m. o'clock, an adjournment was taken to 2:00 o'clock p. m. of the same day.)

[fol. 2130] AFTERNOON SESSION

2:10 p.m.

APPEARANCES: As before.

The Court: All right.

Mr. Adler: Theodore Kerry.

THEODORE H. KERRY, called as a witness on behalf of the defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Adler:

Q. Will you state your full name for the record, please?

A. Theodore H. Kerry.

Q. By whom are you employed?

A. The Aluminum Company of America.

Q. How long have you been employed by Alcoa?

A. Since 1941.

Q. What have your positions been with Alcoa since the time of your employment?

A. I was employed at our Massena plant in the accounting department in 1941. I transferred to a plant in Newark, Ohio in 1943 to become chief cost accountant of that plant. That was an Alcoa plant built for the government—Defense [fol. 2131] Plant Corporation. In 1944 I came to the Pittsburgh office as a staff accountant with specific responsibilities for wire, rod and cable cost accounting. In 1954 I became chief cost accountant of Alcoa. In 1956 I became administrative assistant, comptroller's division, and shared general comptrollership responsibilities with two other people; but specifically under my administration were several divsions, including the cost accounting division. I still hold that position, although in 1960 I added to my specific responsibilities the administration of Alcoa's budget program, and at that time the cost accounting function was transferred to another individual.

Q. All right. Have you been active in professional associations in the field of accounting?

A. I belong to the Comptrollers' Institute of America, and for about ten years, up until this fall, I was a member of the National Association of Accountants. I have never held any offices in those associations, but I have on various occasions been called upon to address these groups and other technical accounting groups on cost accounting practices.

[fol. 2132] Q. Could you describe for the Court the operation and function of Alcoa's cost accounting division?

A. Yes, of course, the primary responsibility of any cost accounting division, including ours, is to maintain adequate costs of its various products and product lines. In addition to that it is a part of our function to provide the sales management with data regarding the cost of the various products, mark-up factors which would account for overhead costs and which would return what the management deems is a desirable return on investment and thereby provide target sales prices for the various products involved.

Q. Is this in accord with accepted accounting practice in your judgment and experience?

A. This very definitely is in accord with the generally accepted responsibilities of the comptroller or comptrollership function. There may be many corporations where a part of this may be performed by some other division other than cost accounting, but it is part of the comptrollership responsibility.

Q. Now, referring to the development of possible target [fol. 2133] sales prices, did Alcoa face any special problem in this regard by virtue of the fact that it was an integrated producer—that is, because it produced both raw materials and intermediate products and finished products?

A. Oh, yes. For years we have had the problem of selling ingot or intermediate products to customers who were also competitors in the sale of the finished product. In these cases it has been our duty to provide the management of our company with data which would not only develop the target price for the products based on a desirable return, but also provide the management of our company with the situation that, to the best of our belief, would be the situation of a competitor who had to purchase an intermediate product at one of our prices, and then would have to sell that product or sell the finished product again at one of our prices, so it

has been definitely a part of our function to provide also, along with the target price, a picture of the profitability to the best of our ability to derive such a thing available to the customer-competitor.

Q. Could you describe briefly the type of or types of cal-
[fol. 2134] culations that you might make with respect to aluminum cable?

A. You mean describe the type of build-up that we would give with respect to cable?

Q. Yes.

A. Yes. We would—you see, we determine the actual cost of producing each item that we sell of cable. It is our practice to start with the market price of the ingot. This is transferred from our smelting division to our fabricating division at market price. Starting from that point, we would add the actual cost of producing the cable. We would add an allocation of our overhead expenses. We would add a mark-up factor which was based upon the invested capital, desired return on the invested capital in producing this cable—that is, the facilities—and thereby arrive at what is known in our company as a target price for the product.

[fol. 2135] Q. Now, was any additional problem presented because certain manufacturers start with redraw rod, purchase redraw rod, from which they make cable?

A. Yes. This is another one such as I mentioned a while ago. Customers start with ingot and customers also start with redraw rod. So in this case our sales department also wants to know; and we provide them with a similar cost build-up, such as I have described, excepting in this case we would start with the sales price of the redraw rod, the price which we would be selling it at to this customer-competitor, would go through the same process, assuming for lack of any other better way of assuming that competitor-customer had the same cost of producing the cable that we did.

Q. Do you assume this to be a valid assumption, that is the assumption that the non-integrated fabricator cost would be similar to yours?

A. Yes, I have to assume that. I wouldn't want to assume that we were less efficient. I don't believe I would want to assume the reverse either.

Q. Now, if in fact it were possible to achieve a sales price equivalent or close to the target price, is it your judgment [fol. 2136] that this would leave an adequate margin of profit for the non-integrated producer?

A. When you say if it were possible to sell at a price at or close to the target price.

Q. Yes.

A. Yes, sir.

Q. Now, Mr. Kerry, when the cost accounting division makes analysis of this type and develops information as to what an appropriate target price might be, how is such information transmitted to the sales department?

A. If this were a complete price revision of a whole line, it would have to be presented in tabular form. That is a schedule table. There may be cases where it may be transmitted in internal correspondence form, and in cases where you talk about one selected subject I have even known it to be transmitted verbally.

Q. Now, what has been done, what does the sales department do with this information?

A. They use this as a guiding line which will hold in front of them the desired target on where we would like to be. They also use, in the case that I mentioned, where we recon- [fol. 2137] struct the competitor- customer situation would be, they use this as a guide line to be sure that we do not on our own evaluation affect any price which would put the customer-competitor in an impossible situation.

Q. Is it at all times, so far as you are familiar, been Alcoa's policy to preserve an adequate spread for your customer-competitor in so far as this would be possible to do?

A. This has always been our policy.

Q. Have you yourself participated with sales department personnel in discussions you got in the establishment of actual sales prices?

A. Yes, I have participated in these discussions, particularly since becoming chief cost accountant and thereafter.

Q. Now, what has in fact been the ability of Alcoa and its sales department to realize a price commensurate with or approaching the target price developed in the cost accounting division since the period of shortly after the Korean War?

A. Increasing difficulty to the point where at least since 1957 I would say practically entirely impossible.

The Court: That is because of competition?

[fol. 2138] The Witness: Yes, sir. Yes, sir.

Q. Is that true with respect to aluminum cable as well as other products?

A. Yes. In recent years I think I can properly say most particularly true in the case of aluminum cable.

Q. I show you, Mr. Kerry, Government Exhibit GX-191 and ask you to look at that and to describe for the Court briefly what that document relates to.

A. This is dated in 1956. It relates to a meeting at which I had been present, one of the other members to whom this letter is addressed was Don Wilmot, at that time a vice-president of our sales department, and it relates to, during this conversation it was brought out, this was shortly after the Korean War, during the Korean War price controls had created a situation whereby our prices were definitely out of line, I would say at least out of line—during the Korean War price control had resulted in a situation whereby our prices were out of line with target and out of line with actual costs. So at this meeting I was asked to develop a schedule, a rough target price, whereby we knew that we netted a half [fol. 2139] a cent a pound increase on E.C. pig, as it was known then,—ingot it is called today—we knew that our cable prices were out of line.

I was also told that at that time we had to watch the redraw rod price because in recent years customers and also competitors by the use of Properzi Equipment had installed this new equipment, were buying ingot from us and in some cases were selling a redraw rod. Therefore, we could not blindly adjust the price of cable or the price of E.C. pig without again watching the spread situation. So I was asked to develop a recommendation as to what would be the theoretical pricing situation which would rectify our need for price revisions and would retain a spread situation somewhat on a historical basis which would permit, which would prohibit any possibility of a squeeze—I have to use the word—of a squeeze to either of these competitors of ours, the ones buying ingot and making rod or the ones buying rod and making cable.

Q. Mr. Kerry, why was an increase needed in the E.C. pig?

A. That is a matter—E.C. pig has closer operating limits. [fol. 2140] There is a closer control needed of the varied ingredients other than aluminum. This closer control, this happens in other alloys of ingot too, this closer control costs us money. I would like to say here that we cannot, no cost accountant can precisely account for this nature of cost as exactly how much it is. We know it requires more supervision, more metallurgical work. We know there has to be, of course, some price differential.

Q. And the same thing is true, I think you stated, with respect to other alloys or types or forms of aluminum product?

A. This is true in certain other alloys of pig, that is correct.

Q. Now, I believe in your testimony you stated that one factor, that the cost accounting division had to bear in mind in readjusting these prices was that an adequate spread be maintained, at least as a theoretical matter between the pig price on the one hand and the redraw rod on the other.

Now, in this memorandum you also state that the pattern of price increase suggested by you, "would return approximately what is needed without unduly opening the spread [fol. 2141] between redraw rod and cable." In other words, you appeared also to be concerned that there not be too wide a spread between the rod on the one hand and the cable on the other. Would you explain the basis of your concern in that regard?

A. You must remember that my function is to make the sales department and the management aware of the possible economical impact of any alternative decision which might be made. You also must remember that since I have three prices to be concerned with here, pig, redraw rod and cable, if the spread on the one opens, the spread on the other obviously closes. We have customers at both stages. So I am simply reporting to the sales department, as I was asked to do, here was the theoretical desirable situation which would return in the aggregate to Alcoa what we needed and would also leave all customers at any stage of the game with the relatively same spread which they had as far as I know successfully operated in recent years.

Q. Now, were the recommendations that you, on behalf of the cost accounting division, proposed in this document put into effect by the sales department?

A. These particular recommended increases were not put into effect in their entirety.

[fol. 2142] Q. Do you recall what was attempted at that time?

A. Yes, I do. The half cent increase on ECP was put into effect. If you will refresh my memory, what did I recommend on EC redraw rod on that letter? It is hard to read.

Q. Yes. I believe that was .014, I believe. I think you had better look at it.

A. Yes. This letter recommended .014 on redraw rod and my recollection is at about that time we increased redraw rod by one cent. My recommendation for cable was an average—and understand, there are many specifications, and this is only an overall average of many—I recommended an average of .018, and my recollection is that the effective average of everything which was done about that time was .015.

Q. Now, Mr. Kerry, in your judgment does the fact that Alcoa, through its cost accounting division, has attempted to analyze relationships between raw materials and finished product prices and has attempted to determine adequacy of spreads between such prices mean that Alcoa has had the power to determine what such spread might be?

[fol. 2143] A. Absolutely not. It is good practice. It is good practice, and I believe essential in good management, that we know where we would like to be and where our customers and competitors are or should be; but we have had absolutely no power to accomplish these things.

Mr. Adler: No further questions.

Cross-examination.

By Mr. Mahaffie:

Q. Mr. Kerry, just to straighten out a couple of things on this document, GX-191. Will you read, Mr. Kerry, the third paragraph on the first page—that is, the last paragraph on the first page which finished up over on page two

and then read the first sentence of the first full paragraph on page two.

A. Yes. First, let me say I have a very difficult copy to read, but I will try it. It is very difficult print. (Reading) "It seems to me that the significant point in this is that our present need for price increases in cable is occasioned by changes in our own facilities and operating practices. Since [fol. 2144] our competitors have not necessarily had parallel circumstances, we should be aware of the fact that any price increase at this time, although needed by Alcoa, may increase the margin available to a competitor to a point beyond that which has ever been available to him since 1948. This, of course, can be eliminated insofar as non-integrated competitors are concerned by making a corresponding price increase in redraw rod."

Q. Now, you testified it was Alcoa's policy, as exemplified by this document, in setting the prices of these two products to maintain the historical spread. I believe you used the word "historical", did you not?

A. I believe I did.

Q. That is, to maintain the spread which had previously been available to a non-integrated competitor?

A. I don't know if I made exactly that statement.

Q. Is that correct, sir?

A. If you will pardon me by saying as long as that spread is adequate, as long as that spread will result in the customer-competitor not having a loss, then I will agree with [fol. 2145] it; but I want to put that qualification in because, under some conceivable circumstance, if the historical spread, due to no power of ours, resulted in a loss situation, we wouldn't want to retain that historical spread any longer than we had to.

Q. Would it be correct that the purport of this language that you just read would be that you wanted to maintain that spread, you didn't want that spread to get too narrow and at the same time you didn't want the spread to get too big?

A. You must remember my position.

Q. Yes.

A. As an accountant, I am making my management aware of the economic impact of any alternative action, and in this I am doing just that. Since I know that we had cost increases due to an expansion program and certain circumstances that might not be existent in the case of competitors, it is incumbent upon me to make my management aware of the fact that an increase at this time may well widen the spread for the competitor. I don't know if this is good or bad, but I must make my management aware of this.

Q. Mr. Kerry, you testified to your knowledge it was [fol. 2146] Alcoa's policy, the policy of the sales department, to maintain what you described, I believe, as an adequate spread.

A. Correct.

Q. To competitors. Now, I ask now if you know, was it the policy of the sales department to make sure that this spread was neither too big nor too small?

A. I know that it was the sales department's policy to make sure that the spread was not too small because these are our customers. I do not know how I could even define what is too big a spread.

Q. I see. But that would be the only use to which this information which you read could be put; is it not, sir?

A. I was making the sales department aware, not that it was too big; I was making the sales department aware that it was possible that this would increase it. They must then use their judgment.

Mr. Mahaffie: No further questions.

Mr. Adler: No redirect.

(Witness excused.)

Mr. Adler: Mr. Gilbert.

[fol. 2147] THOMAS L. GILBERT, called as a witness on behalf of the defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Adler:

Q. Would you state your full name, please?
A. Thomas L. Gilbert.
Q. By whom are you employed?
A. By the Aluminum Company of America.
Q. What is your present position?
A. I am a production assistant in the office of the general manager of the fabricating division.
Q. And how long have you held that position?
A. I have held that for one year and a half.
Q. Do you recall the date?
A. September 1st, 1960.
Q. What was your position prior to that?
A. Prior to that I was superintendent of the covered conductor department at the Massena plant.
Q. And what was the period covered by your employment in that capacity?
A. From 19— about mid 1956 until September 1st of 1960.
Q. And what were your responsibilities in that position?
[fol. 2148] A. The operation of this production department to cover and insulate aluminum cable to end up with products known as line wire and self-supporting service drop or multiplex cable.
Q. Now, prior to 1956 what was your position?
A. I was the superintendent of the cable accessory manufacture department in Massena.
Q. For what period?
A. From, I believe it was, early 1953 to mid 1956.
Q. Now, while you were superintendent of cable accessory manufacture, did you have other duties?
A. Yes, sir, I did. For a period I was assigned—I was given a special assignment as a liaison man to operate between Rome Cable and the Massena plant, and that assignment was in effect to solve any of the small problems that

naturally arose from trying to make the efforts of two different companies work smoothly in this tolling arrangement that has been testified to.

Q. Well, did you have a further responsibility with respect to wire and cable while you were in this position of [fol. 2149] superintendent of cable accessories manufacture?

A. Yes, sir. Following the liaison assignment, there was a period after our management decided to proceed with installation of facilities for the production of polyethelene covered line wire and service drop. I was given the responsibility of coordinating engineering efforts to choose equipment and install this equipment for the polyethelene covering and allied operations. This, of course, extended from about mid 1955 until I was assigned as the superintendent of that covered conductor department in early or mid '56.

Q. Now, we have heard testimony this morning from Mr. Davies regarding the installation of this polyethelene covering facility at Massena. What products were manufactured on that equipment that had formerly been made under the tolling arrangement at Rome?

A. Primarily two types of overhead conductor. Number one was line wire and number two was the twisted multiplex cables.

Q. With the polyethelene?

A. With the polyethelene covering and insulation, yes.

[fol. 2150] Q. Now, when this polyethelene facility was installed at Massena, were you any longer dependent upon Rome for the manufacture of the products you just described?

A. Naturally, in any new operation there is a period of breaking in and actually learning how to operate that equipment. Subsequent to this break-in period we were in a position to fabricate all our requirements for the polyethelene line wire and multiplex cables. So that we no longer needed, after this break-in period, to depend upon the tolling arrangement of Rome Cable to supply us with the polyethelene items.

[fol. 2151] Q. Now, at a subsequent date did you participate in formulating the request for authorization of funds for the installation of Neoprene covering equipment?

A. Yes.

Q. Now, with respect to this neoprene equipment, in what manner was it contemplated that Alcoa would receive the neoprene itself?

A. The neoprene was to have been purchased outside of the company in a pre-compounded state, which would then allow us to add this neoprene compound directly to our proposed neoprene extruder to put on the covering or insulation.

Q. Why did you not plan to do the compounding yourself?

A. Because we did not feel that it was necessary to purchase the equipment that would be required for compounding the neoprene.

Q. Did the products that you planned to make require any variation in the type of compound or type of neoprene covering that you might require?

A. No. We were convinced that the compounds required for these neoprene products we are speaking of were relatively simple and easy to exercise quality control over so that we felt we did not need to have the compounding [fol. 2152] facilities ourselves. In other words, the compounds necessary were rather standard and available from outside suppliers.

Q. Now, in your judgment if a neoprene extruding facility had been installed at Massena, would that have satisfied your requirements or would you have needed Rome to continue tolling part of your requirements?

A. We would have been able to supply practically all of the line wire items that we needed, and we would have been able to supply all of the multiplex neoprene products that we would have needed.

Q. Had this installation been made, in your opinion, would there have been any need for Alcoa to acquire Rome in order to give you greater polyethylene and neoprene capacity for the line wire and triplex products about which you speak?

A. Absolutely not.

Q. Now, I refer to certain of the product boards over here which you have examined, in particular the board entitled "Primary distribution-underground, and secondary distribution-underground;" the board entitled "Utilization," and the board entitled "Other representative Rome products."

[fol. 2153] photographic copies of which have been introduced into evidence as Defendants' Exhibits AR-16, 17, and 18, respectively. Would you at Massena have been able to manufacture the line of products shown on those boards with the equipment about which we have been talking?

A. If there were any items amongst that group that we could have manufactured with our equipment we did not know which ones they were. I can say that we did not think that we would be able to fabricate the line of product shown on the boards that you indicated.

Q. I refer you to Government's Exhibit GX-155, which is the proposed R/A, and refer to the statement therein that "If the neoprene extruding equipment were installed we would be able to produce rubber insulated high voltage cables if required."

Mr. Mahaffie: What page are you referring to, Counselor?
Mr. Adler: Page 2.
The Court: What is that number again?
Mr. Adler: GX-155.

Q. And I ask you to comment about that.

[fol. 2154] A. At the time we felt we would have had a basic extruder for neoprene that could also extrude rubber insulation. Being rather naive and new to the insulating game, we felt that we could make this material, which as I look back now and having learned more of, a little more about the insulation field, I feel certain that we would have been unable to do it for reasons such as the fact that we did not have the high voltage electrical equipment for testing purposes, which test would have been required. Nor did we, I believe, appreciate the extreme soundness that was required in the high voltage insulations. We would have had no way of checking whether we had ample insulation or not.

Q. Now, was a committee formed at some time to investigate the feasibility of Alcoa's establishing its own facilities for the manufacture of a line of products including the sophisticated types shown on those product boards.

A. Yes, sir. I was assigned to such a group in November of 1958.

Q. And what was your role in the activities of the Committee?

[fol. 2155] A. I was one of the junior members of the committee and the person that was assigned full time to this survey to determine what we would need in order to get into the production of this sophisticated array of insulated conductors that you referred to.

Q. What did you conceive the Committee's function to be in that regard?

A. The function would have been to investigate equipment necessary for this production; investigate the best plant site for production and thus closest to markets; and to determine naturally the building space that would be necessary and also to what extent we would have to rely upon the acquisition of technical know how from outside the company.

Q. Had anyone on your committee had actual experience in making these more sophisticated insulated products?

A. No.

Q. Had anyone on the committee had experience with the equipment used in making such products?

A. Other than my having seen them in various visits to insulating plants, I know of no one in the group that was familiar with the equipment necessary.

[fol. 2156] Q. Now, how did the Committee go about determining what products might be manufactured in such a facility?

A. Of course, we were limited in our direction by excluding magnet wire from our considerations and also from high voltage cable. That left the rest of the field open to our investigation, and we did our best to determine what those individual products would be by reviewing the catalogs that are published by some of the companies who also were into the manufacture of these products. It was a matter of judgment on our part to pick what we thought would be the popular items that we would be required to make in such a manufacturing set-up.

Q. Could you tell from examining the catalogs of producers the relative importance of various products or what relative quantities that you might be required to manufacture of each product?

A. No, sir. That was one of our very thorny problems in trying to determine what the needs of the different types of cables would be and in what proportion of volume they would be with respect to one another.

[fol. 2157] Q. Did you yourself consider some kind of research staff in organization to be necessary if you were going to get into the sophisticated type of insulated products?

A. Other than realizing that such research facilities would be required, we took no steps to determine what those facilities would have to be. We were not, in other words, the research investigation was not assigned to our group.

Q. You were limited to production facilities?

A. We were limited to production considerations, yes.

Q. Now, in the course of your committee's work, did you draw up any possible layouts of plants?

A. Yes, sir, we did.

Q. Were these considered to be an actual plan of a plant that would be built?

A. This was our best effort to put on paper what we considered necessary to produce a range of products really at which we were trying to cast our business. I do know, though, with such a setup would be a practical setup to cover the manufacture of this sophisticated line. It was a very preliminary look, possibly as a place to start from, with a more detailed study.

[fol. 2158] Q. Did your committee come up with an estimated total cost of facilities of the type you were——

A. (Interrupting) Yes.

Q. (Continuing)—talking about?

A. Yes, we did, and that amount was thirty-eight million dollars.

Q. Now, if we may, Mr. Gilbert, return to the present, would you state your responsibilities in your present position?

A. I now have to do with representing the general manager in the fabricating division in problems that have to do with products such as alloy wire, rod, bare structural shapes, electrical conductors, aluminum extrusions and aluminum drawn tube.

Q. Would aluminum conduit come within your field of responsibility?

A. Yes, sir, aluminum conduit is one of the products.

Q. Could you describe for the Court the equipment, well, the equipment needed to make aluminum conduit?

A. It depends, of course, what you consider the raw material. I would start, if the Court pleases, with an extrusion ingot, which is a cast aluminum ingot. That ingot is charted into the aluminum extruder which works somewhat like a [fol. 2159] toothpaste tube where you apply pressure and squirt out the extrusion, which in this case would be the pipe of the size we want to handle. Once that pipe is extruded, then it is sawed into lengths specified in the neighborhood of ten feet. Then those pieces of pipe are threaded on either end. Each piece of pipe is coated on the inside with a slip agent to allow insulated wires to be drawn through easily. One end of each pipe is fitted with a screw-on coupling. The other end is covered with a protector or some kind so the threads don't get banged up. And then after suitable labels are stuck on the outside of the pipe, a number of pieces of particular size are tied together and sent to our shipping docks.

Q. I show you Defendants' Exhibit AR-70, and ask you to state the number of producers of extruded shapes and drawn tube shown on that report.

A. 1950 there were 39 such producers. In 1955 110 and in 1960, 133.

Q. Mr. Gilbert, would you expect such producers to have the extrusion press about which you spoke, which you mentioned as one element of equipment needed in the manufacture of aluminum conduit?

[fol. 2160] A. Yes, sir, I would. With this one qualification, that the size of the extruder items, the size of pipe that can be produced. That of the 133 extruders I would suspect they could all extrude the more popular sizes of aluminum conduit.

Q. Now, what would your estimate be as to the cost of equipment needed for threading, labeling, lubricating pipe in order to make a good conduit? In other words, to go from the step where you have the extruded pipe to the point where you have a finished conduit?

A. I would think the figure of $15,000 would be probably more than ample to set up for such a fabricating operation.

[fol. 2161] The Court: I am just curious, Mr. Gilbert, about that extruding machine. I am not going to buy one. When the ingot, if you call it that, is placed in the machine it is subjected to pressure of some kind?

The Witness: Yes, it is a heated ingot, subjected to hydraulic pressure.

The Court: And when the pipe comes off, does it have to be cooled somewhere along the line?

The Witness: Yes, sir. In case of conduit, it is air cooling.

The Court: Air cooled?

The Witness: Air cooled, yes. There are fans from underneath this run-out table that blow the air up and reduce the temperature down to where the metal is not easily scratched and also is then rigid enough to handle, to saw and handle.

The Court: So that when the ingot is placed in the machine, it is pretty hot or comes hot after it is placed in the [fol. 2162] machine?

The Witness: It is placed in the machine already hot, in the neighborhood of 800 degrees Fahrenheit.

The Court: All right. That is just for my own information.

By Mr. Adler: (Continuing)

Q. Now, having returned you to the present, if we can go back for a moment to the time when this request for authorization of funds for a neoprene extruder was prepared, was that request ever given final approval, to your knowledge?

A. No, sir, it was not. It was given approval at the plant level and then up through a committee, investigational committee, who recommended to management that it be approved; but management did never, to my knowledge, approve—I am sure they never approved it.

Mr. Adler: No further questions.

Cross-examination.

By Mr. Mahaffie:

Q. Mr. Gilbert, would you run down, just so we get this all together, just what equipment is required to take an [fol. 2163] extrusion ingot through all of its various stages to finished conduit? Now, you described what the processes are. What I would like now is what equipment is required.

A. We need a furnace to bring the ingot to this tempera-

ture of approximately 800 degrees Fahrenheit. There are conveyors, simple conveyors that carry the ingot from the furnace to the extrusion press. The extrusion press is hydraulically operated and I would say that the press is operated, and the ingot, the hot ingot is extruded out through an extrusion die and as it comes out it takes the form desired—in this case, a hollow tube or pipe. May I ask whether you wish me to go on further than that?

Q. Yes, sir. I want to go all the way to conduit.

A. All right. Then the extrusions are cooled, as I have already described, and they are then sawed to whatever length is specified in the manufacturing procedure. Those lengths of pipe are then put into threading—handled into a threading machine which threads first one end and the pipe is turned around and it threads the other end. There is also [fol. 2164] a machine operation which takes any sawing burr away from the end of the pieces of pipe so that you have a smooth end that will not injure any insulation on the cable that are subsequently pulled through.

Q. Is that a separate machine that does that, or is that done in the threading?

A. It can be either. It can be either the same or separate. The threaded pipe is then lubricated by blowing through the pipe a spray of a lubricant which then adheres to the inside of the pipe.

Q. Is that a separate machine that does that, Mr. Gilbert?

A. Again, it can be separate or it can be part of an automated line. To my knowledge, most people use separate machines, and I have seen just simple hand sprays that have air hoses leading to them to do this spraying.

Q. Mr. Gilbert, is the word "stretcher" familiar to you?

A. Yes, sir.

Q. What is a stretcher?

A. I omitted the stretcher in the extrusion line. After [fol. 2165] the hot pipe comes out of the extruder, it is gripped on either end by mechanical grips, and then the pipe is stretched which makes it straight. Thank you.

Q. Now, is that—does the cooling process take place at the same time it is being stretched, or is that a separate process?

A. It is down to temperatures low enough so that the

stretching will take effect and end up with a straightened pipe.

Q. I believe you said it was air cooled. How is that done, sir? Is it done in racks? Is it cooled as it comes out of the extruder?

A. It is cooled as this piece of pipe travels down along conveyor or run-out table from the extrusion press.

Q. You have a run-out table which accomplishes the cooling?

A. Yes.

Q. And your stretcher picks it up?

A. Men pick it up and put it in the stretcher jaws, and it is stretched.

Q. Now, sir, directing your attention to document AR-70, Mr. Gilbert, the category which you noted on your direct [fol. 2166] testimony is labeled extruded shapes and drawn tube. Now, I ask what "drawn tube" is, Mr. Gilbert.

A. Drawn tube is cold worked tubing. In the aluminum industry you generally start out with an extruded tube bloom or thick walled pipe, actually. That thick-walled pipe is put through a die, using an interior mandrel, and the result is a cold working and reducing of the wall, and usually the outside diameter of the tube bloom, to result in a drawn tube.

Q. Well, does the fact that this category says "drawn tube" mean that—well, strike that.

Does the fact that a manufacturer makes drawn tube necessarily mean that he owns an extruder?

A. In the aluminum industry I know of no way to get a drawn tube without having an extruded tube bloom to start with. It is very possible that a company could buy, purchase outside of its own facilities, tube blooms for their production of cold drawn tubing.

Q. And then he draws the tube on his own machine?

A. I would assume he would.

Q. So then the figure which is shown here in the third [fol. 2167] column under 1960 of 133 producers does not necessarily represent 133 companies which have extrusion presses in their plants?

A. I would agree.

Q. Now, Mr. Gilbert, Mr. Adler asked you about this neo-

prene project in 1957 and '58. I wonder, sir, if you would have another look at GX-155 and 156. What is—well, I think you testified GX-155 is the so-called R for A which, I believe, means request for authorization of funds to set up facilities for producing neoprene covered wire; is that correct, sir?

A. That's correct.

Q. And GX-156—well, will you state what that document is, sir, GX-156?

A. GX-156 is a record of these subjects that were discussed and passed upon in a capital expenditure committee meeting in January, 1959 on the 8th.

Q. And would you, without reading it—would you state what the subject matter of the last item on page one is, sir? It is labeled "Massena M-2520."

A. The subject is the neoprene extruding equipment which in turn is referred to under the R for A, GX-155.

[fol. 2168] Q. So GX-156 represents the action taken by the capital expenditure committee on the request for authorization which is contained in document GX-155?

A. Yes, sir.

Q. Now, sir, what amount of money was approved by the capital expenditure committee in connection with that request?

A. Well, it is my understanding that the capital expenditure committee does not approve expenditure of money. It merely recommends to management that this is a worthwhile project and they are recommending that management favorably look upon it.

Q. Well, Mr. Gilbert, would you read the paragraph at the top of the page, the three-line paragraph that precedes the individual items on GX-156.

A. "The following matters were discussed in the meeting noted above. Approval of all of the items noted below was recommended by the full capital expenditure committee."

Q. And one of those items is this M-2520?

[fol. 2169] A. Yes.

Q. The neoprene extruding equipment. And it states that that item involves the amount of $475,000, does it not, sir?

A. Yes, sir.

Q. Now, Mr. Gilbert, turning to GX-155, I note there is—well, first of all, the request for authorization for this

neoprene extruding equipment is dated November 14, 1958, is it not, sir? That would be on the second page of the exhibit.

A. Yes, November 14, 1958.

Q. And the approval of the capital expenditure committee which we just referred to as dated January 13, 1959—am I correct, sir? I'm sorry, January 8th.

A. January 8th, yes, sir.

Q. Now, would you read the cover memorandum on GX-155, the memorandum dated July 27, 1959, from Mr. Little to Mr. Pellegrino, with a copy to you? What is the text of that memorandum, sir?

A. "Please cancel R for A, M-2520, purchase and install neoprene extruding equipment and rehabilitate the balance of Building 14 for occupancy."

Q. Is there a handwritten notation on that document?

[fol. 2170] A. Yes, sir.

Q. What does it say?

A. "Dead duck."

Mr. Mahaffie: No further questions.

Redirect examination.

By Mr. Adler:

Q. Referring to AR-70, do you personally know of drawn tube manufacturers which purchase what you referred to as a tube bloom—I think that was it—from other manufacturers and begin their operations at that stage?

A. I know—I believe I know of instances where our extruding plants make limited amounts of tube bloom for sale, but they are to my knowledge always very large sizes which come from the very high capacity or large size extrusion presses of which we are operators, but I do not know of any orders that we get for tube blooms of sizes such as you would use for making conduit.

Q. Would it be your conclusion, then, that the large majority of the 133 producers listed on this report would have their own extrusion presses?

[fol. 2171] A. That is my opinion.

Mr. Adler: No further questions.
Mr. Mahaffiie: No recross.

(Witness excused.)

Mr. Latimer: Mr. Pendorf.

JOHN S. PENDORF, called as a witness on behalf of the defendants, being first duly sworn, testified as follows:

Direct examination.

By Mr. Latimer:

Q. Mr. Pendorf, would you state your full name for the record, please?
A. John S. Pendorf.
Q. By whom are you employed?
A. Rome Cable Corporation.
Q. And in what capacity?
A. I am a statistician, head of the statistical department.
Q. How long have you been employed by Rome Cable?
A. Twenty-four years.
Q. And how long have you been a statistician for Rome Cable?
[fol. 2172] A. Twenty-three.
Q. Mr. Pendorf, I show you a chart which has been marked for identification as defendant's AR-82 which is entitled "Public utilities purchasing covered or insulated overlap aluminum conductor from both Alcoa and Rome in 1958," and I ask you if you prepared that chart?
A. Yes, sir.
Q. And from where did you get the information to prepare that chart?
A. The information came from the defendant's answer to the plaintiff's interrogatories, 10 and 11.
Q. And where did the information come from or which the answers to the interrogatories were based?
A. They were tab reports from company records.

Mr. Latimer: I will offer defendant's Exhibit AR-82.

Mr. Wertheimer: No objection.

The Court: Received.

(Defendant's Exhibit AR-82 for identification received in evidence.)

The Court: What is that chart again? I will take your description of it.

[fol. 2173] Mr. Latimer: I believe, your Honor, you have a copy of that in your chart notebook, the very last one. It is entitled "Public utilities purchasing covered or insulated overlap aluminum conductors from both Alcoa and Rome in 1958."

The Court: All right.

By Mr. Latimer:

Q. Mr. Pendorf, does that chart show all the companies which purchased the covered or insulated overlap aluminum conductor—and by that I mean the last two products on the product board, a photographic copy of which has been marked as defendant's Exhibit AR-20—does that cover all the companies who bought these products in 1958 from both Alcoa and Rome?

A. Yes, sir, they do.

Q. Now, could you state how many companies there are on this chart?

A. There are thirteen companies listed.

Q. And how many purchased $1,000 or more from both Alcoa and Rome?

A. There are ten of these companies that purchased more than a thousand from each.

[fol. 2174] Q. Now, I am going to list the utility companies who have testified at the proceedings here, and I wish you would check off the ones who are among the ten who purchased one thousand dollars or more of the overlap products in 1958: Central Hudson Gas and Electric Company, Central Illinois Public Service Company, Dayton Power and Light Company, Long Island Lighting Company, New York State Electric and Gas Company, Niagara-

Mohawk Power Corporation, Public Service Electric and Gas, and Rochester Gas and Electric.

Would you state how many of the ten companies that purchased more than a thousand dollars of the overlap aluminum conductor from both Alcoa and Rome in 1958 appeared as witnesses in this proceeding?

A. I checked off eight.

[fol. 2175] Q. Well, could you count just one more?

A. I got Central Hudson; Central Illinois; Dayton——

Q. I am sorry. It is my mistake. Strike Rochester. Subtract one from the answer you gave.

A. I got seven.

Mr. Latimer: Seven. Thank you. No further questions.

Cross-examination.

By Mr. Wertheimer:

Q. Mr. Pendorf, this tabulation which you prepared does not include any products other than aluminum line wire or aluminum triplex that was sold to the utilities in 1958, is that correct?

A. These figures represent the sales of aluminum line wire and triplex.

Q. Nothing else?

A. That's right.

Q. So any sales by Rome of copper products would be excluded?

A. They are not in here; that's right.

Q. Sales by Alcoa or Rome of ACSR or AAC would be excluded?

A. That's right.

[fol. 2176] Q. And this would not cover sales by Alcoa or Rome of all insulated or covered aluminum conductors or wire and cable to these utilities in 1958?

A. That's right, it would not.

Q. And this tabulation does not list all companies to whom Alcoa or Rome sold the so-called overlap products in 1958, or the companies to whom Alcoa or Rome sold aluminum covered or insulated wire and cable in that year?

A. It is a long question.

Q. Shall I break it down?

A. I think you have got to give it to me in little, short sentences.

Q. OK. This does not include any copper product sold to these utilities?

A. That's right.

Q. It doesn't include all aluminum wire and cable products sold by Alcoa or Rome to these utilities?

A. That's right, it does not.

Q. It does not include all the products included within aluminum insulated or covered conductor wire and cable sold to these utilities?

A. That's right, it does not.

Q. And it does not list all of the utilities to whom Alcoa [fol. 2177] or Rome sold these so-called overlap products in 1958?

A. Are you asking me if this is a complete list of the customers that Rome——

Q. Exactly.

A. This is not a complete list of customers that Alcoa and Rome sold line wire and triplex to.

Q. Right.

And it is not a complete list of customers to whom Alcoa or Rome sold insulated or covered aluminum wire and cable in this year?

A. That's right.

Mr. Wertheimer: No further questions.

Redirect examination.

By Mr. Latimer:

Q. Mr. Pendorf, is this a list of the common customers who in 1958 bought the insulated or covered products which both Alcoa and Rome were making, the only insulated or covered products which both companies were making—is this a list of common customers?

A. Yes, sir, it is.

Mr. Latimer: Thank you.

Mr. Wertheimer: Nothing further.

[fol. 2178] The Court: Wait just a minute. What this is is simply a list of concerns who bought covered or insulated aluminum conductor from both Alcoa and Rome in 1958.

The Witness: That's right.

The two items listed as shown on the attachment. The line wire and the triplex aluminum.

The Court: The line wire and the triplex.

The Witness: That's right.

The Court: All right.

(Witness excused.)

OFFERS IN EVIDENCE

Mr. Bergson: Your Honor, I am about to ring down the curtain on the Defendants' case. I have two exhibits that I would like to offer in evidence. Their relevancy may not be immediately apparent so I would like to explain the purpose of offering them.

One exhibit is a press release issued by the Department of Justice on June 5, 1961, and this has been marked, or I will ask that it be marked Defendants' Exhibit AR-79 for Identification.

(Press release above referred to marked as Defendants' Exhibit 79 for Identification.)

[fol. 2179] Mr. Bergson: You will recall, your Honor, that in the course of the argument on Defendants' motion to dismiss, Mr. Melchior made the statement that it was the Department's position that irrespective of all other considerations a company the size of Alcoa should not be permitted to acquire a company the size of Rome. And in the Government's brief the Government says, in explaining the reasons for the enactment of the Clayton Act, that there has been concern over the effect on individuals and communities remotely administered by giant corporations. Now, this press release, which I would like to offer in evidence, is a press release relating to a case that was brought by the Department against the Standard Oil Company of New Jersey and the Standard Oil Company of Kentucky. The case was settled, and as part of the settlement, the Standard Oil Company of California was brought in and was permitted to acquire the Standard Oil Company of Kentucky.

And the press release says: "Anti-Trust charges against the Standard Oil Company of Kentucky were terminated today by entry of a consent judgment permitting the firm to

[fol. 2180] merge with the Standard Oil Company of California."

Now, the press release—I will skip a little bit.

Mr. Melchior: Counsel, don't you think you should offer it before you read it into the record?

Mr. Bergson: Well, it is not in the record. I can't use it.

Mr. Melchior: Don't you think you should offer it first?

Mr. Bergson: I prefer to proceed the way I am proceeding.

The Court: I have got to find out what it is before I can rule on the admissibility. Go ahead.

Mr. Bergson: The press release then goes on to say that the Standard of California was founded in 1926. The California firm with principal offices in San Francisco is the twelfth largest corporation in the nation. In 1959 it had gross operating income of $1,564,827,112. And Standard of Kentucky had 1959 sales of $305,276,825. And then the [fol. 2181] Attorney General is quoted as saying:

"Despite the size of Standard of California we have agreed to this judgment and we have not opposed the merger because we believe it will stimulate competition."

Now, I have not read the complete release, but I think that it has a material bearing on this case in view of the position that the Department has taken in its brief, and in view of the position that Mr. Melchior took on oral argument, and I now offer the press release.

The Court: I assume there will be no objection, but go ahead.

Mr. Melchior: There is an objection, your Honor. There is an objection on the ground of relevancy.

We take no issue with any statement in the press release, but I think we should point out to the Court that this was a proceeding which was not under Section VII. This was a proceeding under the Sherman Act. And the document, since it is now in evidence, I think should be read in part to [fol. 2182] the Court.

Mr. Bergson: It is not in evidence yet.

Mr. Melchior: I beg pardon?

Mr. Bergson: It is not in evidence yet.

The Court: Go ahead.

Mr. Melchior: The complaint in this proceeding—what the situation briefly is, without going into too much detail, it was this: There was a marketing agency for Standard Oil of New Jersey and it was by virtue of these contractual arrangements between this marketing agency, which was the Kentucky Corporation, and Standard Oil of New Jersey that the Government sued. And the complaint charged that this sales contract between Kentucky and Standard Oil of New Jersey, the so-called 80 percent sales contract, violated Section I of the Sherman Act and Section III of the Clayton Act. It also charged that these firms had conspired in violation of the same section of the Sherman Act to allocate sales in certain states.

Now, it should be noted that the Kentucky organization was merely a marketing firm and had no production facil- [fol. 2183] ities. And through the settlement arrangement the parties agreed with the Government that the Kentucky sales organization should be divested from the Standard Oil of New Jersey and become a part of Standard Oil of California.

Mr. Bergson: What do you mean——

Mr. Melchior: May I finish. With the hope that the Standard Oil Company of New Jersey would set up its own marketing organization and thereby increase competition. There were really no change in facilities, merely a change of marketing organization from the Standard Oil of New Jersey to the Standard Oil of California.

The press release goes on to say "It is expected that as a result of the merger Jersey will set up its own marketing association to compete with the Kentucky organization in Mississippi, Georgia, Alabama, and those states where there is alleged to be the illegal contract."

And then the Attorney General goes on to say: "Despite the size of California we have agreed to this judgment and [fol. 2184] have not opposed this merger because we believe it will stimulate competition. Where we have had one giant in effect selling through Standard of Kentucky now we will have two competing against each other."

I think this, therefore, indicates a lack of relevancy in this press release to this merger.

Mr. Bergson: The fact that this case was a Section I or a Section III case is immaterial. The fact, the material fact,

is that this involved a merger. Standard of Kentucky was not a part of Jersey. It was a contracting party. It was a completely separate entity. And the Attorney General approved the acquisition or merger of a company with assets the size of Standard of California, of a company with assets the size of Kentucky.

Now, it seems to me that for the Government to get up here in this case and argue that this acquisition should not be permitted because Alcoa is so big and Rome was so big, [fol. 2185] that it doesn't make any difference what other effect there was, but this has an important bearing on that argument.

I think this is extremely material.

Mr. Melchior: I think perhaps the Court can take judicial knowledge of the fact that the transfer of the Kentucky marketing organization draws from Standard Oil of New Jersey, which is by far the largest petroleum company in the United States and the world to one, albeit large, but much smaller.

Mr. Bergson: May I ask what you mean by a transfer of the Kentucky organization? They have a contract.

Mr. Melchior: I am limited to what is in the press release, Counsel.

The Court: I mistrust that what Mr. Bergson wants to do is if you adopt the argument that size alone creates maybe a presumption of lack of competition or something of that kind, he would like to have this little press release as a shoring of his foothold, if you want to call it a toehold, I don't know what it is.

[fol. 2186] Mr. Bergson: I think it is more than that, your Honor.

The Court: I see no particular harm in it. It is a fact, and in our discussion I am not yet converted I don't think to the proposition that size alone is enough. So I don't think that it is of great importance here, I don't know what relevancy it has. Maybe the Attorney General, Mr. Bergson, made a mistake when he consented to that California merger.

Mr. Bergson: Well, I think he has made two mistakes, one when he brought this case.

The Court: I won't go into that. I went into that one because you mentioned it. Maybe he has a right to change

his mind. He may have been all right there and not here. I am not disturbed about that.

Mr. Melchior: May I state for the record that this Department does not oppose bigness as such. May I also ask the Court if it will indulge the Plaintiff the right to introduce or to offer the judgment in this proceeding, the consent judgment.

[fol. 2187] The Court: Yes. Let me finish with this first. Have you something else to offer?

Offers in Evidence

Mr. Bergson: The only other thing I have, your Honor, is Moody's Industrials on the size of Standard Oil of California and Standard of Kentucky.

The Court: All right, I will take it even before I give Mr. Melchior a chance. I will take it over your objection. What is the exhibit number?

Mr. Bergson: 80, sir.

(Defendants' Exhibits 79 for Identification and 80, received in evidence.)

Defendants Rest

Mr. Bergson: The Defendants rest.

The Court: Off the record.

(Discussion was held off the record which the reporter was asked not to take.)

Colloquy Between Court and Counsel

The Court: Before you go, I want to cross-examine Mr. Bergson a little bit. I want to get again or try to understand these things as I go along. The testimony of Nesti, and to apply it against certain charts. Now, his testimony, as I recollect it, indicated that NEMA's reports on certain products did not represent the complete industry.

[fol. 2188] Mr. Bergson: That is correct.

The Court: So that the charts offered by the Government, the numbers of which I wouldn't accurately state now, simply reflect that companies.——

Mr. Bergson: They reflect only the companies reporting to NEMA.

The Court: That's right. And apparently leaving with me, or wishing to leave with me, the inference that they are not, I don't like to use the world reliable, they are reliable as far as they go, but they are not complete.

Mr. Bergson: They are not complete as industry statistics.

The Court: All right. Now, there was equated in the testimony charts offered by the Government and received which were based on Census figures. And I can't remember those charts——

Mr. Bergson: I can give you the numbers, if your Honor please.

The Court: As distinguished—that is, I can't remember the Census charts as distinguished from the Nema charts.

[fol. 2189] Mr. Bergson: The Census charts are Government Exhibit 455.

The Court: 455. Yes.

Mr. Bergson: And Government Exhibit 458.

The Court: All right.

Mr. Bergson: Now, those are the only two Census charts on conduit.

The Court: In some of his testimony he testified, as I recollect it, one of his charts was made from the reports of twelve producers.

Mr. Bergson: I think the number is wrong.

The Court: Two of which were not, on cross-examination that was brought out, were suppliers.

Mr. Bergson: Those were seven aluminum producers and it was brought out on cross-examination that these two did not necessarily make their own aluminum. But he also testified that that had to be made by somebody and that somebody did not report it under the Nema statistics because under the Nema reporting system since their dues are assessed on that basis, nobody ever reports.

[fol. 2190] The Court: Yes.

Mr. Bergson: Now, in addition, he testified, your Honor, that there were four other aluminum companies that didn't report to Nema at all, and of those four I think three were witnesses in this case.

The Court: Yes. I think I got that part of it. The Nema end of it. I have not got the Census end of it right. Wasn't there testimony that this witness obtained the number of producers who reported to Census, he couldn't get their names because that was forbidden by statute. He got the number who reported and that applied to some particular item of commerce which is here.

Mr. Bergson: The number that he obtained from the Census, as I recall it, and I will stand corrected if I am wrong, and I think the number that he recited are the same numbers that were contained in the letter from this Census that the Government introduced as Government's Exhibit 500.

The Court: Yes, I think so.

[fol. 2191] Mr. Bergson: That they, the Census, as well as he, used 18 companies for steel conduit and they had seven companies for aluminum conduit, just as he did. So that he was confident that all companies had not reported to Census, No. 1. Number 2, because of affiliations, because of interplant shipments and foreign transfers and so forth, as equated against the Nema figures, that the Census figure even as mentioned by the letter of February 1, I think it is, was understated. Now, he did not state how much it was understated. He just expressed the view that it was substantially understated. And as far as I know the record in this case now remains open as to what the total Census Universe can or should be.

The Court: But if the Census only got reports of substantially the same number that Nema got and Nema didn't cover the whole industry, my problem is how far did the Census fail to cover the whole industry?

Mr. Bergson: This is the infirmity, your Honor. Now, Mr. Nesti testified he didn't know whether the 19 companies [fol. 2192] that reported to Census were the same 19 companies that reported to Nema.

The Court: Does anyone know how many companies?

Mr. Bergson: Census knows but it won't tell you.

The Court: Does the record, I will put it this way, do I have any way of knowing how many companies there are whose product should be included in the Universe figure to get a correct chart?

Mr. Bergson: No.

The Court: It is not in the record.

Mr. Bergson: I don't think the record would support a correct chart. Now, I must say, your Honor, that so far as the defendants are concerned, we don't think it is our burden to establish the correct chart. We know this is wrong. We cant' prove what is right.

The Court: Well, I know what Mr. Melchior, who is about to rise, is going to say. I can understand him. He is using the best figures that he has got and he advances the argu-
[fol. 2193] ment that the Census figure includes more than the particular production that we have in litigation here, besides those foreign shipments and so on, and fittings. And that therefore he asks me to infer that the Census figure is high in so far as it appears but he doesn't answer very directly to me why it shouldn't cover the production itself.

Mr. Bergson: Well, all I can say to that, your Honor, is that Mr. Nesti stated that in considering the fittings, the foreign shipments and everything else, he thinks that the Census figures are understated. Now, this is not in the record, and I don't know whether I should allude to it or not.

The Court: Well, we have violated almost every rule of evidence that I will go ahead and take one more thing.

Mr. Bergson: In Mr. Nesti's figures Youngstown Sheet and Tube is not included as a supplier of steel conduit. Youngstown Sheet and Tube is the largest supplier of con-
[fol. 2193a] duit in the United States and it supplies, I am informed, between 10 and 12 per cent of the conduit market.

I am sure that Youngstown Sheet and Tube reported to the Census. A company of that size, I am quite sure, would have reported to the Census. But this is one reason why his figure seems to be at variance with the Census. And the incomplete coverage of his figures.

[fol. 2194]. There is no question about that. We are trying to grab onto something, as a universe figure, which we can't come up with and we haven't solved the problem. We have cast doubt, I think, on what the government universe is and

the propriety of the government's universe and the propriety that we have such and such a percent of the market. I don't concede it to be adverse to show what our percentage of the market actually is. I think it is the government's burden to show what our actual percentage of the market is. I would have done it if I could have, but Mr. Nesti said that all he could say was that he was sure that the Census was substantially understated, but he couldn't say that instead of being 125 million it should have been 150 million or 140 million, and Mr. Melchior, on the cross-examination, didnt ask him what he thought it should be.

The Court: Well, I think I probably got my finger on the [fol. 2195] problem that exists in my own mind. How it is going to be eventually left or whether it is going to be left the way it is is something else. The question is, what can I do with it?

Mr. Melchior: On that point, we are going to try to clarify that for you tomorrow; but I would also like to state that you must recall that the NEMA witness testified that he collected with respect to aluminum conduit, particularly, statistics one way. His seven companies, he admitted—and defendant's answers to interrogatories admitted—it contained two companies who did not fabricate. They were merely resellers. So now with his five companies of the type that would report to the Census, Mr. Nesti is attempting to cast doubt on the Census total without one shred of evidence in the record that there is anything wrong with the Census total merely because he happens to have seven companies in his aluminum total and eighteen companies——

[fol. 2196] Mr. Bergson: That wasn't his testimony.

The Court: I don't go for that. He produced NEMA's figures and he says he knows that they do not cover the field. Now, for instance—but your witness, if I understood him properly, says your records are so close or they may differ quite a little, but anyway, when a thing like Youngstown is left out of his records, and presumably in yours, why the increase is not enough which says or satisfies him that you have the correct universe either, and I have no record and no way of knowing how many of these companies there are in the United States that make this particular product. I don't have it, do I? I don't have in the record how many report in the Census.

Mr. Melchior: Seven. That is in evidence.

The Court: On which particular seven?

Mr. Melchior: No, we do not have that in the record; or [fol. 2197] which particular eighteen, we don't have that in the record.

The Court: If you can clear it up, I will be glad to have you clear it up by proof. But it leaves it awfully hazy in my mind—the value of the universe that is set up in your charts. It is pretty definitely set in my mind that the value of the universe, based on NEMA, is of no value.

Mr. Melchior: I agree, the weight of the NEMA chart——

The Court: Is badly shaken.

Mr. Melchior: I agree with that.

The Court: There is certainly a doubt cast on the weight of the Census charts.

Mr. Bergson: Your Honor, if you will recall, the NEMA charts, when they were offered, were offered for the purpose of shoring up the Census charts.

Mr. Melchior: Now, if I may, your Honor, I will explain why that happened. You will recall in——

[fol. 2198] The Court: Listen, gentlemen. I really don't care what it is. What I am trying to do is to get a little better understanding out of these cases as they go along. If not, I will wind up on these charts badly balled up. In trying to think the thing through, the more I think the more confused I become. That is why I bring it up in this informal way to clear it, and it doesn't make very much difference—the reasons—you have two propositions, one that the NEMA Charts concededly don't represent the whole industry, so that a chart based on that is of very little value to me, I think.

Now, the next thing that there is is that the charts are based on the Census. Certainly this witness' testimony cast some doubt in my mind, at least, on the value of the Census reports of the universe figure. Now, it may be the thing has got to be left the way it is upon the theory that the government has given all they can. I don't know. If it could be [fol. 2199] cleared up, I think I would be a little bit better satisfied in my own mind, at least, because we are getting down here, I think, to a comparatively small proportion or percentage, where if you don't start out with the right uni-

verse figures, you can stray way off on your percentage figure as a result of it. There is my difficulty.

Mr. Melchior: May I make one comment on that?

The Court: Sure.

Mr. Melchior: I think the reason the witness was given an opportunity to impute the inherent weakness of the NEMA statistics was because of the strange coincidence that the numbers of these companies making conduit, generally, and in aluminum specifically, happened to be the same. You had two eighteens and two sevens, but what your Honor has to realize is that in the NEMA eighteen and in the NEMA seven there are some obvious duplications because the totals include some resellers.

[fol. 2200] Now, may I finish, counsel? Now, if from the NEMA total we could pick out the duplications and the resellers—and we know that there are two in the seven figure, leaving five—then there would be no inconsistency in comparing five with seven.

The Court: I don't follow you at all. I don't know whether there is seven or seventeen. If they haven't got the whole total of the manufacturers of that product, their universe figure is wrong.

Mr. Melchior: There is no evidence that the Census does not have the total, your Honor.

The Court: I know. I am talking now—you are talking about these two that are sellers. I don't see how that is important.

Mr. Melchior: Those two sellers would not have been counted by Census.

The Court: I don't care whether they were counted or not counted; NEMA says that the figures he has does not repre-

[fol. 2201] sent the whole industry. Now, it doesn't make any difference whether it is seven or five, he says; they don't represent it. If they don't represent it, you are starting on a false assumption to draw a percentage.

Now, how far the Census figures represents the whole industry, I don't know.

Mr. Melchior: We think they do.

The Court: I know, but there isn't much of any proof on it. In fact, doesn't the proof go just the opposite? For instance, let's say that 458——

Mr. Melchior: That is the aluminum.

The Court: That is based on Census?

Mr. Melchior: That is based on Census, yes, sir.

The Court: Now, that's the value of shipments of aluminum conduit in 1960. How many manufacturers are there in the United States in 1960 that make and sell aluminum conduit?

Mr. Melchior: We have from another document the figure [fol. 2202] from Census, seven fabricators.

Mr. Bergson: And, your Honor, you will recall that there were three witnesses who testified here, who are not included on the NEMA list—I don't know whether they were included in Census or not—but the fact of the matter is that——

The Court: There were more than seven.

Mr. Bergson: There are more than seven. And, your Honor, to clear up one thing about the NEMA statistics, you will remember that Mr. Nesti was most emphatic in stating there was no duplication in the NEMA figures and, according to our answer to the defendant's, or the plaintiff's interrogatories, we listed thirteen producers of aluminum conduit.

The Court: You see, that is what confuses me. I assume —and I will admit I don't know where it is in the record— that there are more than five or seven aluminum conduit manufacturers in the United States.

[fol. 2203] Mr. Melchior: There are a number of resellers, your Honor, but there is no evidence in the record, or there is no way to identify more than seven fabricators.

Mr. Bergson: I can name them offhand.

Mr. Melchior: In 1960?

Mr. Bergson: I could name them offhand, and you could name them offhand.

Mr. Melchior: This is one year.

The Court: You can see what my difficulty is.

Mr. Melchior: I can appreciate it, your Honor.

The Court: The same thing on this other one where we had eighteen. That is a different product.

Mr. Bergson: That is 465. That is the whole works, your Honor. You see, your Honor, that includes everything. It includes aluminum and steel. That is the other line of commerce.

Mr. Melchior: There is no way for the defendant to show [fol. 2204] that the Census total is not complete there. They know that NEMA didn't have Youngstown, that they didn't show—that Census did not——

The Court: Well, I think, Mr. Melchior, that that is right, that you have to get your reliance upon a percentage, which you are, and these charts. I think you do have to show its accuracy rather than the intentness to show it is in error. I think if they point out to you, if they raise no objection, I think the Court would be justified in finding it is accurate, but when they point out to you where there is what they call inaccuracies, they then—then the burden shifts back to you or stays with you. It never shifts at all—to show the accuracy of the chart.

Mr. Melchior: I will agree, if they demonstrated the inaccuracy, which I don't believe they have.

The Court: I think they have done enough to cast a little doubt on it.

Mr. Melchior: Well, apparently so. We will try to have a [fol. 2205] witness tomorrow to reassure the record.

The Court: All right. We will recess until tomorrow morning. Will you be ready tomorrow morning?

Mr. Melchior: Yes, we hope so.

The Court: How long?

Mr. Melchior: A very short time. I think we will have a handful of documents and two witnesses.

The Court: You will finish tomorrow?

Mr. Melchior: Yes.

The Court: Tomorrow morning at ten o'clock. Recess until tomorrow morning at ten o'clock.

(Whereupon, at 4:08 p.m., an adjournment was taken to Thursday, March 1st, 1962, at ten o'clock a.m.)

[fols. 2206-2207] [Title omitted]

Transcript of hearing—March 1, 1962

* * * * * * *

[fol. 2208] The Court: Mr. Bergson, while you rested yesterday I suggested that you check over your exhibits so there will be no misunderstanding about it. Have you done that?

Mr. Bergson: Yes, your Honor. We did check over our exhibits and we find that we had offered all that we intended to offer. During the course of the Government's case we had marked for identification six exhibits which we did not offer in our own case. These are Exhibits AR-1, 2, 3, 8, 10, and 11.

Now, 1, 2 and 3, I believe, your Honor, were the earlier versions of some of the charts that were introduced because at that time we didn't have 1961 statistics. And when we got the 1961—I mean, we had marked for identification, not introduced. When we got the 1961 statistics we substituted the more up-to-date charts for the ones we had previously marked for identification.

The Court: Yes. The way I have it, I think that might be right, from my notes.

Mr. Bergson: I can check it in a minute.

The Court: I don't think it is necessary so long as you [fol. 2209] agree among yourselves. Then with that you rest again?

Mr. Bergson: Yes, sir.

The Court: All right. Rebuttal, Mr. Melchior.

Mr. Melchior: Mr. Leo Finn.

LEO V. FINN, called as a witness in behalf of the Government, being first duly sworn, testified as follows:

Mr. Melchior: Will you mark this for identification?

(Chart and tabulation attached marked as Government's Exhibit GX-502 for identification.)

Direct examination.

By Mr. Melchior:

Q. Would you state your name and place of employment?

A. Leo V. Finn. I am employed in the Antitrust Division, Department of Justice.

Q. What is your present position?

A. I occupy a business economist's position.

Q. How long have you been employed by the Antitrust Division?

[fol. 2210] A. I have been employed in the Division about 23 years.

Q. What is your educational background?

A. I am a graduate of Columbus University and have a bachelor of commercial science degree.

Q. Now, Mr. Finn, in connection with your assignment to the Rome-Alcoa proceeding, have you prepared a chart and tabulation dealing with the production and sale of primary aluminum by Alcoa?

A. Yes, I have.

Q. Would you identify it?

A. This chart and accompanying table is entitled "Alcoa Primary Aluminum Production Sold to Customers and Used by Alcoa."

Q. It there a tabulation attached thereto, Mr. Finn?

A. Yes, sir, there is a tabulation that accompanies this chart.

Q. Now, what does this chart and tabulation purport to show?

A. Well, it shows a relationship between Alcoa's production and the volume of primary aluminum they have used in their own operations, and the volume that has been sold to outside their own operations. Also it includes the invento-

[fol. 2211] ries at the beginning of the year and the inventories at the end of the year.

Q. Now, what period of time does this chart cover?

A. It covers from 1950 through 1960.

Q. What were the sources of information you utilized, Mr. Finn, in preparing this chart and tabulation?

A. This tabulation is from the Defendants' Exhibit AR-44 and AR-44A.

OFFER IN EVIDENCE

Mr. Melchior: I offer Government's Exhibit 502 for identification.

Mr. Bergson: No objection.

The Court: Received.

(Government's Exhibit GX-502 for identification received in evidence.)

Q. Mr. Finn, directing your attention to Government's Exhibit 502, and in particular the chart, what is the relationship between Alcoa's production of primary aluminum and the volume of primary aluminum used by Alcoa in its own operations?

A. Well, this shows that over this period of time, from 1950 to 1960, the dominant part of the production has been used by Alcoa in its own operations. In comparing the volume used by Alcoa to the amount that they have sold outside [fol. 2212] their own company, has been relatively small in comparison to the amount that they have used themselves.

Q. Now, have you made any computation as to the percentage of its primary aluminum production which Alcoa used in its own operations?

A. Well, for instance, in 1960, the last year we have here, about 67 per cent was used in their own operations, and in 1959 there was about 86 per cent, and it has varied somewhat. In 1957 it dropped, it was down to 53½ per cent.

Q. And how do you tell that by looking at the chart?

A. Well, of course, the chart doesn't show any percentage but it is meant to be visual that you can see it.

Q. Which particular shaded area would that be?

A. Well, I think at the top you find a legend to the chart and if you are attempting to find out or to compare the amount used by Alcoa, you merely refer to the legend.

Q. Now, does this chart demonstrate any relationship between Alcoa's production of primary aluminum and its sales of primary aluminum to non-integrated fabricators?

A. Yes, it does.

[fol. 2213] Q. Would you state what that might show in one of the recent years?

A. Well, for example, in 1960, it shows about 7.8 percent was sales to fabricators; in 1959, about 13 percent; in 1958, about 16 percent, 16 or 17 percent.

Q. Now, does this tabulation indicate in any way the volume of primary aluminum that was exported or which was held in inventory by Alcoa at the end of any particular year?

A. Yes, there is a total figure here which includes—it is consolidated with exports, stockpile, toll conversion, exchange and sale to other primary producers.

Mr. Melchior: You may examine.

Cross-examination.

By Mr. Bergson:

Q. Mr. Finn, do you have available to you Defendants' Exhibit AR-44—well, here, I will show you my copy. Doesn't that chart also show that the majority of Alcoa's primary production was used in its own fabrication?

A. Yes, it does.

[fol. 2214] Q. Now, may I ask you why in preparing Chart GX-502 you did not provide for unused capacity of Alcoa in the chart?

A. Well, the purpose for which I drew this chart was to base it entirely on actual transactions that had taken place in the company over this period of years.

Q. But if you had shown unused capacity, you would have shown more aluminum available to independent fabricators, would you not?

A. Well, not in the sense that—well, capacity is sort of an intangible, the amount of production—what I am trying to say, yes, there would be some excess capacity to make more aluminum, but, as I say, this chart doesn't deal with that sort of phantom figure.

Q. If that is such a phantom figure, why did the Government in its case in chief introduce a chart on aluminum

capacity in the United States for the year 1960? This is Government Exhibit 465.

A. Well, the relationship there is capacity to capacity, and I have no quarrel with that.

Q. Is it really phantom if it is available, if there are orders for it?

[fol. 2215] A. Orders for it?

Q. Is excess capacity really phantom if it is available to fill orders for aluminum?

A. Well, the capacity is there to make more aluminum, I will agree with that.

Q. Isn't that highly significant? Hasn't one of the Government's contention in this case been that because of Alcoa's acquisition of Rome, and try to show because of its acquisition of Cupples, there would be less aluminum available for non-integrated producers?

A. Well, I think the record shows that there are many statements with respect to capacity of Alcoa as compared to the rest of the industry, and when I drew this chart I merely confined it to actual transactions that had taken place in the company.

Q. Well, in drawing this chart you show a lot in this crosshatched—I guess it is not hatch, these diagonal lines would show amounts in inventory; don't you think that Alcoa would have been happy to sell that if they had the opportunity to sell it?

A. Undoubtedly.

Q. And don't you think that Alcoa would have been happy to use its unused capacity if they had orders for it?

[fol. 2216] A. Yes, I do.

Q. So that when you said in 1960, for example, that 7.6 per cent of Alcoa's production was to non-integrated fabricators, how much would you say of its production was available for sale to non-integrated producers?

A. Well, of its production in that particular year, the rest of the inventory would be available.

Q. And would not its excess capacity be available?

A. Yes, if the market warranted it.

Q. So, therefore, 7.6 isn't a fair figure?

A. Well, it is based merely on transactions that had taken place.

Q. But it doesn't prove anything?

A. I am not trying to prove anything here.

Q. I thought that is why the chart was offered.

A. Well, I am trying to enlighten——

[fol. 2217] Q. Frankly I don't see how this chart is any more enlightening than our chart, AR-44 was, except that you do it in bars and we did it in graph form.

A. I like to think that this is more readily readable and, of course, there were some adjustments made in the figures.

Q. Now, in—were the adjustments major or minor?

A. Oh, minor.

Q. To what degree? Would it be as much as one percent?

A. I am speaking about the sales and particularly the export sales in the latter years that were on the other chart. I think that those were adjusted by the introduction of AR-44-A.

Q. They weren't adjusted, were they, they were made clearer?

A. It was a supplement.

Q. Yes. They were made clearer. Now, in discussing Alcoa's percentage of production used in its own fabrication as against its total production, you gave us the figures for the year 1960, which I think you said was about 67 percent.

[fol. 2218] A. Yes, about 67 percent.

Q. And for 1959?

A. It was about 86 percent.

Q. And for '57?

A. 53 percent.

Q. You didn't give us the ones for '58; did you?

A. No.

Q. What were those?

A. 68 percent.

Q. 68 percent? It looks to me like it has to be a little lower.

A. In '58 you speak of?

Q. Yes.

A. I got a rough figure here of about 68 percent.

Q. Well, it doesn't matter, I just wondered why you took '57, '59 and '60 and didn't use '58.

A. Oh, no, I just skipped over.

Q. Now, Mr. Finn, you have been here during the course of the entire trial, haven't you?

A. Yes.

Q. And you heard testimony regarding the so-called, not so-called, the aluminum shortage in 1955 and early 1956. [fol. 2219] I think they began to see the light in July of 1956; do you recall that?

A. I heard it.

Q. I think I am stating it correctly. Would you look at the years '55 and '56 and tell us what percentage of Alcoa's production was sold to non-integrated fabricators as against its use in its own production.

A. Well, in '56——

Q. Just taking two now, the dark line and the actual sales to fabricators. We are ignoring the exports and the inventory.

A. '56 was one of the years you asked about?

Q. '55 and '56 I asked about.

A. I will give you '56. The amount used by Alcoa was about 64 percent and the sales to other fabricators is about 23 percent.

Q. Right. I assume this is right. Now, in '55 what was it?

A. I have not worked that out.

Q. Can you work it out?

A. I will be glad to. It is over 20 percent.

Q. Now, in those two years, which are the years that have been testified to as the shortage years, isn't the percentage [fol. 2220] sold to non-integrated as compared to Alcoa's use in its own consumption far greater than it was in any of the other years that appear on that chart?

A. Yes, sales to fabricators in '55 and '56 were larger than, percentagewise, than those in the later years from '57 on through '60.

Q. And also the earlier years?

A. Perhaps they are. I have not——

Q. So that during '55 and '56, in the years of the shortage, Alcoa apparently cut back its own production in order to make aluminum available to non-integrated producers—on its own fabricating in order to make aluminum available to non-fabricators?

A. I wouldn't know.

Q. Doesn't the chart indicate that?

A. I wouldn't know whether they cut back their own production. All I know is——

Q. If there was a shortage year and they used a smaller percentage, it would seem to me to follow that they could have used it if they so chose, but it apparently is as Mr. Magee testified that they rationed themselves just the way they rationed everybody else, even to their detriment; isn't that true?

[fol. 2221] A. I don't know that.

Q. Doesn't that seem to be——

A. The chart indicates that there was less used by Alcoa in those particular years.

Q. In the shortage years?

A. Yes, that's right.

Q. And more made available, or more available to non-integrated, or more sold, let's put it that way, more sold to the non-integrated in those two years?

A. Well, perhaps in '55 or '54 it seems like a small amount went to fabricators.

Q. I am talking about percentages. Let's take percentages of '54 and the percentage—cut the chart off at the export line. Now, of the Alcoa production used in its own fabrication and of Alcoa production sold to non-integrated, what percentage was used by Alcoa in its own production?

A. In 1954?

Q. In 1954.

A. Roughly about 40 percent was used in their own facilities.

Q. In '54. I am just talking now about the dark part of [fol. 2222] the line and the little dots. The dotted portion. About 800 and——

A. I don't follow you, Mr. Bergson.

Mr. Bergson: Am I making myself clear to your Honor?

The Court: Yes, I can understand what you mean.

Q. What I am trying to ask you to give us is what percentage of this (indicating).

A. Yes.

Q. (Indicating) This much.

A. Yes.

Q. Was used by Alcoa?

A. That has all been used by Alcoa.

Q. No, in its own production, its own fabrication.

A. As in relationship to production?

Q. No; as in relation to these two (indicating).

A. Oh, I see. It is a little over 80 percent.

[fol. 2223] Q. Are you sure it is a little over? It is not more than a little? I think it is closer to 85.

A. I get about 82 per cent.

Q. Well, it doesn't matter. Now, make the same computation for 1955, because I am not sure you understood my previous question.

A. On the same basis?

Q. On the same basis, yes.

A. I'd say it's about 65 per cent.

Q. And would you make the same computation for 1956?

A. I get about 86 per cent.

Q. You get what? I think you better do that again.

A. I am not doing this under the best conditions.

Q. I don't see how 1955 can be 65 per cent and 1956 be anything but less than 65 per cent.

A. You are asking me for 1956?

Q. Yes, and just the ratio of this dark line and the dotted portion (indicating).

A. I see. I still get about 80 per cent.

The Court: It couldn't be. Look at your graph right in front of you. If in 1955 the production was 65 per cent used in its own by Alcoa, 1956 must be less than that. It has to be.

[fol. 2224] Mr. Bergson: It's got to be less than 65.

The Witness: Sure, it has. It is about one-sixth, sold to outside fabricators.

By Mr. Bergson:

Q. I hate to take up the Court's time, but I think you are wrong. If you are not wrong, your graph doesn't mean anything, because this hatch part certainly doesn't occupy one-sixth of the line from the beginning where the numerals 1956 are out to the end of the dotted part. It is so apparent on its face that either your figures are wrong or your chart is wrong. Don't you have to do this, don't you have to in order to make this computation——

A. (Interrupting) I am sorry.

Q. You have got to take the part used by Alcoa and you add to that, which in 1955 we were talking about, first used by Alcoa was 951,000 or 951,000,000, approximately, right?

A. Yes.

Q. And sales to fabricators, which was approximately 295,000,000, right?

A. Yes.

Q. Then don't you add those two together and divide [fol. 2225] the sales to fabricators by the total that you get to get the percentage sold to fabricators?

A. Yes, you are right. I was adding here. I didn't look across the sheet, and I was putting in exports and adding that to sales and coming out with a percentage.

Mr. Bergson: Do you wish me to take the time to do this, your Honor?

The Court: I think that it is apparent here that in the years 1955 and 1956, if I understand the chart right, there was percentagewise, there was more aluminum sold by Alcoa to non-integrated fabricators than there was in the years immediately preceding 1955 and in the years immediately following 1956.

Mr. Bergson: Your Honor, we have worked out these computations and we find that in 1954 Alcoa's percentage used in its own fabrication was 85.7 per cent; in 1955 it was 76 per cent; and in 1956 it was 73 percent. Now, do you want to accept those, Mr. Finn, or do you want to do them yourself?

The Witness: Well, I will accept them.

[fol. 2226] By Mr. Bergson:

Q. Now, starting with that as a premise, would you as an economist and as a statistician conclude that in the so-called shortage years of 1955 and 1956 Alcoa made more or less of its production available to non-integrated producers than it used in its own fabrication?

A. Yes, percentagewise they did.

Q. And also tonnagewise, that is apparent from the face of the chart?

A. Yes.

Mr. Bergson: Thank you. No further questions.

The Court: Redirect.

Redirect examination.

By Mr. Melchior:

Q. Mr. Finn, do you know whether or not the Government aluminum set-aside program was in effect in the years 1955 and 1956?

A. I am not too familiar with it, but I understand it was.

Mr. Melchior: That's all.
Mr. Bergson: No further questions.
The Court: All right.

(Witness excused.)

[fol. 2227] Mr. Melchior: Mr. Bernsten.

Bernard P. Bernsten, called as a witnes in behalf of the government, being first duly sworn, testified as follows:

Direct examination.

By Mr. Melchior:

Q. Would you state your name and place of employment?

A. Bernard P. Bernsten. I am employed in the industrial division of the Census Bureau, U. S. Department of Commerce.

Q. What position do you hold?

A. I am chief of the electrical machinery and transportation section of the industry division.

Q. How long have you held this position?

A. I have been in the section a little over two years; acting chief of the section starting in May last year and chief of the section beginning in June of last year.

Q. Now, in general what type of work does this position involve?

A. The direction of the collection, compilation and publication of statistics, economic statistics of the major groups [fol. 2228] which fall within the section; which are Major Group 19, ordnance and accessories; Major Group 36, electrical—when I use "major group" it is in the standard in-

dustry relation; Major Group 37; Major Group 38, Instruments and up until a couple of months ago Major Group No. 39.

Q. How long have you been engaged in the field of statistic analysis?

A. A total of a little over six years.

Q. What is your educational background, Mr. Bernsten?

A. B.A. magna cum laude and a Master's degree at Fordham University. I completed my Ph.D. requirements and I majored in economics and have taken courses including courses in statistics.

Q. Mr. Bernsten, I hand you government's Exhibit 498 for identification and ask you if you will identify it.

A. This is a release put out by the Census Bureau last October 19th in our current industrial report series. It covers the shipments, quality and volume of shipment of wire devices and supplies in the year 1960.

OFFERS IN EVIDENCE

Mr. Melchior: I offer government's Exhibit 498 for iden-
[fol. 2229] tification at this time.

Mr. Bergson: No objection.

The Court: Received.

(Government's Exhibit 498 for identification received in evidence.)

Q. Now, Mr. Bernsten, do your responsibilities include the assembly of information which is compiled in this report?

A. They do, sir.

Q. Now, is there a form used in the collection of this information by the Bureau of Census?

A. There is, sir. Census form MA-36-K.

Q. I hand you government's Exhibit 499 for identification and ask you if this is the document?

A. Form MA-36-K.

Mr. Melchior: Your Honor, we don't have an extra copy of this.

The Court: This is the instruction sheet; is it?

Mr. Melchior: Yes, sir, this is the instruction sheet.

The Court: All right.

Mr. Melchior: We will interrogate the witness about it.
[fol. 2230] The Court: All right.
Mr. Melchior: I offer government's Exhibit 499.
Mr. Bergson: No objection.
The Court: Received.

(Government's Exhibit 499 for identification received in evidence.)

By Mr. Melchior:

Q. Now, directing your attention to government's Exhibit 499, Mr. Bernsten.
A. Is that the form, Mr. Melchior?
Q. That is the form MA-36-K. Does this form include categories, product categories of electrical conduit and electrical fittings?
A. Yes, sir, it does.
Q. Would you identify the product categories by their code numbers?
A. Yes. The inside of the form toward the lower portion under "'Non-current carrying wire devices——"

Mr. Bergson: Mr. Melchior, excuse me. We have an extra copy for the Court.
Mr. Melchior: Fine. I appreciate that.
[fol. 2231] The Court: All right.

A. Under "non-current carrying wire devices," Code 36442, the general code and class of products electrical conduit and conduit fittings is category "Rigid Conduit (standard weight) including couplings, nipples, bends and elbows." Under that, under Code 3644221 is indented the category "Steel."
The next code, 3644222, indented directly under steel, "Other." There is another heading which would be under where we begin rigid conduit, this is electrical metallic tubing (thin-wall conduit), including couplings, nipples, bends and elbows.
Code 3644223, identation, "Steel."
3644224, indented under that, "Other."
There are a couple of other categories. Shall I go into all of them under the general head "Electrical conduit and conduit fittings" or only these four?

Q. Let me ask you this, Mr. Bernsten, as I read this form the field of rigid conduit is divided into two groups. One is "steel" and one which you categorize as "other"; is that correct?

A. That is correct, sir.

[fol. 2232] Q. Would all steel conduit be included under the "steel" category?

A. It would, sir.

Q. What would be included under the "other" category under rigid?

A. All other metallic non-steel rigid conduit.

Q. All metallic conduit?

A. That is correct.

Q. Would this include aluminum rigid conduit?

A. Presumably, if rigid conduit is made of aluminum, it would be classified "other." All aluminum and any other non-steel metal.

Q. That's right. Now, your next broad category is EMT, which is electrical metallic tubing.

A. That is correct.

Q. And I see you have a dual breakdown there, "Steel" and "other".

A. Similar to the other.

Q. Would all steel electrical metallic tubing be included under the heading of "steel"?

A. Yes, sir, it would.

Q. And what would be included under the heading of "other"?

A. All other non-steel electrical metallic tubing.

[fol. 2233] Q. And would this include aluminum electrical metallic tubing?

A. Yes, it would, presumably yes, all other non-steel metals.

Q. Now, I notice there are other categories listed below that such as flexible steel conduit, raceways and raceway fittings and so forth.

A. Yes, sir.

Q. Now, I ask you would any rigid steel conduit be included under any of these other headings properly?

A. No, sir, they would not. Under the product distribution there is only one line for "steel rigid conduit," and that is under Code 364421 previously mentioned.

Q. Would any other rigid metallic conduit be included under any of these other categories?

A. To use your word before, "not properly." There is only one line for the 3644222.

Q. With respect to EMT steel conduit, would any of the EMT steel conduit be properly included in any of these other headings?

A. No, sir.

[fol. 2234] Q. Now, how about any other EMT metallic conduit, would any——

A. There should not be other than for Code 3644224.

Q. Now, is the submission of this report required by law, Mr. Bernsten?

A. Yes, it is mandatory under provisions of an act of Congress 13 U. S. Code, and is so stated on the cover letter which went with this report, such as states "The inquiry is authorized by Act of Congress 13 U.S.C. 18, which requires that you submit this report."

Q. Are there penalties involved for non suppliers of this information?

A. There are, but I could not tell you exactly what they are.

Q. Now, Mr. Bernsten, would you generally describe the studies the Bureau of Census utilizes to insure that the information submitted in government Exhibit 499 is complete, and that the coverage from a company standpoint is complete. General description, if you will.

A. All right. As with any so-called complete coverage Census survey, I use the term because in some areas we use [fol. 2235] just sample techniques and inflate for establishments which we do not cover. This is not one of these, this is a complete coverage survey. In a complete coverage survey such as this we use as a source of our current list of respondents first of all the prior complete Census of Manufactures for the commodity specifically covered on the survey form. Number two, we of course realize that between the quinquennial Census of Manufactures other establishments, we call them births, could come into the manufacturing field.

We therefore check, by taking the records of the BOASI, Bureau of Old Age Survivors Insurance, by law anyone who employs one old age employee must pay a social se-

curity tax and they file with BOASI in Baltimore. They file a description as to what types of commodities, what type of business they are in—excuse me—what type of business they are in. And BOASI uses the same classification system as the Bureau and others do. The Budget Bureau, standard production classification annually. They will assign to the establishment a four-number code based on their business activity. The second of this survey would therefore follow, [fol. 2236] and anyone would be coded 3643, current carrying wire and devices, or 3644, non-current carrying wire and devices. In addition to which we use other readily available lists of manufacturers. For instance, we use Dun and Bradstreet and Thomas's Register.

This is pretty much—well, we are human, we do everything humanly possible to make sure that we have everyone who is classified as a manufacturer within the scope of such a manufacturing survey.

[fol. 2237] Q. I see. Now, you stated, I believe, that finally you checked the previous census of manufacturers as a starting point?

A. That is correct, sir.

Q. When was that?

A. 1958, covering the year 1958.

Q. Now, directing your attention to Government Exhibit 499, which is your form MA36K, your reporting form?

A. Yes.

Q. Would you state in a general fashion the manner in which this form was prepared?

A. Yes. This survey on wiring devices and supplies, which is now a part of a continuing Census Bureau program in our current industrial report service, was initiated to cover the first year, 1960, the types, the classifications of the products to be covered were essentially covered in the same manner in the complete census of manufacturers, so we began by using as the basic product stub, if you will, the same information which we had collected as part of the census of manufacturers.

Then as the Standard Bureau on Procedure, since we are solely a publisher of statistics, we are not analyzers or [fol. 2238] users of statistics, therefore we went to people who are the major users of this type of data, in this case it would be manufacturers and manufacturing associations,

together with pertinent government agencies, we went over the proposed form, both by mail and in person—I don't know whether I should use the term meeting or meetings, there was at least one meeting with industry representatives and at least one with government representatives. Suggestions were given to us as to what type of data should be collected over the data collected in 1958 and I believe it can be noticed that in the current industrial report, the published figures, the results of the collection of the data on this form, you can see there were in some cases expansion of categories as against that which was collected in the census. As a matter of fact, the items on conduit are some in point. I believe what we had originally done on collecting the data on conduit, we either just collected all conduit or perhaps just rigid and electrical metallic tubing, but on the advice of users we attempted to get a break in 1960 between steel and other on both rigid and EMT.

[fol. 2239] After we received the pertinent comments of industry and government users, incorporated those, it was felt we would have a fairly good chance of collecting and publishing meaningful data. As is required by law we submitted the report, the proposed report form to the Bureau of the Budget, which, of course, must approve any such product. There is an office there of OSS, Office of Statistical Standards, within the Budget Bureau, which gave final approval and we initiated collection of data for 1960.

Q. I take it quite a bit of work went into the preparation of this form?

A. As with any form, yes.

Q. As with any form of the Bureau of the Census?

A. Yes.

Q. There were consultations with industrial members?

A. Yes.

Q. Did you consult with BDSA?

A. Yes, this is the Business and Defense Service Administration, another agency within the Department of Commerce.

Q. Did the Bureau of Census consult on this form with [fol. 2240] the National Association of Electrical Manufacturers?

A. You mean NEMA?

Q. Yes.

A. Yes, we did.

Q. There were representatives at meetings you held on this particular form?

A. Yes, sir.

Q. Now, Mr. Bernsten, let me ask you this, what is the view, if you know, of the Bureau of Census as to the completeness of its coverage of respondents with respect to the submission of GX-498, which is the wiring devices and supplies report?

A. Well, I am not sure I am clear on your question. Respondents give us 498.

Q. 499.

A. Respondents submit the form.

Q. Yes.

A. Well, not anticipating this question, but I attempted to give a full explanation before of what we do to insure complete coverage. We checked all available records of manufacturers of these products, and we feel that we have them all. As you know, the Director of the Census Bureau in response to a request, wrote a letter to you on February [fol. 2241] 13, and I can no better state it really than what he put in that letter, namely——

Q. (Interrupting) Would you read that into the record?

A. "We are satisfied with the results of the survey and are convinced of the reliability of the figures we have published as revised in the Bureau's letter of February 1."

This, of course, is specifically in reference to the figures as published as to the coverage, again within the realm of possibility, it is not devine revelation or infallibility, but within the realms as is humanly possible, we feel we have complete coverage of all manufacturers of wiring devices and supplies as defined within the scope of the Census of manufacturers.

Q. Now, do the figures contained in GX-498, with particular respect to the electrical conduit figures, include exports?

A. Well, if I may answer it sort of indirectly, sir, if there were exports of any of these items in 1960, they should be included here. Our figures that we collect are quantity and value of shipments f.o.b. the factory, regardless of the final [fol. 2242] destination. If the manufacturers either directly exported or shipped directly to an exporter, it is the

same as if it went to any commercial establishment, they should be included within these figures here. There is no way of our knowing whether there are any exports, because, as you note, the form simply asks for total quantity and value of shipments. We did not attempt to break out exports.

Q. And do these figures include interplant transfers?

A. Same answer as before, in fact the form says, "Total shipments including interplant transfers." Again we have no way of knowing whether any of the figures on the form, not only conduit, any of the wiring devices figures were shipped between manufacturing establishments of the same company. If they were, they again should be included here.

Q. What is an interplant transfer, Mr. Bernsten, if you know?

A. Let's put it this way, I don't think we directly give a definition. We use what we term standard industry terminology, but our understanding would be a shipment of a product which we are collecting as such on the form, which [fol. 2243] one company would have to be what we call a multi-unit company, a company that has two or more establishments, and it would be shipments of this commodity from one establishment of the company to another establishment of the same company.

Q. And would the product shipped require further processing, if it required further processing, would it have to be included in that category?

A. Not necessarily. The distinction which is made is as to how we request the second establishment, the recipient of the commodities to report, namely—well, part of this, I am an economist and statistician, I am not an electrical expert, but commonsense tells us as to the type of commodity included. For example, something which when it leaves establishment A's door is complete, is usable and is usually used in its form it is in when it leaves that door, if for some marketing purpose they ship it to another establishment of the same company and that company does not do any further manufacturing—he may put it in a package, but we tell the respondent in the report form, this is not assembly, this is not manufacture, if the manufacturer re- [fol. 2244] sells that without further manufacturing, in the total Census of manufacturers, we have a separate line for

re-sales, it is not included in the commodity table in this form here, because we are only interested in commodity detail, not in these general statistics.

The establishment of that company should not report those when he resells them.

On the other hand, if there is further manufacturing, usually speaking, what establishment "A" will report to us may be some part, let's say, which perchance happens to be collected on the same form, if establishment "B" does further processing, usually speaking, when he reports it is on a different line where it has reached a further stage of fabrication, but there are some industries where this makes more sense than in others. I understand in the metals area where somebody sends a casting and somebody else does further fabrication, as far as wiring devices and supplies, I would have no way of knowing whether this would be true or not.

Q. You don't know whether conduit received further processing, you wouldn't know that, would you?

[fol. 2245] A. It depends on what is meant by conduit. If it is conduit, I am not sure what else you can do with it—more conduit?

Mr. Melchior: No further questions. You may examine.

Cross-examination.

By Mr. Bergson:

Q. Mr. Bernsten, would you please look at Government Exhibit 499, which is the reporting form?

A. Yes, sir.

Q. And particularly at those sections relating to the reporting of conduit?

A. Yes, sir.

Q. The form requests a report on rigid conduit, including couplings, nipples, and sets forth—then it breaks it down into steel or other, or electrical metallic tubing, is that right?

A. That is correct.

Q. If you were a manufacturer of aluminum conduit, in which line would you report your aluminum conduit?

A. Well, depending on what kind of conduit it was.

Q. Not electrical metal tubing, but rigid aluminum conduit.

[fol. 2246] A. If it were rigid aluminum conduit it should be reported under Code 3644222, "Other;" if it were aluminum electrical metallic tubing, it should be reported under 3644224, the other line there.

Q. Now, I also notice that you have a classification Code No. 3644236, entitled "Other Electrical Conduit;" what type of conduit, if you were reporting, what type of conduit would you report in that form?

A. Now, let me put it this way. The question, of course, is hypothetical, and I am not in a position as a Census Bureau employee to give a hypothetical answer.

May I backtrack a bit to give you some information?

Q. Yes, all I want to do is clarify it.

A. That is what I am here for. As any Census Bureau employee, as I believe I brought out on direct examination by Mr. Melchior, we are not experts in any commodity field. We cannot be. As I explained before, in my own work there are 95 separate industries with a couple of thousand products and it is a physical impossibility to be an expert. The preparation of a report form is something where we really—[fol. 2247] I will say almost exclusively, we must have some working knowledge of the products with which we deal, but we really almost exclusively rely on the manufacturers of the product involved and the users of the statistics to give us what is the general industry terminology and its best description of the items to be collected.

Now, if you asked me what is included under "Other," the only thing I can do, and without trying to be smart or anything else, is to refer to the report form which, since it was given to us by manufacturers representatives, we must assume has a definitive meaning to the manufacturers, namely, that it includes underground conduit and fitting, molding angles, molding outlet and molding junction boxes.

Q. That says "including," that doesn't say "only"?

A. That is correct. Anything in a parentheses is meant to be—to give an example, an e.g. sort of thing. That is true, it doesn't say "only," I will admit that, but you asked before about rigid conduit. Now, there are two lines for rigid conduit. There are two lines for electrical metal tubing. [fol. 2248] Now, I wouldn't even attempt to tell you whether

there are any other types of conduit—well, there is at least one other, "flexible steel conduit," I see there is a line for it. Perhaps there is semi-flexible tubing, as far as I know, that would belong in line 236, but a respondent should not, if he is making electrical metal tubing, I can't see on what basis he could justify—well, put it in 236.

Q. Do you think a manufacturer of conduit other than steel, rigid conduit other than steel, would be in violation of the law, for example, if he reported conduit other than steel under "Other electrical conduit"?

A. Depending on the reason for his doing it. The law states—I am not a lawyer and I don't have the code in front of me, but the law does state, No. 1, that the Respondent cannot refuse to report, because it is mandatory, 2, nor can he deliberately give false or misleading information. As I tried to bring out before, maybe I wasn't clear here, the same as we are fallible in our attempt to gain complete coverage of the materials collected here on this form, it [fol. 2249] must be assumed that a respondent is fallible too, and could make a mistake.

Q. I think you or Mr. Melchior used the expression "not properly included"?

A. That is correct. If I may just continue, for example, if someone did not wish it known that he were a manufacturer of one of these products, full well knowing he could hide his figures by burying it in "all others," this, I will rely on your honor, could be interpreted as deliberate disobedience of the law, but if someone looks at the two lines and perhaps says "I am not sure which one it goes in, I better put it in 'All others'," we do specifically say to please contact the Census Bureau if they don't understand it.

Q. But there is a possibility it might not properly be included for perfectly innocent reason?

A. That is correct.

Q. And I assume that is why you very carefully qualified your statement by saying "not properly"?

A. That is correct.

Q. Now, when the Census got this information it published the current industrial report for wiring devices and supplies for 1960?

[fol. 2250] A. Yes, sir.

Q. Which is Government's Exhibit 498, right?

A. Yes.

Q. And when the Census published that report, it didn't do what it instructed the reporters to do, did it?

A. What did we instruct the reporters to do that we didn't do?

Q. You instructed the reporters to include, according to your testimony, rigid aluminum conduit in the "Other" category from steel under rigid conduit, is that not right?

A. Not specifically aluminum, we told them "all."

Q. All conduit, but where did you report in the current industrial reports aluminum rigid conduit?

A. We do not report, we publish and by law we are specifically——

Q. (Interrupting) It is called a report and I assumed that it meant what it said.

A. This is more of a technical difference involved, namely, we tell the respondent where to report. Their reporting of figures is based on their honest and best knowledge of which of the figures of which of the commodities they have made in [fol. 2251] quantity, where asked for, and the dollar value in all cases that we ask. We publish the data along the exact same lines. If you will notice, if you have taken the time to check——

Q. (Interrupting) I have.

A. The product stub here is pretty much the same as the product stub as collected on the report form. We published —not reported—published a figure on steel rigid conduit. We have published a figure on steel electrical metallic tubing; we have combined, not that we didn't report it correctly, we have combined the figure on "Other rigid conduit," and "Other metallic electrical tubing," because we are governed by different laws than that of the respondent. The law that governs him, he has to report to the best of his ability. We have another part of the law which says we are prohibited by law from disclosing the operations of individual companies. We had a disclosure on one of the two lines. If we were to publish the figures as reported there was a reasonable chance to pick up the files and say, "XYZ" or "ABC," or "DEF companies made this amount in one of the two lines." We had a choice, we could either withhold [fol. 2252] the figures entirely—but we are not in the business of not publishing figures, we are in the business of pub-

lishing them, or we could combine the figures to at least give market analysts an opportunity to see what the total market of these products were. Therefore, we combined other rigid conduit with other electrical metal tubing, there was no disclosure in the combined figure, and yet we have given a total quantity and value figure. You can add the dollar figures and get the total figure. You cannot get a separate figure on other rigid or other metal tubing because of the disclosure provisions of the law.

[fol. 2253] Q. So as a result aluminum conduit went into electrical metallic tubing rather than in rigid, where you asked for it?

A. No, no, no. It is not in. That figure that you see below —we are talking about two entirely different figures. Let's stick to the dollar figure of 16 million——

Q. I am not talking about money. That is too prosaic to discuss. I am talking about reporting and publishing.

A. We seem to be talking about the same thing.

Q. As I read this form——

A. Report.

Q. —this report which you published, I think you asked for aluminum conduit.

A. We did not ask for aluminum conduit.

Q. Aluminum rigid conduit.

A. We didn't ask for aluminum rigid conduit.

The Court: Wait a minute, witness.

Let's get a question down.

Q. You asked that aluminum rigid conduit be included within other aluminum conduit fittings and rigid conduit; did you not?

A. We asked for non-steel metal to be included.

[fol. 2254] Q. And that includes aluminum, does it not?

A. That is presumably correct.

Q. When you published the figures, however, you published the aluminum rigid figures in a different category; isn't that true?

A. No, sir.

Q. Well, where are the aluminum rigid conduit figures?

A. They are combined with the electrical metallic tubing.

The Court: That is just what he asked you.

The Witness: Well, he says where—maybe I misunderstood the question. We put the footnote in 5 and combined it in EMT. We could have done that the opposite way and put it under other rigid conduit and stuck footnote 5 under EMT. We could have put the footnote on both of them and put the whole figure in that footnote.

Q. You are quarreling with my terminology?

A. I am only familiar with the Census Bureau terminology, not with yours.

[fol. 2255] Q. Let me ask you this, where in the current industrial report is rigid aluminum conduit?

A. It is combined with other electrical metallic tubing.

Q. Now, where was it asked for in the request that you sent out?

A. It was asked for in a separate line by itself, as was the other one.

Q. It was asked for, was it in under rigid conduit steel or other?

The Witness: Your Honor, may I direct a statement to you?

The Court: No, you don't need to. That has been asked and answered five times.

The Witness: That is so, that is what I believe too.

The Court: Then why don't you say so, just say yes.

The Witness: Well, as a Census Bureau employee I am interested in the Court's understanding of what we have done. May I direct something to you?

Mr. Bergson: Sure.

The Court: Yes, but when we get right down to it we can [fol. 2256] get down to a very simple proposition. The difficulty I have is locating rigid aluminum conduit. Well, now it is very plain and I don't see why there is this long harrang-e.

The Witness: I think——

The Court: Now, wait a minute. You asked for it under rigid conduit.

The Witness: Yes.

The Court: And with this report it is combined with something else so that I can't get it. That is what he is getting at.

The Witness: That is correct.

The Court: There is nothing very complicated about the whole thing as I can see it that requires a lot of explanation.

By Mr. Bergson:

Q. Now, I ask you whether this is not possible in view of the way Census handles these figures, and please believe me that I am not trying to impute anything sinister to the Census and you don't have to defend Census when I ask you this [fol. 2257] question—is it not possible that aluminum conduit or aluminum EMT might possibly have gotten into other electrical conduit on a perfectly innocent basis both on the part of the reporter and on the part of the Census?

A. I answered the question before and answer it again, yes, it is perfectly possible. Not properly so, but possibly so.

Q. I think you said before that they were pretty much accurate is the quote I have.

A. That is correct.

Q. But it is possible that it is erroneous. Now, let me ask you this, the sum, the value that you have for 1960 under this category "other aluminum conduit", which includes ells and junction boxes and so forth, do you have sufficient knowledge of the industry to know that if you exclude all electrical conduit from that total that there would be as much dollar volume of sales of these products to reach the total of 53 million dollars?

A. We have no way of knowing because we collected it as a total figure. We have no way of knowing what portion of that is any of the figures, is any of the products included within the parentheses.

[fol. 2258] Q. You said also that in preparing this reporting form you discussed this form with representatives of NEMA.

A. That is correct.

Q. Do you recall how the form came about, I mean this special industrial report came about?

A. As I recall, we were specifically requested by the National Electrical Manufacturers Association to institute a current program in the wiring devices and supply field.

The Court: Take a short recess.

(At this point a recess was taken after which the trial was continued.)

By Mr. Bergson:

Q. Mr. Bernsten, are you familiar with the term "basket category" as referred to in Census statistics?

A. Yes, in the sense that I heard it. We do not use it ourselves, but others have. It usually applies to a category wherein the product will appear the word "other" or "all other."

Q. Would you consider this other electrical conduit category on current industrial report, government Exhibit 498, to be such category?

[fol. 2259] A. I repeat, we do not use the term "basket" but this would be, I think I can truthfully say, the type of category that those who use the statistics apply the category.

Q. The amount involved in the category is somewhat over 53 million dollars.

A. Fifty-three, two hundred and forty-one for 1960.

Q. Isn't that an unusually large amount to have in a category of that kind?

A. No, sir. May I make one point?

Q. Yes.

A. If you will notice the fifty-three, two forty-one is a combination of two lines.

Q. Yes.

A. One the "other electrical conduit." The second line being the "fittings" line.

Now there is a disclosure problem again here, and if you will notice here since the two lines one immediately follow the other, we used a different technique than we previously used. Here we simply use a bracket to show the two figures together. This is a technique we would have used earlier if the disclosure even had been the same thing. We have [fol. 2260] no way of knowing how much that 53 million is, as you term "basket" as against the fittings figure. Even taking the two combined, now this 53 million, we would compare that generally speaking, sir, with the figures within the same class of products, namely the electrical conduit and fittings. Roughly we have 83 and 27, about 110, 126, 142, 152, out of a total of over 200 million dollars some portion

of 53 million is the basket "other." And I repeat I use the term "some portion" because it has fittings which go with the conduit. This would not be an abnormally large figure.

Q. This is just to clarify my own thinking on this line. Electrical conduit and fittings NSK, is that included within the products?

A. No, the three dots are standard Census symbols for this—may I give an explanation?

Q. Yes.

A. Basically the explanation is in footnote 3, which is on the '58 data. Perhaps this is not entirely clear in the complete Census of Manufactures where we have canvassed every known manufacturer, the Census form does not only deal with commodity data as before, but all different types [fol. 2261] of data, such as employment size, man hours, production workers, wages, materials semi-metallic workers, operation et cetera. It is a rather large form and a detailed one. We have found through consultation and advice of users and different manufacturers who must supply the data and other government agencies, that there is a question that the large form imposes somewhat of a burden on very small manufacturers because of their limited facilities. In addition to which the amount of detail which they can report, generally speaking, because they are so small is not going to add anything which is statistically significant to a separate line item. So what we do, we know what industry they are classified in through the BOASI records. We send them a so-called Census short form. This form is only one page. The form will just list total employment without getting a detailed breakdown by quota of production workers for example. It will list the classes of products he makes. For example, he can put down that he makes so many thousands of dollars of electrical conduit. The term "NSK" is a short form "not specified by kind."

As you notice for that whole class of products, for the [fol. 2262] year 1958, the short form respondent amounted to five million dollars, as the footnote says, these products reported as NSK by small establishments which did not have an opportunity to report in detail the statistics required of larger establishments because they didn't receive the form with all the many lines on it.

However, when we go to an annual commodity survey, in

our current industrial report series, where only information we ask is commodity data for these other statistics, we feel that it is not a burden on him to put on the proper line his dollar value. Therefore, going backwards, in 1960 these smaller respondents didn't have an opportunity to report NSK. They had to put their figures on the specific lines. Therefore, for comparison purposes of the whole class of products, the NSK is necessary to show in '58 when you attempt to compare the figures of '58 and '60.

However, there are other NSK categories and you will notice all of them have the three dots for 1960. Their figures are distributed within the category.

Q. I think you testified that among the trade associations [fol. 2263] that you consulted in regard to this form—what is it?

A. MA-36-K.

Q. MA-36-K, was the National Electrical Manufacturers Association.

A. That is correct.

Q. Do you know whether or not you discussed with them the conduit portions of the form?

A. At the meeting, a joint meeting held between the Census Bureau and representatives of NEMA, the question of the whole proposed report form including the lines on conduit as well as every other line, these questions were brought up. Just drawing from memory, I do believe at the meeting the Association said that there was no one present at the meeting from their association—the words were something like "who felt competent to comment at the fiscal meeting on the particular lines"—they did say, however, that in time for us to submit the report form to the Bureau of the Budget they would comment one way or the other in writing. And then after that a letter was received, I believe signed by Mr. A. J. Nesti, who was chief statistician of NEMA, to the effect that they had no objection to the other [fol. 2263a] sections of the form which were not specifically discussed at the meeting.

[fol. 2264] Q. The other section of the form?

A. Yes. I believe not only was conduit an area where the NEMA representative did not feel competent to discuss with us, but I believe there were one or two others. But from memory, I don't remember exactly what it was,

and when we had asked for the joint meeting, it was specifically for the purposes of discussing the whole form. As I recall, through some—I don't know what it was, we sent them a copy of the proposed report form which included conduit and other areas, but I think someone read the letter without referring to the report form we sent them and the explanation we got, and I believe they misunderstood, they saw wiring devices and didn't realize it included everything in wiring devices, which appears to mean they didn't look at the form we had attached to the letter.

Q. Do you know whether or not there were any changes on the form after that meeting?

A. The differences in the form between 1958 and 1960 I could not pinpoint as to where they came from. There were differences, as I pointed out before, in conduit, namely, for 1960 we were requested to break out steel and "other" [fol. 2265] for both rigid and EMT. I believe these suggestions were made by BDSA, the other government agency I referred to before.

Again, if my memory serves me as to NEMA not specifically commenting at the meeting on conduit the changes in conduit did not come about as part of their review, obviously. I believe there were one or two other changes in the report, but as to whether they were specifically NEMA recommendations, those details I don't have, and that detailed a set of notes we don't keep.

Q. Did the Census publish statistics for conduit in 1958?

A. Well, at the risk of getting into a misunderstanding again, let me say yes and no. We collected conduit figures, we had a disclosure problem and we combined them with an "all other" category. It is included but not as a separate line. Does that answer your question?

Q. There is no publication of conduit figures.

A. If I can just look to make sure—that's correct, I see in the Footnote 4—I take that back, there were figures on conduit. For example, the flexible steel and the raceways, [fol. 2266] there were no figures on the rigid or the EMT, which were more in discussion, no separate figures, that's correct.

Q. Now, Mr. Bernsten, you said you get your information as to companies from the Bureau of Old Age Survivors and Survivors Insurance, among other sources?

A. That's correct. This is mainly a check on existing mailing lists.

The Court: Yes, he did. Go ahead.

By Mr. Bergson:

Q. If a company were listed at the Bureau of Old Age Survivors, or on your previous Census forms as an extruder of aluminum shapes or aluminum pipes, would he necessarily get a form for conduit?

A. Not necessarily. May I expand my answer?

Q. Certainly.

The Court: Yes, but don't make these explanations so long. These questions are rather simple.

The Witness: There is a chance the answer might not be as simple as the question. In these types of surveys, these are commodity surveys and we are therefore interested in collecting data on people who specifically manufacture items [fol. 2267] line by line. Therefore, it is not just a man's classification as to what he does as a major product, but does he specifically manufacture items here. For example, when we went to the Census list we have line by line anyone who manufactures any of these products in the 1958 Census, whether that man was primarily a wiring device manufacturer or an aluminum extruder, if he made these even as a second product, we got him. But as an extruder of aluminum, I think somebody mentioned 34, as such, he doesn't necessarily get one. If he reported to us he shipped conduit, he would get a form.

Q. If a man reported to Census or a company reported to Census as an extruder of aluminum shapes or pipes for the 1958 Census, and sometime between 1958 and 1960, began to fabricate aluminum conduit, would he necessarily get one of these MA36K reports?

A. If he was selected in the supplemental annual survey of manufacturers, where again he has to put down his specific class of products, and we match the annual survey against the reporters on the commodity survey, yes; if he was non-select in the annual survey of manufacturers, no.

[fol. 2268] Q. Supposing in the annual survey of manufacturers he said he was an extruder of aluminum pipe.

A. This is not what he would say. There is a specific product section. He gets a book with an alphabetical listing of all products, and a code to put down in a specific item on the annual survey. Any extrusion of aluminum would have a code of thirty-four something. If, in addition, say, 1959 or 1960 or 1961, he looks and he sees "conduit," he would put down "conduit," and it would have the code 36442. Or he might not even put down—some people only put down "conduit," and neglect to put in the code; some only put the code and neglect to put the description, but we match it.

Q. If, in the 1959 report, he just said, didn't say conduit because he wasn't manufacturing conduit in 1959, would he get the 1960 request?

A. Going back over your other assumptions, no, he would not. But if he then in 1960 would——

The Court: You don't need all of that, Witness. The question was a very simple one. He would get it. What is your opinion? Your opinion was no.

[fol. 2269] The Witness: That is correct.

The Court: All right.

By Mr. Bergson:

Q. And I suppose the same would be true of a fabricator of steel pipe?

A. That is correct.

Q. Now, Mr. Bernsten, would you tell the Court—I don't want you to violate any disclosure problems that exist under the Census Act, and I don't want to embarrass you or myself by asking that kind of a question, but in the current industrial report, which is Government's Exhibit 498, which was released on October 19, 1961, you had a figure for conduit and EMT which totaled $120,367,000. This is the total in Government exhibit, the conduit, is that correct?

A. We did not publish subtotals. It looks like that figure would be correct, sir.

Q. Right. Now, subsequently, on February 1, 1962, by letter from the Director of the Census to Mr. Loevinger, the Assistant Attorney General, which is Government Exhibit 496, you increased the total to $125,707,000; how did that

come about, not the exchange of correspondence but how did the increase in numbers come about?

[fol. 2270] A. Well, correspondence has something to do with it, because there was a prior letter from Mr. Loevinger explaining these figures, the original ones would be entered in as evidence and asking whether there would be a possibility of any revisions. This is important, because normally——

The Court: How did the change come about, is the only question.

The Witness: As a result of the request made by Mr. Loevinger, we, ahead of time, made a review of the report submitted on 36K, against reports submitted on the annual survey of manufacturers that we described before, and made the check against the BOASI record and in so doing we noticed a combination of discrepancies in figures reported to us on the one survey as against the other, and the two should have been the same, plus people from BOASI listed people as having come into the production, at least in the general industry, and we initiated telephone correspondence, verified in one case the change in figures. In the other cases, these people were now in and subsequently we [fol. 2271] sent by letter what these figures would be.

Q. Did the Department or Mr. Loevinger indicate there was any need for haste for getting these figures in?

A. Well, his letter says: "Specifically the Government has used these totals, since the Government is relying on these figures in this litigation and since the trial of the case commences on February 5—" his letter is dated January 30, by the way, "We would appreciate your advising us as soon as possible whether the figures for the value of shipments of these products have been revised subsequent to their publication in 1961, and if so, the changes which have been made."

Q. You had already told him orally, or had you already told him orally, in response to their oral request you had checked and found certain revisions were necessary?

A. I hadn't, I am not aware of anyone at the Bureau having done so. I believe it was only by letter, sir.

Q. Is it possible that in the haste to meet the February 5

deadline, that you might not have picked up all the dis-
[fol. 2272] crepancies that there were?

A. That was a possibility, but subsequent to that we have rechecked at our leisure and the figures are as reported, as revised in the letter.

Q. And this at your leisure was reaffirmed in the letter of February 13?

A. That is correct. I believe the letter specifically indicates the company accounts published there refer to the revised figures.

Q. And it refers to reports received from all known producers?

A. That is correct.

Q. Now, I suppose that was put in against the possibility that there might be some unknown producers?

A. I believe it was worded that way because it is standard terminology. Obviously, we can only have reports from all known producers.

Q. Now, Mr. Bernsten, is there any way without running into the disclosure problem of taking the Census total of 125,907,000, which is the amount now referred to in the Government Chart 455, and breaking out of there into plant transfers, foreign shipments or "Other"?

A. No, sir. The problem is not disclosure, the problem is
[fol. 2273] simply the figures as collected were total shipments. We did not ask for a breakout of interplant transfers.

Q. Would you have any way of knowing whether the total of interplant transfers, foreign shipments and other factors would result in a difference of, say, eight to ten million dollars in the Census figures?

A. No, sir, no way. If we don't have the figures on the exports specifically of these products or the interplant transfers, there is no way to do it, and we don't guess.

Q. Mr. Nesti, to whom you have referred, testified that NEMA figures did not include interplant transfers, foreign, and when I say "Others" I mean sales within an organization, was $116,697,000 for those companies reporting to NEMA. If those figures—and he said that those figures were incomplete because there were companies that did not report to NEMA—if you broke out interplant transfers or foreign shipments, other shipments from your Census total, and you came close to the 116,000,000 of NEMA, would you

as a statistician—is that your profession—say that the census figures would be subject to the same infirmity that [fol. 2274] the NEMA figures would be subject to?

A. Two points, one, I am not in a position to comment upon NEMA statistics; number 2, I was called as a witness for the Census Bureau, not for my own personal opinion. As a Census Bureau employee, again we will stand behind the figures that we published. Mr. Nesti, if he wishes to downgrade his statistics, that is his province. Whatever our final figures would show, and this is reiterated in the letter, we have confidence in them and we stand behind them. We feel that they are the best and most complete coverage possible of the items in question, no matter what the figures show.

Q. The best you are able to do under the circumstances?

A. Best as the largest statistical collecting agency in the world is able to do, yes, sir.

Q. Now, is this the first year, this 1960, the first year that the current industrial report was published for wiring devices?

A. Published in 1961 covering 1960, yes, sir.

Q. Is it customary or do you find in the performance of your duties that when you put out a new reporting form that you don't hit it right on the head the first year?

[fol. 2275] A. No more so than a survey that is being conducted for ten or twenty years.

Q. You feel you have as accurate results when you first start a new survey as you have after you have had the survey in effect ten or twenty years?

A. Yes, because the same care is taken to insure the complete coverage of respondents. We try not to get careless with one that is running for twenty years and we are as careful about a new one.

Q. Don't you find over the years that on occasions industrial representatives have pointed out discrepancies and that you have adjusted for those discrepancies?

A. I do not recall ever a discrepancy as such pointed out. As I pointed out before, I have only been with the Bureau a little over two years, but from reading through correspondence in the Census Bureau, I don't recall the Census ever revising a figure because a respondent has said the figure has been wrong. We have in our careful review re-

vised figures, but again, even though this is true and we are willing to state it for the record, there is no ratio that is higher on the first year than it is on the tenth year.

[fol. 2276] Q. Didn't you find a five million dollar discrepancy in this year?

A. We did not find a five million dollar discrepancy. As I pointed out before, the review of this was done earlier than would be normal Census procedure because of the request. This would have been picked up and published as part of the 1961 report, because this same careful review would have taken place in preparation for the 1961 report where we also show 1960 data revised when necessary.

Q. Getting away from the conduit now, how are industry classifications set up, are they set up in consultation with members of the industry?

A. Yes. Here I can only give you some hearsay. The Standard Industrial Manual, the product of the Budget Bureau as such, which consults with all users of statistics and all producers of statistics.

Q. And the statistics are furnished for the benefit of manufacturers in the conduct of their business, among other things.

A. Yes.

Q. And if they are interested in having particular things [fol. 2277] broken out, they will be broken out provided no disclosure problem is involved; is that right?

A. If feasible within the resources of the agency providing the figure. We will not simply because someone requests us to break it out, break it out. We have to have some evidence that the effort involved in breaking out the figure will result in the publication of a figure which has significance to general users.

Q. Now, I know you testified as to the area of your responsibility, and I don't know that you testified—I probably do know that you testified that wire and cable is not within your area of responsibility.

A. That is correct, sir.

Q. However, you do have certain knowledge of the Census procedures?

A. Yes, sir.

Q. Now, I show you Defendants' AR-9, which is the 1958

Census of manufacture for non-ferrous metal mill and foundry products.

A. That's correct.

Q. And I invite your attention to page 33D22, the bottom part of the page, and 32D33. These tables refer to ship-
[fol. 2278] ments of insulated wire and cable?

A. Yes, sir.

Q. Do you find any distinction in those tables between wire and cable using aluminum as a conductor on the one hand and copper as the conductor on the other hand?

A. I beg the Court's indulgence since I had nothing to do with the preparation of this, and to be fair, I am checking it through line by line to make sure I don't miss anything. I do not see any reference to aluminum or, I believe you said copper?

Q. Right.

A. That's correct.

Q. Now, however, there are breakdowns in some of these products. Take, for example, weatherproof, between braided, neoprene and thermoplastic covered, is that right?

A. Not exactly, as braided, then there is polycloroprene.

Q. Which is neoprene?

A. There is others which includes thermoplastic covered, which under Census procedure this is an example.

Q. Inviting your attention to service cable, there is a [fol. 2279] breakdown between rubber and thermoplastic insulated?

A. Yes.

Q. Now, would this indicate to you that the manufacturers in this industry were not concerned with whether or not the conductor metal was copper or aluminum?

Mr. Melchior: Your Honor, I think I am going to have to object to this line of testimony. The witness has stated he is not familiar with this particular part of the Census report and it exceeds the direct.

The Court: If he can't answer, he can say so. Overruled.

The Witness: I cannot answer that question.

By Mr. Bergson:

Q. I will ask you this question, does the fact that it is broken down say, for service cable, between rubber and

neoprene, or thermoplastic insulated, indicate that the manufacturers in that industry are interested in statistics for rubber insulated cable and thermoplastic insulated cable?

A. I cannot answer that because I do not know who was
[fol. 2279a] consulted on this, government, industry or who.

Mr. Bergson: No further questions.

The Court: All right. Redirect examination.

[fol. 2280] Mr. Melchior: I just have a few questions.

Redirect examination.

By Mr. Melchior:

Q. Mr. Bernsten, I would like to clarify one point that you were examined on in cross. I direct your attention to government Exhibit 498, which is a report.

A. The release itself.

Q. This is a report. Now, when the Bureau collected this information on government Exhibit 499, as I recall your testimony on direct, it collected it under, in four different categories, as far as conduit is concerned, under rigid conduit it collected it as steel and other?

A. That is correct.

Q. And as EMT it collected it as steel and other?

A. That is correct, sir.

Q. And then when you put out your report all you really did was to take "other rigid" and "other EMT" and added them together?

A. Yes, sir.

[fol. 2281] Q. And the only reason you did this was to prevent a disclosure of some individuals, or the possible disclosure of some individual's participation; is that right?

A. That is correct, sir.

Q. In other words, in one of those fields there were so few companies involved that it was possible to determine someone's shipments?

A. It might be possible.

Q. Might be possible, that's right. And therefore through a super abundance of caution you decided to combine them.

A. That is correct.

Q. Now, you were asked on cross-examination about pos-

sible confusion on the part of companies who are required to submit this form. Now, as a matter of fact, from time to time do members of the industry who are required to fill out these forms call the Bureau of Census for assistance in filling out this form? This is the usual occurrence, isn't it?

A. Yes.

Q. Members of the industry are aware that they can call the Bureau for assistance?

[fol. 2282] Mr. Melchior: That is all.

Recross-examination.

By Mr. Bergson:

Q. I just want to ask one question. How many companies or how few companies must there be in an industry to present a disclosure problem?

A. I am not free to answer that question.

Mr. Bergson: You are not free to answer that. No further questions.

The Court: Witness, what my trouble is here, and I am going to have to determine as a line of commerce aluminum conduit, rigid aluminum conduit, I think. Can you, do these two exhibits that we have been talking about help me to determine the amount of aluminum conduit in any particular year?

The Witness: No sir. The only thing it tells you is the total of other than steel metallic conduit, sir.

The Court: Okay. All right.

Mr. Melchior: No further questions.

(Witness excused.)

[fol. 2283] Offers in Evidence and Colloquy Thereon

Mr. Melchior: May it please the Court, the government has two or three documents it wishes to offer. I would like to have marked for identification Government Exhibit 501.

(Final judgment in the case of United States versus Standard Oil Company of New Jersey et al marked as Government Exhibit 501 for identification.)

Mr. Melchior: Government's Exhibit 501 for identification is the final judgment in the case of United States versus Standard Oil Company of New Jersey et al in the United States District Court for the Western District of Kentucky. I offer it.

Mr. Bergson: You certainly may. I have no objection.

The Court: Received.

(Government's Exhibit 501 for identification received in evidence.)

Mr. Melchior: I would like this marked.

(Directory of Aluminum Suppliers marked as Govern-
[fol. 2284] ment's Exhibit 503 for identification.)

Mr. Melchior: I offer at this time Government's Exhibit 503 for identification. This is a directory of aluminum suppliers put out by Business and Defense Services Administration, United States Department of Commerce, as revised December 15, 1959.

Mr. Bergson: No objection.

The Court: Received.

(Government's Exhibit 503 for identification received in evidence.)

(Newspaper clipping from the New York Times dated March 1, 1962 marked as Government's Exhibit 504 for identification.)

Mr. Melchior: I offer at this time Government's Exhibit 504 for identification, which is a newspaper clipping from the New York Times dated today, March 1, 1962, and the article is entitled "Two metals producers cancel their plans for joint aluminum plants." I offer that at this time.

Mr. Bergson: Your Honor, I am getting soft. I am not
[fol. 2285] going to object.

The Court: I was going to offer the one that was in my room the other day. That was the Wall Street Journal.

Mr. Melchior: The New York Times.

The Court: No, the one they sent me was from the Wall Street Journal.

Mr. Bergson: The one that said independents were the price cutters.

The Court: Yes. I will take it.

Mr. Melchior: Is that received, your Honor?

The Court: Yes.

(Government's Exhibit 504 for identification received in evidence.)

Mr. Melchior: Now I would like to reoffer at this time, your Honor, government's exhibits for identification 473 to 491, excluding government exhibit for identification 478. These documents, as your Honor will recall, are documents which were secured by discovery in another proceeding from the defendant Alcoa and they relate to four different real estate projects, to wit the Mansion House redevelopment [fol. 2286] project in St. Louis, a project in which Alcoa loaned certain monies; the Ebbett's field project in Brooklyn, in which Alcoa loaned certain monies to the Kratter Corporation, and in connection with the third project entitled "The Olympia Project" in New Jersey, we believe Monmouth, New Jersey, and finally the Century City project in which Alcoa participated with Webb and Knapp. We offer these on the ground that a reading of these documents will generally disclose the practice utilized not only by Alcoa but certain other integrated aluminum producers in attempting to insure that their own aluminum made products are utilized in these projects to the exclusion of similar products made by their non-integrated competitors. We believe that these are highly relevant in a proceeding of this type.

Mr. Bergson: I object, your Honor, for the reasons stated before plus the fact that this is not proper rebuttal.

[fol. 2287] The Court: I will sustain the objection.

Mr. Melchior: If it may please the Court, the government would like then to make an offer of proof and read it into the record.

Mr. Bergson: Your Honor, I think it is improper to make an offer of proof at this time.

The Court: These exhibits have been offered and rejected. What you are doing is getting them into the record anyway.

Mr. Melchior: I would like to read into the record what the documents would show if admitted.

The Court: You already told us what they were.

Mr. Melchior: Then that would be a sufficient offer of

proof. I wouldn't read from the documents. I did have a little more complete statement as to what we think the documents would show.

Mr. Bergson: I object to it.

[fol. 2288] The Court: All that that is is you are summarizing something and getting it into the record. The objection is sustained. I looked at them and I don't think they are relevant. I think we are going very far afield. I sustain the objection.

Mr. Bergson: Your Honor, I think I have always been taught not to argue when I have been sustained. I do think I ought to have on the record this additional fact, that after you sustained the objection before we had here testifying the executive vice president for Alcoa, Mr. Hickman, who could have been interrogated regarding these documents by the government if he so chose, and we would have a chance to answer any inferenec that he might have tried to draw from them. Consequently, I think that the plaintiff forfeited his opportunity to even make an offer of proof in this situation.

The Court: Well, I will sustain it.

Mr. Melchior: I would like to make a comment on coun-

[fol. 2289] sel's remarks if I may, your Honor. These documents relate to officers and officials other than the said Mr. Hickman, and the direct examination of Mr. Hickman sorely limited an opportunity to examine him with respect to any of the pertinent documents herein.

The Court: Did you try?

Mr. Melchior: I beg your pardon?

The Court: You didn't try to examine him on any of the documents.

Mr. Melchior: I didn't think it was appropriate.

The Court: Don't say you were limited. I think when Mr. Bergson got through somebody said "no cross."

Mr. Bergson: I think the record will show that in many instances in the trial of this case the cross went well beyond the direct on both sides.

The Court: Yes. I didn't hold you down at any time, even on incompetent evidence.

Mr. Bergson: Your Honor, I have a document that I

[fol. 2290] want to offer.

The Court: I may go out and pick up a few myself.

Mr. Bergson: Off the record.

(Discussion off the record.)

Mr. Bergson: I would like to offer as defendant's Exhibit AR-84 a statement of Clarence W. Higbee representing the import committee of the wire and cable division of the National Electrical Manufacturers Association on February 28, 1962. This document, your Honor, discusses the problems that the manufacturers of wire and cable face, or feel that they face, so far as foreign imports are concerned.

The Court: All right.

Mr. Melchior: No objection.

The Court: Received.

(Defendant's Exhibit AR-84 marked received in evidence.)

BOTH SIDES REST

The Court: Now both sides rest?

Mr. Melchior: Government rests, your Honor.

The Court: Government rests. Do the defendants rest?

[fol. 2291] Mr. Bergson: Defendants rest.

The Court: All right, motions.

Do you want to make a motion?

MOTION FOR A JUDGMENT FOR DEFENDANT'S, ETC.

Mr. Bergson: Yes. I would like to move for a judgment for the defendants on the grounds that the plaintiff has failed to prove its cause of action.

The Court: I will reserve decision. All right, I guess this finishes this lawsuit.

COLLOQUY BETWEEN COURT AND COUNSEL

Mr. Bergson: Your Honor, I think it might be appropriate at this time, if you care to take a moment or two, to discuss the scheduling that we agreed upon.

The Court: Yes. It would be a good thing to get that into the record. Have you got it?

Mr. Melchior: We have prepared a memorandum of understanding which counsel are fully in agreement on,

as I understand it, with the possible exception of the date of the hearing.

The Court: All right. Do you want to put it into the [fol. 2292] record?

Mr. Melchior: We can read it into the record.

The Court: Yes.

Mr. Melchior: (Reading) Memorandum of understanding as follows: By April 16, 1962 the plaintiff's proposed findings of fact and conclusions of law and the plaintiff's post-trial brief will be due.

On May 1, 1962 the defendants' proposed findings of fact and conclusions of law and the defendants' post-trial brief will be due.

On May 15, 1962 plaintiff's comments on defendants' proposed findings of fact and conclusions of law or plaintiff's counter proposals thereupon and plaintiff's reply post-trial brief if desired will be due.

The Court: That is agreeable to you gentlemen, that time schedule?

Mr. Bergson: Perfectly agreeable, your Honor.

The Court: All right.

[fol. 2293] Mr. Bergson: Do you think it advisable at this time, your Honor, to set a time for argument?

The Court: No. Number one, so many things happen that in my informal talk with counsel last night I said that I would like to have this submitted to me around June 1st, because I don't think I can do much with it before that time. After this May 15th, which is the last date on your memorandum of understanding, then I will as soon as I get a chance look over what you have submitted, deciding whether or not argument is necessary, and then communicate with you to fix a date for that argument. I would like to make it myself, if I am not engaged in trial somewhere, sometime between May 15th and June 1st.

Mr. Bergson: This would be entirely agreeable to us, your Honor. The one thought that we have, and of course we don't know how extensive an argument your Honor would like, but we think it might be desirable if two days would be set aside for argument.

[fol. 2294] Mr. Melchior: This would be agreeable to us.

The Court: All I am going to tell you is my own experience. You don't need this on the record.

(Discussion off the record.)

The Court: Gentlemen, it is my understanding that you gentlemen are going to file your exhibits with the clerk and are going to do it——

Mr. Bergson: Today. We are ready to do it now.

Mr. Melchior: Yes, today. Yes, sir.

The Court: All right. I think it would be very helpful if you have the manpower or stenographic power or ability to give a list of those exhibits that you file to the clerk, so he will know what he is supposed to have. I am going to leave that with you. You will be around here this afternoon.

Mr. Melchior: Sure. I will take care of it.

[fol. 2294a] The Court: I will be around. I have some other matters to take care of this afternoon.

(Whereupon, at 1:00 p.m. the case was considered closed.)

[fols. 3367-3403] IN UNITED STATES DISTRICT COURT,
NORTHERN DISTRICT OF NEW YORK

Civil No. 8030

UNITED STATES OF AMERICA, Plaintiff,

v.

ALUMINUM COMPANY OF AMERICA AND ROME CABLE CORPORATION, Defendants.

* * * * * * *

[fol. 3404] Interrogatories 6, 7, and 9

6. State the wire and cable products (by product code numbers as reported for the 1958 Census of Manufacturers) manufactured by Alcoa, Rome or others, constituting:

(a) overhead transmission and distribution lines carrying electric power from a generating plant to a house or other building constituting a consuming unit;
(b) underground transmission and distribution lines carrying electric power from a generating plant to a house or other building constituting a consuming unit;
(c) other transmission and distribution lines carrying electric power from a generating plant to a house or other building constituting a consuming unit.

7. With respect to each of the products listed in response to Interrogatory No. 6 state whether such product is used solely for:

(a) overhead (i) transmission, (ii) distribution or (iii) both;
(b) underground (i) transmission, (ii) distribution or (iii) both;
(c) other (i) transmission or (ii) distribution.

If any such product is not solely used in any one of the above categories, state its various uses and the extent of each.

9. State, which of the products, listed in response to Interrogatory No. 6, which in 1958, or in the first three months of 1959, were sold:

(a) by Alcoa;
(b) by Rome.

Answers to Interrogatories 6, 7, and 9

The following table identifies wire and cable products as requested in Interrogatory 6, being broken down between subdivisions (a) and (b) thereof. We know of no products falling within the description of subdivision (c). The use of each product, requested in Interrogatory 7, is shown [fol. 3405] under the heading "Function." It is impossible to make a firm distinction between products used solely for transmission and products used solely for distribution. For the purpose of answering Interrogatory 7, we have classified as used for distribution, products designed for voltages of 22KV and lower, and as used for transmission, products designed for voltages above 22KV. It should be noted, however, that in some instances distribution of power may be at voltages higher than 22KV, while power may be transmitted at voltages below 22KV. In the table, Interrogatory 9 is answered by showing under the heading "Sold By," whether the product was sold by Alcoa, by Rome, by both or by neither.

(a) Products Used for Overhead Transmission and Distribution Lines

Census Product	Census Code	Function	Sold By
Copper Wire and Cable			
Copper wire, bare and tinned for electrical transmission	33923-11-4	Distribution	Rome
Copper Base Alloy wire for electrical transmission	33923-51-8	Distribution	Neither
Copper strand and cable, except insulated	33923-71-0	Both	Rome
Wire rope, cable and strand (except insulated)			
Aluminum Cable—steel reinforced (ACSR) and other bare aluminum cable	34892-61-1	Both	Both
Weatherproof and Slow Burning Wire			
Braided (includes Slow Burning)	36312-31-7	Distribution	Rome
Polychloraprene (Neoprene) covered	36312-37-5	Distribution	Both
Other (includes Thermoplastic covered, etc.)	36132-39-1	Both	Bothe

[fol. 3406]

Building Wire and Cable (having Underwriters' labels) except varnished cambric insulated			
Service Cable (includes self-supporting type but excludes Service Entrance Cable)			
Thermoplastic insulated	36312-45-0	Distribution	Both
Rubber	36312-44-7	Distribution	Both
Power Wire & Cable 601 Volts and Higher			
Varnished Cambric Insulated	36312-63-6	Footnote (1)	Neither
Paper Insulated	36312-65-2	Footnote (2)	Neither
Rubber Insulated	36312-67-8	Footnote (1)	Rome
Thermoplastic	36312-68-1	Footnote (3)	Rome

[Footnotes on page 1198]

(b) Products Used for Underground Tranmission and Distribution Lines

Census Product	Census Code	Function	Sold By
Building Wire and Cable (having Underwriters' labels) except varnished cambric insulated			
Rubber insulated fibrous covered and/or Neoprene jacketed (includes lead covered)	36312-41-8	Footnote (4)	Rome
Thermoplastic (no braid)	36312-48-9	Footnote (4)	Rome
Service Entrance Cable	36312-46-3	Distribution	Rome
Power Wire & Cable 601 Volts and Higher			
Varnished Cambric Insulated	36312-63-6	Footnote (1)	Neither
Paper Insulated	36312-65-2	Footnote (2)	Neither
Rubber Insulated	36312-67-8	Footnote (1)	Rome
Thermoplastic	36312-68-1	Footnote (3)	Rome

[fols. 3407-3454]

(1) To the best of our information and belief, varnished cambric insulated power cable (36312-63-6) and rubber insulated power cable (36312-67-8) are predominately used for distribution of power within buildings, in motor leads, shipboard wiring and equipment wiring. These products are used to a lesser extent for the distribution of electric power to consuming units.

(2) To the best of our information and belief, paper insulated power cable (36312-65-2) is used primarily for the transmission and distribution of electric power from generating plants to consuming units. To a lesser extent, it is also used for the distribution of power within industrial plants.

(3) To the best of our information and belief, thermoplastic power cable (36312-68-1) is predominately used for the distribution of electric power to consuming units. To a lesser extent, it is also used for the distribution of power within buildings and in the other applications noted in footnote (1).

(4) To the best of our information and belief, rubber covered building wire (36312-41-8) and thermioplastic covered building wire (36312-48-9) are predominately used in the wiring of buildings. To a lesser extent, they are also used in conduit as services to buildings.

[fol. 3455] Interrogatory 16

16. With respect to each item of machinery and equipment in the Rome plant at the date of the acquisition, used in the manufacture, fabrication or processing the products listed below state (i) whether prior to the acquisition it was allocated, and (ii) whether it now is allocated,

(a) solely for copper;
(b) solely for aluminum; or
(c) for both aluminum and copper, and, if, for both, specify the comparative extent of the use for aluminum and the use for copper:

(1) ACSR
(2) bare wire
(3) bare cable
(4) weatherproof wire and cable
(5) service drop cable
(6) each other insulated wire or cable product.

Answer to Interrogatory 16

The attached tabulation shows whether each item of machinery and equipment in the Rome plant both before and after the date of the acquisition, used in the production of electrical wire and cable products, was allocated solely for copper, solely for aluminum, or was utilized for both aluminum and copper. To the extent possible, where an item of machinery or equipment was or is utilized for both aluminum and copper, we have specified the extent of use in making the listed electrical wire and cable products with copper or with aluminum as the electrical conductor. For the most part, it has not been possible to make the refined breakdown requested since each item of machinery or equipment is used in connection with the manufacture of many different types of electrical wire and cable products. Where existing records do not permit a breakdown according to specific products, we have used the notation "unable to isolate production types." Certain machines have been grouped together be- [fol. 3456] cause the available data does not show the extent to which any one of these functionally equivalent machines has been used for aluminum or for copper.

[fol. 3457]

QUESTION #16

MACHINERY OR EQUIPMENT	Prior to Acquisition (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.	Now (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.
23-04 Elevator supply 11 die rod drawing mch.		X				X		
23-30 12 cradle 22" Watson strander 38-01 7 wire Larmuth type strander 22" 38-02 42 wire Watson rigid frame 22" strander 38-03 12 wire Larmuth type 22" strander 38-04 12 wire Larmuth type 22" strander 38-05 12 wire Larmuth type 22" strander		Alum. (1) ACSR (2) Bare W. (3) Bare Cable (4) Line W. (5) Drop W. (6) Other TOTAL Copper Unable to isolate production types		7.5% 0 6.0% 7.0% 14.4% 3.1% 38.0% 62. %		Alum. (1) ACSR (2) Bare W. (3) Bare Cable (4) Line W. (5) Drop W. (6) Other TOTAL Copper Unable to isolate production types		3.8% 0 .4% 4.6% 15.4% 4.8% 29.0% 71.0%
23-35 Syncro drawing mch.		X				X		
31-03 (2) 13 die Syncro 31-04 drawing mchs.	X				X			
31-06 7 die Vaughn drawing mch.	X				X			
31-10 (4) Vaughn 16 die thru light intermediate 31-13 drawing machines		Alum. (6) Other Copper (6) Other		.4% 99.6%		Alum. (6) Other Copper (6) Other		2.5% 97.5%
31-14 (2) Vaughn 13 die interm. 31-16 drawing mchs.	X				X			
31-21 10 die Vaughn rod drawing machine	X				X			
31-40 Vaughn 3 block rod drawing and shaving mch.	X				X			
31-62 10 die Waterbury-Farrell interm. wire drawing mch.	X				X			
33-01 (9) 16 die Rome thru fine wire drawing 33-09 machines	X				X			

[fol. 3458]

QUESTION #16

MACHINERY OR EQUIPMENT	Prior to Acquisition (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.	Now (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.
33-10 thru 33-15 (6) 16 die Vaughn fine wire drawing machines	X				X			
33-16 thru 33-29 (14) 16 die Vaughn fine wire drawing machines	X				X			
34-04 Water-sealed annealer	X				X			
34-05 Water-sealed annealer	X				X			
34-06 Water-sealed annealer	X				X			
34-07 Water-sealed annealer	X				X			
34-08 Electric Bell type annealer	X				X			
34-09 Electric Bell type annealer	X				X			
34-10 Electric Bell type annealer	X				X			
35-01 Fine wire tinning mch.	X				X			
35-02 Fine wire tinning mch.	X				X			
35-03 Fine wire tinning mbb.	X				X			
35-04 Fine wire tinning mch.					X			
35-12 Heavy wire tinning mch	X				X			
36-01 2 stand Torrington flat rolling mch.	X				X			
36-02 2 stand Torrington flat rolling mch.	X				X			
36-03 2 stand Torrington flat rolling mch.	X				X			
36-04 3 stand Rome flat rolling machine	X				X			

[fol. 3459]

QUESTION #16

MACHINERY OR EQUIPMENT	Prior to Acquisition (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.	Now (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.
38-07 12 wire Larmuth type strander 6" spools 38-08 12 wire Larmuth type strander 8" spools 38-12 12 wire Larmuth type strander 12" spools 38-16 12 wire Larmuth type strander 12" spools 38-17 12 wire Larmuth type strander 8" spools 38-18 12 wire Larmuth type strander 8" spools 38-19 12 wire Larmuth type strander 8" spools 38-20 7 wire Larmuth type strander 12" spools 38-62 7 wire Larmuth type strander 8" spools 38-63 12 wire Larmuth type strander			ALUM. (6) Others COPPER (6) Others	.6% 99.4%			ALUM. (6) Others COPPER (6) Others	2% 98%
38-30 61 wire Watson rigid frame strander 6" spools	X				X			
38-31 N. E. Butt bunch strander	X				X			
38-32 N.E.Butt bunch strander	X				X			
38-33 N.E.Butt bunch strander	X				X			
38-34 N.E.Butt bunch strander	X				X			
38-35 N.E.Butt bunch strander	X				X			
38-36 N.E.Butt bunch strander	X				X			
38-37 N.E.Butt bunch strander	X				X			
38-38 (2) Double spindle 38-39 Haskell-Dawes bunch stranders 8"x10" traverse reel	X				X			

[fol.3460]

QUESTION #16

MACHINERY OR EQUIPMENT	Prior to Acquisition (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.	Now (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.
38-40 (2) Double spindle 38-41 Haskell-Dawes bunch stranders 8"x10" traverse reel	X				X			
38-42 (2) double spindle 38-43 Haskell-Dawes bunch stranders 12"x22" traverse reel	X				X			
38-56 (2) double spindle Haskell-Dawes bunch stranders 12" x22" traverse reels	X				X			
38-57 N.E.Butt bunch strander	X				X			
38-59 (3) N.E.Butt bunch 38-60 stranders 38-61	X				X			
40-04 4 triple deck N.E. Butt braiders	X				X			
40-05 Drum type saturator	X				X			
40-06 Drum type saturator	X				X			
40-07 Drum type saturator	X				X			
40-08 Drum type finisher	X				X			
40-09 Drum type finisher	X				X			
40-20 Triple head Sinfra knitter	X				X			
40-21 2 Triple head Sinfra 40-22 knitters	X				X			
40-23 2 Triple head Sinfra 40-24 knitters	X				X			
40-25 Triple head Sinfra knitter	X				X			
40-26 Triple head Sinfra knitter	X				X			

[fol. 3461]

QUESTION #16

MACHINERY OR EQUIPMENT	Prior to Acquisition (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.	Now (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.
40-27 3 Triple head Sinfra knitters 40-28 40-29	X				X			
40-30 2 Triple head Sinfra knitters 40-31	X				X			
52-01 Horizontal cotton covering mch.	X							
52-02 5 Horizontal cotton covering machines thru 52-06	X							
52-08 1 Horizontal cotton covering mch.	X							
52-11 3 Horizontal double paper single cotton machines 52-12 52-14	X					Alum. (6) Other		.6%
52-13 1 Horizontal double paper single cotton mch.	X					Copper (6) Other		99.4%
52-15 1 Horizontal double paper single cotton mch.	X							
52-20 Vertical 10 spindle cotton covering mch.	X							
52-21 Vertical 10 spindle double cotton covering mch.	X							
55-01 Horizontal asbestos machine	X				X			
55-02 3 Horizontal glass covering machines 55-03 55-04	X				X			
55-05 Horizontal glass covering machine	X				X			
55-06 Horizontal glass covering mch.	X				X			
55-07 Horizontal glass covering mch.	X				X			

[fol. 3462]

QUESTION #16

MACHINERY OR EQUIPMENT	Prior to Acquisition (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.	Now (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.
55-08 8 spindle vertical glass machine	X				X			
55-23 Horizontal glass covering machine	X				X			
57-01 4 wire Michigan Oven Co. enamelling unit	X				X			
56-01 8 spindle Industrial Oven Co. lacquer tower	X				X			
56-05 10 wire vertical glass oven	X				X			
61-18 7 wire cabler 12" dia. spools								
69-20 Service Entrance mch.								
61-20 7 wire cabler maximum 48" dia. reels								
61-22 multiple head taping machine		Unable to isolate production types				Unable to isolate production types		
61-23 multiple head taping machine								
61-37 37 wire cabler 24" dia. reels								
61-05 reverse lay cabler	X				X			
61-09 Edmunds tripler 24" reels	X				X			
61-19 48 cradle cabler 12" dia. spools	X				X			
61-38 (2) 30" cord twisters 61-39	X				X			
61-40 10 spindle vertical cotton covering machine	X				X			
61-42 44" cable twister	X				X			
61-43 Edmunds tripler 24" reels	X				X			

[fol. 3463]

QUESTION #16

MACHINERY OR EQUIPMENT	Prior to Acquisition (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.	Now (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.
61-50 Horizontal cotton serving mch.	X				X			
63-01 4½" Tuber 63-03 6" Tuber		Alum. (5) Other Copper (5) Other		2.6% 97.4%		Alum. (6) Other Copper (6) Other		11.4% 88.6%
63-02 3½" Tuber		Not operating				Not operating		
64-01 4½" Continuous vulcanizing mch. 64-02 3½" Continuous vulcanizing mch. 64-03 3½" Continuous vulcanizing mch. 64-04 3½" Continuous vulcanizing mch. 64-05 3½" Continuous vulcanizing mch. 64-06 4½" Continuous vulcanizing mch. 64-07 4½" Continuous vulcanizing mch. 64-19 6" Continuous vulcanizing mch.		Alum. (4) Line W. (5) Drop W. (6) Other TOTAL Copper (4) Line W. (5) Drop W. (6) Other TOTAL		19% 24% 3% 46% 5% .6% 48.4% 54 %		Alum (4) Line W. (5) Drop W. (6) Other TOTAL Copper (4) Line W. (5) Drop W. (6) Other TOTAL		10% 22% 5% 37% 4.3% .9% 57.8% 63.0%
67-01 thru 67-05 (140) 16 carrier Wardwell braiders 67-08 (16) 24 carrier Wardwell braiders 67-09 (13) Cable braiders 67-40 Yarn serving mch. 69-10 Large finisher 69 13 Small finisher		Unable to isolate production types				Unable to isolate production types		

[fols. 3464-3466]

QUESTION #16

MACHINERY OR EQUIPMENT	Prior to Acquisition (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.	Now (a) Solely Copper	(b) Solely Alum.	(c) No allocation. Can run both	% Util.
75-08 Robertson continuous lead extruder w/9" die block	X				X			
75-09 Robertson continuous lead extruder with 11" die block	X				X			
85-20 48" Edmunds twister		Alum.	(5) Drop W.	91%		Alum.	(5) Drop W.	88%
		Cpr.	(5) Drop W.	9%		Cpr.	(5) Drop W.	12%
87-01 36" Edmunds twister	X				X			
87-03 (2) Roflex saturating 87-04 and finishing mchs.	X				X			
87-10 (21) 16 carrier Wardwell braiders	X				X			
87-11 (6) 24 carrier Wardwell braiders	X				X			
87-12 (16) Paper wrap mchs.	X				X			
88-01 2½" Plastic extruder) 88-02 3½" Plastic extruder) 88-03 3½" Plastic Extruder) 88-04 4½" Plastic Extruder) 88-05 4½" Plastic extruder) 88-06 4½" Plastic extruder) 88-07 6" Plastic extruder) 88-08 (4) 1-1/2" Plastic extruders)		Alum.	(4) Line W.	11%		Alum.	(4) Line W.	7%
			(5) Drop W.	15%			(5) Drop W.	15%
			(6) Other	3%			(6) Other	3%
			TOTAL	29%			TOTAL	25%
		Copper	(4) Line W.	4.0%		Copper	(4) Line W.	5.0%
			(5) Drop W.	2.3%			(5) Drop W.	.8%
			(6) Other	64.7%			(6) Other	69.2%
			TOTAL	71.0%			TOTAL	75.0%
88-41 (8) Vertical striping machines	X				X			

[fol. 3467] Interrogatory 18

18. For each of the years 1956 through 1958 and for the first quarterly period in 1959, separately state for (a) Alcoa and (b) Rome the sales of ACSR, in pounds, linear feet and dollars, broken down into sales of each type of ACSR, designated by its code word and by its cir mils or AWG.

Answer to Interrogatory 18

The attached tabulation separately states for each of the years 1956 through 1958 and for the first quarterly period in 1959 (a) Alcoa's shipments and (b) Rome's sales of ACSR in pounds, linear feet, and dollars with a breakdown according to type of ACSR. The manner in which Alcoa's records are maintained makes it impracticable to report sales by size of ACSR. Shipment data closely approximate sales data and any discrepancy would be insignificant. Because shipment rather than sales records were used, the dollar values shown for individual sizes of ACSR are based on calculation rather than actual sales revenue records.

[fol. 3468]

ANSWER 18 (a)

Code Word	Circular Mils or AWG	1956 Pounds	1956 Feet	1956 Amount $	1957 Pounds	1957 Feet	1957 Amount $	1958 Pounds	1958 Feet	1958 Amount $	1st Quarter 1959 Pounds	1st Quarter 1959 Feet	1st Quarter 1959 Amount $
Turkey	6	16,176	660,245	8,926	7,676	313,306	4,293	42,930	1,752,245	21,444	381	15,551	191
Thrush	5	-	-	-	512	16,570	270	-	-	-	-	-	-
Swan	4	1,060,052	27,180,815	527,658	437,106	11,207,844	222,706	419,927	10,767,357	190,395	61,462	1,575,948	27,738
Sparrow	2	2,450,257	39,520,269	1,174,898	2,079,926	33,547,189	998,780	1,943,940	31,354,867	829,090	405,541	6,524,854	170,838
Shrike	33,185	-	-	-	4,788	152,484	6,062	-	-	-	996	31,730	1,074
Robin	1	8,548	110,588	4,057	677	8,657	317	112,580	1,439,642	46,743	-	-	-
Raven	1/0	4,195,819	42,553,912	1,963,741	3,288,888	33,353,808	1,506,219	3,450,847	34,998,421	1,412,122	805,729	8,171,789	328,504
Quail	2/0	952,075	7,666,732	442,697	1,039,588	8,363,537	472,597	1,054,435	8,482,982	428,417	259,021	2,083,931	104,811
5/3	2/0	-	-	-	-	-	-	-	-	-	1,194	14,400	864
Pigeon	3/0	1,950,208	12,427,549	900,606	1,356,047	8,648,258	611,306	1,531,470	9,767,026	516,876	148,658	948,074	59,597
Penguin	4/0	2,944,782	14,894,880	1,359,873	3,896,463	19,708,933	1,756,526	3,024,848	15,300,165	1,218,409	556,564	3,341,005	266,218
5/1	4/0	-	-	-	1,076	5,443	307	-	-	-	-	-	-
Swanate	4	2,722,105	69,797,549	1,502,602	1,715,146	43,978,093	950,019	1,885,125	48,336,528	927,293	488,497	12,523,561	240,479
Sparate	2	1,180,123	19,034,229	520,509	774,728	12,495,611	406,732	768,562	12,395,160	357,525	185,233	2,987,629	86,870
Grouse	90,000	162,467	2,153,341	106,140	60,678	807,962	39,847	77,379	1,030,345	46,010	30,145	401,398	17,109
Petrel	101,800	46,869	488,218	42,154	19,407	202,156	17,600	17,391	181,156	14,302	23,518	244,979	18,732
Minorca	110,800	1,487	14,220	1,213	4,035	38,612	3,591	17,122	163,847	13,807	2,410	23,062	1,879
Leghorn	134,600	17,681	139,220	14,944	34,064	268,220	28,924	73,151	575,992	56,180	11,215	88,291	8,092
Guinea	139,000	130,601	870,672	106,388	153,308	1,022,052	125,053	8,609	57,393	6,341	77,215	514,753	54,539
Dotterel	176,900	835	5,003	666	835	5,003	665	6,322	37,879	4,550	362	2,175	450
18/12	188,500	542	3,129	591	-	-	-	-	-	-	18,223	105,214	16,001
Dorking	190,800	9,402	52,233	7,438	-	-	-	26,776	148,753	19,065	135	750	92
Brahma	203,200	-	-	-	5,296	27,626	5,156	1,964	10,245	1,719	-	-	-
Cochin	211,300	24,159	121,219	18,827	39,739	199,393	30,826	3,251	16,312	2,272	2,529	12,689	1,687
8/7	219,900	45,016	217,049	27,568	27,437	132,290	16,168	25,116	121,094	13,424	14,193	68,433	7,352
Owl	266,800	142,557	569,317	72,619	88,149	352,033	45,519	11,288	45,072	5,062	-	-	-
Waxwing	266,800	13,428	53,566	5,754	28,033	111,953	12,138	135,016	539,201	58,169	-	-	-
Partridge	266,800	773,404	3,072,719	401,319	759,957	3,019,294	398,445	418,597	1,662,078	199,336	527,486	2,095,691	244,279
Ostrich	300,000	983	3,491	504	5	18	3	-	-	-	-	-	-
Merlin	336,400	1,811,848	5,737,325	760,976	2,197,266	6,958,091	933,881	1,803,507	5,710,913	696,695	484,642	1,534,648	188,322
Linnet	336,400	3,718,476	11,719,112	1,562,213	3,548,748	11,184,199	1,791,053	2,060,447	6,492,584	940,067	706,100	2,225,338	319,367
Oriole	336,400	573,099	1,801,628	309,302	158,082	496,956	85,902	190,647	599,329	93,798	8,441	26,536	4,006
Chickadee	397,500	89,221	278,446	12,033	132,747	356,367	35,170	85,076	228,392	22,116	-	-	-
Ibis	397,500	1,334,050	3,557,458	552,484	1,082,458	2,886,547	531,812	1,052,448	2,806,521	488,550	234,764	626,036	101,089
Lark	397,500	120,148	319,627	53,775	38,355	102,035	20,447	359,727	956,975	173,460	78,092	207,747	36,236
Pelican	477,000	491,580	1,102,228	138,172	759,974	1,697,121	306,802	738,695	1,649,602	270,658	231,224	516,283	82,177
Flicker	477,000	438,166	973,701	201,206	280,164	622,586	149,576	45,276	100,613	18,980	160,663	401,473	73,477
Hawk	477,000	1,956,392	4,347,533	941,011	3,586,128	7,969,165	1,734,252	2,270,908	5,046,437	994,885	47,788	106,195	20,214

[fol. 3469]

Code Word	Circular Mils or AWG	1956 Pounds	1956 Feet	1956 Amount $	1957 Pounds	1957 Feet	1957 Amount $	1958 Pounds	1958 Feet	1958 Amount $	1st Quarter 1959 Pounds	1st Quarter 1959 Feet	1st Quarter 1959 Amount $
Hen	477,000	11,058	24,519	5,756	144,383	320,139	75,238	14,816	32,851	6,978	4,785	10,610	2,166
Heron	500,000	186,718	394,752	96,981	-	-	-	90,352	191,019	42,393	289,150	611,309	130,378
Osprey	556,500	46,191	88,488	18,167	46,191	88,488	18,378	-	-	-	-	-	-
Parakeet	556,500	243,472	463,756	110,609	507,628	966,910	231,935	446,287	850,070	184,718	140,381	267,392	56,166
Dove	556,500	3,142,222	5,985,179	1,491,927	1,959,047	3,731,514	933,290	1,452,674	2,766,995	626,248	39,612	75,451	16,471
Eagle	556,500	2,067	3,930	1,064	12,996	24,707	6,685	-	-	-	-	-	-
Peacock	605,000	-	-	-	87	152	39	-	-	-	-	-	-
Grosbeak	636,000	2,218,839	3,698,050	1,041,967	2,167,823	3,613,024	1,019,527	543,971	906,615	231,460	72,817	121,361	29,848
Hook	636,000	331,531	552,549	148,625	300,018	500,028	134,978	1,106,031	1,843,378	450,486	371,350	618,914	146,015
Kingbird	636,000	110,114	184,445	42,636	189,502	317,423	73,792	20,864	34,948	7,361	-	-	-
18/3	653,000	175,294	285,494	66,156	262,740	427,914	99,605	-	-	-	115,322	187,820	38,172
Flamingo	666,600	287,291	456,741	128,103	749,043	1,190,844	334,972	553,909	880,616	224,278	340,745	541,723	133,061
Starling	715,500	120,630	178,711	56,045	486,429	720,635	226,676	-	-	-	-	-	-
Drake	795,000	3,003,059	4,004,069	1,379,005	3,511,804	4,682,394	1,616,483	3,341,723	4,455,620	1,390,157	933,669	1,244,889	373,374
24/7	795,000	-	-	-	-	-	-	-	-	-	119,588	159,450	45,826
Coot	795,000	23,177	30,903	8,854	1,360,842	1,814,451	525,013	1,855,082	2,473,436	650,021	-	-	-
26/7	850,500	5,146	6,416	2,343	-	-	-	-	-	-	-	-	-
36/1	954,000	265,452	294,946	103,234	-	-	-	35,644	39,604	12,436	-	-	-
36/1	1,033,500	-	-	-	-	-	-	388,379	398,337	121,912	-	-	-
22/37	236,850	-	-	-	-	-	-	1,205	5,379	1,420	-	-	-
50/7	468,200	7,873	14,634	3,644	-	-	-	-	-	-	-	-	-
42/19	556,500	-	-	-	-	-	-	13,118	24,987	7,929	-	-	-
45/7	628,700	264,667	446,319	111,875	-	-	-	-	-	-	-	-	-
436/19	631,000	6,624	11,095	3,950	-	-	-	-	-	-	-	-	-
Egret	636,000	6,844	11,388	3,584	-	-	-	-	-	-	-	-	-
Crow	715,500	373	553	170	-	-	-	7,722	12,849	3,627	-	-	-
Tern	795,000	49,371	65,828	20,366	-	-	-	-	-	-	-	-	-
Condor	795,000	103,937	138,582	46,865	390,389	520,517	149,441	1,687,927	2,250,564	630,947	1,338,470	1,784,622	497,108
Mallard	795,000	231,898	308,370	118,082	30,264	40,352	12,581	632,104	842,803	256,065	8,699	11,599	3,487
46/61	807,000	-	-	-	1,924	2,558	902	55,928	74,372	25,486	-	-	-
Canary	900,000	414,538	488,264	184,428	-	-	-	28,573	37,379	26,330	-	-	-
Rail	954,000	163,599	181,776	66,470	251,762	296,538	103,399	86	101	34	-	-	-
48/7	954,000	-	-	-	716,653	796,280	269,247	994,884	1,105,426	364,625	673,476	748,306	244,943
Cardinal	954,000	780,154	866,837	345,296	39,020	43,356	15,807	-	-	-	-	-	-
48/7	1,027,400	370,384	382,233	161,080	703,981	782,200	287,435	1,082,169	1,202,409	430,270	-	-	-
Ortlan	1,033,500	82,575	84,692	33,286	149,752	154,543	60,305	-	-	-	5,284	5,453	2,066
Curlew	1,033,500	854,073	875,971	375,792	372,168	381,710	139,042	470,445	482,507	171,430	51,274	52,589	18,525
Bluejay	1,113,000	-	-	-	1,925,991	1,975,373	781,567	1,292,520	1,325,660	510,545	480,342	492,658	187,333
Finch	1,113,000	-	-	-	695,233	658,983	258,210	471,117	446,553	170,639	-	-	-
26/34 X 3/19	2,753,000	-	-	-	23,856	22,612	9,941	706	669	287	-	-	-
63/19	1,158,400	-	-	-	-	-	-	293	106	134	5	2	2
Bunting	1,192,500	142,979	126,529	57,034	859,107	760,267	317,182	62,598	57,167	27,193	-	-	-
Grackle	1,192,500	-	-	-	888,415	786,203	368,070	-	-	-	586,611	519,121	209,127
Bittern	1,272,000	776,440	643,809	308,091	609,215	505,149	223,521	315,965	279,613	127,555	374,849	331,723	149,752
Pheasant	1,272,000	37,776	31,382	16,886	12,637	10,478	5,203	871,913	722,973	311,796	18,931	15,697	6,703
Dipper	1,351,500	102,657	80,123	40,501	65	51	24	832	690	334	-	-	-
Bobolink	1,431,000	-	-	-	-	-	-	-	-	-	-	-	-
Plover	1,431,000	-	-	-	14,053	10,356	5,734	253,283	186,647	89,713	737,410	543,405	258,388
48/7	1,468,000	235,682	170,197	99,788	-	-	-	678	500	269	-	-	-
Lapwing	1,590,000	3	2	1	-	-	-	-	-	-	-	-	-
Falcon	1,590,000	252,981	167,871	110,957	25,473	16,903	10,299	905,768	601,040	318,649	-	-	-
Chukar	1,780,000	549,182	385,533	225,549	4,231	2,508	1,609	517,003	343,068	203,441	79,880	53,006	31,041
8-/19	2,156,000	-	-	-	38,774	18,969	14,501	-	-	-	-	-	-
Kiwi 72/7	2,167,000	-	-	-	-	-	-	50,267	24,592	18,317	-	-	-
								-	-	-	2,075	1,010	841

Code Word	Circular Mils or AWG	1956 Pounds	1956 Feet	1956 Amount $	1957 Pounds	1957 Feet	1957 Amount $	1958 Pounds	1958 Feet	1958 Amount $	1st Quarter 1959 Pounds	1st Quarter 1959 Feet	1st Quarter 1959 Amount $
72/7	2,874,000	-	-	-	9,814	3,611	3,978	930	342	367	-	-	-
Expanded	932,000	25,979	29,488	14,561	-	-	-	-	-	-	-	-	-
Expanded	1,275,000	-	-	-	27,047	22,298	15,257	-	-	-	-	-	-
Expanded	1,414,000	395,327	294,799	207,151	2,984,605	2,225,650	1,684,213	4,356,895	3,248,980	2,697,789	60,561	45,161	38,050

Note: All weights are aluminum only.

ANSWER 18 (b)

Code Word	Circular Mils or AWG	1956 Pounds	1956 Feet	1956 Amount	1957 Pounds	1957 Feet	1957 Amount	1958 Pounds	1958 Feet	1958 Amount	1st Quarter 1959 Pounds	1st Quarter 1959 Feet	1st Quarter 1959 Amount
				$			$			$			$
Turkey	6	2,192	89,443	1,315	728	29,694	425	582	23,739	313	-	-	-
Swan	4	25,232	646,584	13,329	24,010	615,281	12,518	34,975	896,274	17,868	8,827	226,200	4,002
Sparrow	2	120,975	1,959,837	57,464	76,101	1,232,858	36,865	55,486	898,898	26,190	4,932	79,893	2,121
Robin	1	-	-	-	-	-	-	71	905	33	348	4,454	179
Raven	1/0	39,090	397,240	18,797	99,041	1,006,455	45,930	71,991	731,573	33,579	42,861	435,549	17,446
Quail	2/0	23,496	190,322	11,624	12,484	101,123	5,856	19,413	157,245	8,854	5,650	45,766	2,276
Pigeon	3/0	8,535	54,051	3,944	23,534	149,038	11,068	1,814	11,485	930	-	-	-
Penguin	4/0	15,151	75,864	6,934	23,409	117,218	10,921	10,626	53,207	4,787	5,069	25,384	2,010
Swanate	4	34,985	897,204	19,335	55,933	1,434,423	31,953	204,582	5,246,588	109,992	22,187	568,987	10,656
Sparate	2	-	-	-	18,009	291,362	9,428	9,935	160,740	4,853	1,808	29,253	880
Merlin	336,400	129,221	403,583	53,686	36,540	114,121	16,570	7,815	24,408	318	8,894	27,778	6,217
Chickadee	397,500	-	-	-	397	1,056	189	-	-	-	-	-	-

Note: All weights are aluminum only.

[fol. 3562]

INTERROGATORY 47

Identify each acquisition or merger, since January 1, 1951, of any company then or now manufacturing:

(A) any copper wire and cable product

(B) any steel conduit product

(C) any aluminum wire and cable product

(D) any aluminum conduit product

(E) any accessory product related to any product included in any of the categories (A) through (D) above by or with any company producing any such product or any material utilized in the production of any such product.

INTERROGATORY 48

With respect to each acquisition or merger identified in answer to 47, identify:

(A) the date of acquisition and the companies involved; and

(B) the products manufactured, distributed or sold by each company involved.

ANSWERS TO INTERROGATORIES 47 and 48

Acquiring Company	Products of Acquiring Company	Acquired Company	Products of Acquired Company	Date
American Enka Corp. Enka, N.C.	Rayon and nylon yarns and fibers used in covering wire and cable products	Rex Corporation West Acton, Mass.	Plastic communication and control cable	March 1958
		Wm. Brand & Co. Willemantic, Conn.	Plastic insulated control cable; fixture and appliance wire	January 1959
Anaconda Wire & Cable Co. New York, New York	Copper rod; bare and insulated or covered wire and cable	Sequoia Wire & Cable Co. Redwood City, Calif.	Special plastic wires for aircraft, missile, and electronic controls	April 1959

[fol. 3563]

Acquiring Company	Products of Acquiring Company	Acquired Company	Products of Acquired Company	Date
Beryllium Corp. Reading, Pa.	Beryllium alloys; copper rod and wire	Nonotuck Manufacturing Co. Holyoke, Mass.	Bare and stranded wire	December 1955
Cerro Corporation (Formerly Cerro de Pasco Corp.) New York, N.Y.	Copper	Circle Wire & Cable Corp. Maspeth, N.Y.	Copper rod, bare wire, building wire, cord, rubber and plastic power cable, varnished cambric, armored cable, thin wall conduit	December 1955
		Rockbestos Products Corp.	Special purpose plastic, asbestos and varnished cambric wire and cable	June 1955
Continental Copper & Steel Industries, Inc. Perth Amboy, N.J.	Insulated wire and cord sets	Spencer Wire Corp. Union, N.J.	Wire and cable	October 1955
Copperweld Steel Co. Pittsburgh, Pa.	Copper covered steel wire and rods; solid and stranded wire	Flexo Wire Co. Oswego, N.Y.	Fine bare and stranded wires	1951
Crescent Co. Pawtucket, R.I. (a division of Penn-Texas Corp. at the time of acquisitions)	Insulated wire and cable	Lowell Insulated Wire Corp. Lowell, Mass.	Flexible cords, fixture and appliance wire	October 1956
		Carol Cable Co. Pawtucket, R.I.	Flexible cords, fixture and appliance wire	October 1956

[fol. 3564]

Acquiring Company	Products of Acquiring Company	Acquired Company	Products of Acquired Company	Date
Essex Wire Corp. Fort Wayne, Ind.	Bare, insulated and covered wire and cable	Carolina Industrial Plastics Corp. Mt. Airy, N.C.	Plastic and insulated cord sets	1952
		J. M. White Co. Philadelphia, Pa.	Wire and cable assemblies	April 1955
Carlisle Corp. Carlisle, Pa.	Unknown	Tensolite Insulated Wire Co. Tarrytown, N.Y.	Special purpose insulated wires	1959
		International Wire Products Corp. Midland Park, N.J.	Unknown	1959
General Cable Corp. New York, N.Y.	Bare, insulated and covered wire and cable	General Insulated Wire Works Providence, R. I.	Cord sets and assemblies	June 1955
		New England Cable Co. Concord, N.H.	Cords	June 1956
		Clifton Conduit Co. Baltimore, Md. Memphis, Tenn.	EMT and rigid conduit, building wire	March 1956
		Alphaduct Wire & Cable New Brunswick, N.J.	Telephone cords	May 1956
		Cornish Wire Co. North Adams, Mass. Williamstown, Mass.	Cords and assemblies	June 1959

[fol. 3565]

Acquiring Company	Products of Acquiring Company	Acquired Company	Products of Acquired Company	Date
General Cable (cont'd)		Indiana Steel & Wire Co. Muncie, Ind.	Steel wire	May 1959
		Hathaway Patterson Corp. Palatka, Florida	Wood poles and crossarms	1958
International Tel & Tel New York, N.Y.	Coaxial cable and other communications products	Royale Electrical Co., Inc. Pawtucket, R.I.	Flexible cords and telephone cords	October 1956
Kaiser Aluminum & Chemical Corp. Oakland, Calif.	Aluminum ingot, rod and bar; bare, insulated and covered wire and cable; conduit	Wire Mill Division of U.S. Rubber Co. Bristol, R.I.	Weatherproof wire, cords, building wire, service entrance, power cables, signal and control, latex insulated wire, service drop	February 1957
Kennecott Copper Corp. New York, N.Y.	Copper wire bar; rod; bare, insulated and covered wire and cable	Okonite Co., Passaic, N.J.	Paper and varnished cambric cables, rubber and plastic power cables, control cable, communication cables, instrumentation cables	December 1958
Leviton Mfg. Co. Brooklyn, N.Y.	Bare wire, building wire, weatherproof, cords, rubber and plastic power cables, control cables, telephone communication wire	Rhode Island Insulated Wire Co. Providence, R.I.	Plastic building wire and cords	1955

[fol. 3566]

Acquiring Company	Products of Acquiring Company	Acquired Company	Products of Acquired Company	Date
Miami Copper Co. New York, New York	Copper wire bar	Chester Cable Corp. Chester, N.Y.	Plastic building wire, instrument wire, varnished cambric	September 1956
Narragansett Wire Co., Inc. Pawtucket, R.I.	Insulated or covered wire and cable	Texas Wire & Cables Plano, Texas	Bare wire and insulated building wire	July 1954
		Jordan Rogers Co. Orange, Calif.	Plastic hose, pipe and plastic insulated wires	July 1957
		Chadmore Manufacturing Co. Taunton, Mass.	Plastic insulated wires	Unknown
Olin Mathieson Chemical Corp. New York, N.Y.	Chemicals; owns 1/2 interest in Ormet, a primary aluminum producer	Southern Electrical Corp.	Aluminum rod, bare wire, ACSR, weatherproof, service drop, and other insulated or covered wire and cable products	May 1957
Phelps Dodge Corp. New York, N.Y.	Copper and copper products including rod, bare and insulated wire and cable	Edlin, Inc. Bethesda, Md.	Connector adapters and accessories for aluminum sheathed cables	1960
Simplex Wire & Cable Co. Cambridge, Mass	Insulated wire and cable	Hi Temp Wires, Inc. Westbury, N.Y. Monrovia, Calif.	Special plastic insulated wires	Sept. 1960

[fols. 3567-3568]

Acquiring Company	Products of Acquiring Company	Acquired Company	Products of Acquired Company	Date
Warren Wire Corp. Pownal, Vermont	Enameled wire, magnet wire, fine wire, and wire making equipment	Wire Company of America Alhambra, Calif.	Missile and instrument assemblies	December 1959
Aluminum Company of America Pittsburgh, Pa.	Aluminum ingot, rod and bar; ACSR, bare wire, weatherproof, service drop cable; conduit; cable accessories	Rome Cable Corporation Rome, New York Collegeville, Pa., and Torrance, California	weatherproof, service drop, ACSR, bare wire, building wire, service entrance, power cables, magnet wire, and other wire and cable; cable installation devices; conduit.	April 1959
		Rea Magnet Wire Co. Fort Wayne, Ind.	Magnet wire	January 1960
Rome Cable Corporation Rome, New York	As listed	T. J. Cope, Inc. Collegeville, Pa.	Cable installation devices	April 1957

[fol. 3569] Interrogatory 50

50. Identify each type of information relating to any wire, cable, conduit, or accessory product which Alcoa, or any of its subsidiaries, reports to any agency, association, or organization, or has reported at any time since January 1, 1954. For each such type of information identify:

(A) the reporting forms
(B) the products and subjects included
(C) the agency, association or organization to whom the reports are made.

Answer to Interrogatory 50

Following is a tabulation of the types of information relating to any wire, cable, conduit, or accessory product which Alcoa or any of its subsidiaries reports or has reported since January 1, 1954, to any agency, association, or organization.

(A) Type of Information	(B) Reporting Form	(C) Products and Subjects Included	(D) To Whom Submitted
Quantity of shipments and unfilled orders	BDSAF-84	Copper wire mill products	U.S. Department of Commerce
Quantity of shipments	BDSAF-122	(1) Wire, bare, conductor and nonconductor ACSR and aluminum cable, bare Wire and cable, insulated or covered	U.S. Department of Commerce
Production Maximum production Production run out Inventory	BDSAF-481	Solid conductor and 7 strand, bare Service drop Power cable	U.S. Department of Commerce
[fol. 3570]			
Stocks on hand	BDSAF-530	All conductor Conductor, bare Weatherproof Service drop and entrance Power cable Building wire Non-metallic sheath cable	U.S. Department of Commerce

(1) During a portion of the period involved bare conductor wire was reported separately from bare nonconductor wire.

Type of Information	Reporting Form	Products and Subjects Included	To Whom Submitted
Quantity of shipments	1-Assn.	Aluminum wire other than conductor ACSR and aluminum cable, bare Aluminum wire conductor, bare Aluminum wire and cable conductor, insulated or covered	The Aluminum Association
Quantity of shipments by end use	2-Assn.	Wrought mill products	The Aluminum Association
Quantity of shipments by end use	3-Assn. & 4-Assn.	Wire, other than conductor ACSR and aluminum cable, bare Bare wire conductor Conductor wire and cable, insulated or covered	The Aluminum Association
Value and, for some items, quantity of shipments Various data relating to number of employees, payroll, material and fuel or electricity consumed, inventories, capital expenditures, etc.	MC 33 F MC 33 H MC 33 M & MC 36 A	Copper, unalloyed—rod Aluminum rod Bare wire, conductor Bare wire, non-conductor Copper wire and cable Aluminum and aluminum base alloy wire Wire rope, cable and strand (except insulated) Cable-steel reinforced (ACSR and other aluminum cable, bare) Thermoplastic, covered Polychloroprene (neoprene), covered Service cable including self-supporting type Building wire and cable Power wire and cable Marine wire and cable (U.S. Navy and Merchant Marine) Appliance wire and cord Weatherproof and slow burning wire Magnet wire Control wire and cable Signal wire and cable Communication wire and cable Extruded and drawn tube (includes conduit) Electrical conduit and conduit fittings (including underground & underfloor) Steel pipe and tube Cable installation equipment Pole line hardware Unclassified	U.S. Department of Commerce

[fol. 3571]

Type of Information	Reporting Form	Products and Subjects Included	To Whom Submitted
Value of shipments Various data relating to number of employees, payroll, material and fuel or electricity consumed, inventories, capital expenditures, etc.	MA–100	Rolled copper rods Aluminum rods Bare wire—conductor Bare and tinned copper wire and cable Aluminum wire and cable (including ACSR) Cable—steel reinforced (ACSR & other aluminum cable, bare) Weatherproof slow burning and building wire Magnet wire Communication wire and cable Appliance wire and flexible cord Power wire and cable Other insulated wire and cable Conduit—EMT and rigid Extruded and drawn tube (includes conduit) Mechanical steel tubing Raceways—electrical Cable installation equipment	U.S. Department of Commerce
[fol. 3572]			
Domestic and export shipments (footage) and total unfilled orders (tonnage)	S–530	Rigid steel conduit	National Electrical Manufacturers Assoc.
Total (domestic and export) unit sales billed	S–534	Rigid steel conduit, elbows, and couplings	National Electrical Manufacturers Assoc.
Total (domestic and export) unit sales billed and unfilled orders (footage)	S–538	Rigid steel conduit Steel electrical metallic tubing	National Electrical Manufacturers Assoc.
Value of net sales Value of inventories	S–618	Wire and cable	National Electrical Manufacturers Assoc.
Value of net sales	S–620	Wire and cable Magnet wire	National Electrical Manufacturers Assoc.
Domestic net sales billed	S–624	Building wire and cable	National Electrical Manufacturers Assoc.
Domestic net sales billed	S–626	Flexible (portable) cord Flexible and appliance wire	National Electrical Manufacturers Assoc.
Value and quantity of sales	S–632	Magnet wire	National Electrical Manufacturers Assoc.

Type of Information	Reporting Form	Products and Subjects Included	To Whom Submitted
Domestic net sales billed	S-636	Portable molded rubber sheathed cord and cable	National Electrical Manufacturers Assoc.
Domestic net sales billed	S-638	Rubber and thermoplastic power and control cable	National Electrical Manufacturers Assoc.
Value of net sales	FS	Steel rigid conduit Steel EMT Aluminum rigid conduit Aluminum EMT Magnet wire Building wire and cable Rubber thermoplastic and varnished cloth cable Portable molded rubber sheathed cord and cable Flexible and appliance wire	National Electrical Manufacturers Assoc.
[fols. 3573-3727]			
Sales value	BC 61 F	All products fabricated from aluminum, 1954	U.S. Department of Commerce
Sales value	CB 51 C 1	All products fabricated from aluminum, 1958	U.S. Department of Commerce
Consumption of materials	6-1115-MS	Primary brass and copper melts	U.S. Department of Interior, Bureau of Mines
Analysis of copper consumption	N-1(1255)	Copper	U.S. Copper Assoc.
Output Maximum production capabilities Plant description including production equipment	DD-404	Rod Bare wire Weatherproof Magnet wire Building wire Thermoplastic, insulated Spiral 4	U.S. Department of Defense
Tentative schedule of production and request for allocation	DD-406	WD-1 (field wire) Spiral 4	U.S. Department of Army
Renewal agreement Tentative schedule of production and request for allocation	DD-406(a)	WD-1 (field wire) Spiral 4	Bureau of Ordnance Army Signal Corps Agencies

[fol. 3728] Interrogatory 61

61 (A) For each major type of each aluminum wire or cable product offered for sale at any time since January 1, 1958 by Alcoa, Rome, or Rea Magnet Wire Company

(i) identify four representative sizes which are four of the most widely sold by wire and cable manufacturers;

(ii) with respect to each type and size of each aluminum product identified in answer to subdivision (i) give the copper product and its type and size which normally would be used if the said type and size of aluminum product were not used;

(iii) for each type and size of aluminum product identified in answer to subdivision (i), and for the corresponding copper type and size identified in answer to subdivision (ii), give the list price [5] (identifying sources) as of:

(a) January 1 of each year from 1950 through 1959,
(b) July 1, 1959,
(c) October 1, 1959,
(d) January 1, 1960,
(e) April 1, 1960,
(f) July 1, 1960,
(g) October 1, 1960,
(h) January 1, 1961.

(B) Describe the method by which the copper size corresponding to any specified aluminum size is determined, and state and describe exceptions to or limitations on the general applicability of such method.

Answer to Interrogatory 61

61. (A) The following charts show the prices prevailing on the specified dates for representative sizes of conductor wire and cable products made with copper and with aluminum as the conductor metal.

[fol. 3729]

1227

BARE CABLE, COPPER and BARE ACSR

List prices per thousand feet.

Date	Copper #6 Sol. HD, CLS	Aluminum 4 ACSR 7/1	Copper #2 - 7 str. HD, RLS	Aluminum 1/0 ACSR 6/1	Copper #4/0 - 7 str. HD, RLS	Aluminum ACSR 336.4 MCM 26/7	Copper 500 MCM 37 Str. HD, RLS	Aluminum ACSR 795 MCM 26/7
1/1/50	19.09	15.22	51.80	32.19	161.09	115.56	386.30	248.89
1/1/51	25.73	17.11	69.43	36.34	216.60	129.55	518.32	280.61
1/1/52	25.73	17.11	69.43	36.34	216.60	129.55	518.32	280.61
1/1/53	29.13	17.97	78.14	38.16	244.35	136.03	583.94	294.61
1/1/54	31.18	19.22	83.39	40.51	261.06	143.07	623.46	307.41
1/1/55	29.98	19.73	80.31	41.38	251.27	146.77	600.30	313.98
1/1/56	42.30	21.47	111.88	45.45	351.83	159.74	838.08	344.61
1/1/57	37.18	24.09	98.76	51.26	310.04	178.72	739.26	387.28
1/1/58	33.98	23.02	90.56	48.83	283.92	156.45	677.50	405.33
1/1/59	31.66	22.15	84.41	46.94	264.33	165.52	631.18	355.44
7/1/59	33.98	20.03	90.56	42.38	283.92	150.75	677.50	321.09
10/1/59	34.38	20.03	91.59	42.38	287.18	150.75	685.22	321.09
1/1/60	35.58	21.48	96.71	45.81	303.51	160.34	723.82	343.73
4/1/60	35.58	21.48	96.71	45.81	303.51	160.34	723.82	343.73
7/1/60	35.58	21.48	96.71	45.81	303.51	160.34	723.82	343.73
10/1/60	35.58	21.87	96.71	46.80	303.51	163.53	723.82	351.28
1/1/61	33.18	21.87	88.51	46.80	277.39	163.53	626.06	336.30

WEATHERPROOF LINE WIRE

List prices per thousand feet

Date	Copper #2 - 7 str. HD. 3/64 Rolene	Aluminum 1/0 ACSR 6/1 Polyeth.	Copper 4/0 - 7 str. HD. 4/64 Rolene	Aluminum 336.4 19 str. Polyeth.	Copper #4 - 7 str. HD. 3/64 Roprene	Aluminum #2 ACSR 6/1 Neoprene	Copper #2 - 7 str. HD. 3/64 Roprene	Aluminum 1/0 - 7 str. Neoprene
1/1/50	73.03		209.20		46.83		73.03	
1/1/51	94.36		261.20		60.77		94.36	
1/1/52	94.36		261.20	"	60.77		94.36	
1/1/53	103.14	93.04	287.20		66.30	56.60	103.14	76.24
1/1/54	110.37	86.60	308.64	216.80	70.85	52.70	110.37	71.05
1/1/55	107.00	84.90	298.64	213.00	68.73	51.60	107.00	69.60
1/1/56	139.40	90.00	394.64	231.00	89.13	55.00	139.40	74.00
1/1/57	126.57	99.00	368.64	257.00	81.05	60.00	126.57	83.00
1/1/58	118.47	88.00	344.64	228.00	75.95	55.00	118.47	73.00
1/1/59	112.42	79.00	326.72	205.00	72.14	49.50	112.42	66.00
7/1/59	118.85	71.00	345.76	185.00	76.19	44.50	118.85	59.00
10/1/59	118.85	71.00	345.76	185.00	76.19	44.50	118.85	59.00
1/1/60	118.85	76.50	345.76	200.50	76.19	48.00	118.85	64.00
4/1/60	118.85	71.00	345.76	185.00	76.19	44.50	118.85	59.00
7/1/60	118.85	71.00	345.76	185.00	76.19	44.50	118.85	59.00
10/1/60	121.90	73.50	354.80	191.50	78.11	46.00	121.90	61.00
1/1/61	115.83	73.50	336.80	191.50	74.29	46.00	115.83	61.00

MULTIPLEX SERVICE CABLES 1229

List prices per thousand feet

Date	Copper Polyeth. 2 x #4 7 str. 1/c 4 - 7	Aluminum Polyeth. #2 - AA	Copper Polyeth. 2 x #6 7 str. 1/c 6 - 7	Aluminum #4 ACSR Polyeth.	Copper Polyeth. 2/c #4 7 str. 1/c 6 - 7	Aluminum #2 ACSR Polyeth. reduced neutral	Copper Neopr. 2/c #6 7 str. 1/c 6 - 7	Aluminum #4 ACSR Neopr.
1/1/50							121	
1/1/51							150	
1/1/52							150	
1/1/53		200		131		178	175	142.02
1/1/54		157.30		112		152.15	199	121.40
1/1/55		149		106		145	178	115
1/1/56	(1)	146		112		142	200	121
1/1/57	243	164	176	125	225	159	184	135
1/1/58	217	145	159	111	202	141	167	120
1/1/59	216	131	159	100	201	127	167	108
7/1/59	228	118	166	90	211	114	174	97
10/1/59	228	113.75	166	86.75	211	110	174	93.50
1/1/60	234	123.25	170	93.25	217	118.75	178	100.50
4/1/60	234	113.75	170	86.75	217	110	178	93.50
7/1/60	234	113.75	170	86.75	217	110	178	93.50
10/1/60	234	117.50	170	90	217	114	178	97
1/1/61	222	117.50	163	90	206	114	171	97

(1) First price sheet issued Feb. 23, 1956.

[fol. 3732]

TW BUILDING WIRE

List prices per thousand feet

Date	Copper Size 6	Aluminum Size 4	Copper Size 1	Aluminum Size 2/0	Copper Size 2/0	Aluminum Size 4/0	Copper Size 4/0	Aluminum Size 350 C. M.
1/1/50	46.60		126		184		263	
1/1/51	72.60		201		285		425	
1/1/52	76.70		212		301		450	
1/1/53	76.70		212		301		450	
1/1/54	75.30		212		314		474	
1/1/55	70.80		195		288		431	
1/1/56	94.00		263		391		585	
1/1/57	102		284		421		630	
1/1/58	78.50		218		323		485	
1/1/59	79.40	49.20 (1)	216	136	310	202	461	352
7/1/59	76.20	49.20 (1)	213	136	310	202	461	352
10/1/59	81.60	49.20 (2)	228	136	332	202	494	352
1/1/60	85.70	54.10	239	150	349	222	518	387
4/1/60	85.70	54.10	239	150	349	222	518	387
7/1/60	65.30	54.10	182	150	265	222	394	387
10/1/60	65.30	54.10	182	150	265	222	394	387
1/1/61	65.30	54.10	182	150	265	222	394	387

(1) Kaiser sheet Sect. 10-103, page 3, dated June 30, 1958.

(2) Kaiser sheet Sect. 3, page 6, dated August 25, 1959.

[fol. 3733]

1231

RHW BRAIDED BUILDING WIRE

List prices per thousand feet

Date	Copper Size 6	Aluminum Size 4	Copper Size 1	Aluminum Size 2/0	Copper Size 2/0	Aluminum Size 4/0	Copper Size 4/0	Aluminum Size 350 C.M.
Jan. 1950	(1) 51.20		(1) 129		(1) 193		(1) 284	
Jan. 1951	(1) 79.70		(1) 200		(1) 299		(1) 463	
Jan. 1952	(1) 84.20		(1) 212		(1) 316		(1) 490	
Jan. 1953	(1) 84.20		(1) 212		(1) 316		(1) 490	
Jan. 1954	83.30		228		335		526	
Jan. 1955	78.80		213		313		487	
Jan. 1956	104		285		422		657	
Jan. 1957	112		308		455		709	
Jan. 1958	85.50		236		348		544	
Jan. 1959	86.20	(2) 53.50	233	148	332	216	515	405
7/1/59	83.70	(2) 53.50	230	148	330	216	516	405
10/1/59	89.10	(3) 53.50	245	148	351	216	549	405
1/1/60	93.40	58.90	257	163	368	238	576	446
4/1/60	93.40	63.40	257	163	368	238	576	446
7/1/60	71.70	63.40	197	163	282	238	442	446
10/1/60	71.70	63.40	197	163	282	238	442	446
1/1/61	71.70	63.40	197	163	282	238	442	446

(1) Indicates RH price.

(2) Kaiser price sheet Sect. 10-103, dated June 30, 1958.

(3) Kaiser sheet Sect. 3, page 5 dated August 25, 1959.

[fol. 3734]

TYPE SE STYLE U SERVICE ENTRANCE CABLES

List prices per thousand feet

Date	Copper 3c #6	Alum.(1) 3c #4	Copper 3c #3	Alum.(1) 3c #2	Copper 3c #1/0	Alum.(1) 3c #2/0	Copper 3c #3/0	Alum.(1) 3c #4/0
1/1/60	317	235	533	303	1240	520		704
4/1/60	317	235	533	303	1240	520		704
7/1/60	241	235	407	303	947	520		704
10/1/60	241	235	407	303	947	520		704
1/1/61	241	235	407	303	947	520	1432(2)	704

(1) Not offered in aluminum prior to December 1, 1959.

(2) Anaconda Wire & Cable price sheet, January 16, 1961.

Note: The National Electric Code governs generally the selection and installation of SE conductors. Type SE-U service entrance cable is one of the commonly used types of cables used for this purpose. We have selected four representative sizes of conductor in both aluminum and copper to provide the most commonly used ratings for services as they are shown below. Since SE cables are usually used only in short lengths, the selection of comparable copper products is in this case based upon ampacity rather than resistivity.

Rating	Copper	Aluminum
60 ampere	3c #6	3c #4
100 ampere	3c #3	3c #2
150 ampere	3c #1/0	3c #2/0
200 ampere	3c #3/0	3c #4/0

[fol. 3735]

600 VOLT RUBBER POWER CABLE (RRD)

List prices per thousand feet

Date	Copper Size 6	Aluminum Size 4	Copper Size 1	Aluminum Size 2/0	Copper Size 2/0	Aluminum Size 4/0	Copper Size 4/0	Aluminum Size 350 C.M.
1/1/50	(1)							
1/1/51	100		246		328		482	
1/1/52	106		260		346		509	
1/1/53	106		260		346		509	
1/1/54	118		293		392		589	
1/1/55	118		293		392		589	
1/1/56	141		365		497		753	
1/1/57	156		390		526		797	
1/1/58	117		292		394		596	
1/1/59	124	77.30 (2)	301	192	386	253	575	470
7/1/59	121	77.30 (2)	292	192	382	253	573	470
10/1/59	129	77.30 (3)	312	192	409	253	613	470
1/1/60	135	85.00	327	211	430	278	644	470
4/1/60	135	85.00	327	211	430	278	644	470
7/1/60	104	85.00	251	211	328	278	491	470
10/1/60	104	85.00	251	211	328	278	491	470
1/1/61	104	85.00	251	211	328	278	491	470

(1) Prior sheet dated 4/1/49 but only covered sizes 14 through 8.

(2) Kaiser sheet Sect. 10-103, dated June 30, 1958.

(3) Kaiser sheet Sect. 4, page 5, dated August 25, 1959.

[fol. 3736]

5 KV SHIELDED RUBBER POWER CABLE (Class B Strand)

1234

List prices per thousand feet

Date	Copper Size 6	Aluminum Size 4	Copper Size 1	Aluminum Size 2/0	Copper Size 2/0	Aluminum Size 4/0	Copper Size 4/0	Aluminum Size 350 C.M.
1/1/50								
1/1/51		NO ROME CABLE PRICE SHEET						
1/1/52								
1/1/53								
1/1/54	396		665		851		1080	
1/1/55	396		665		851		1080	
1/1/56	437		772		976		1258	
1/1/57	445		774		973		1247	
1/1/58	455		779		973		1231	
1/1/59	477	369 (1)	811	629	1017	786	1284	1136
7/1/59	479	369 (1)	818	629	1029	786	1302	1136
10/1/59	499	369 (1)	849	629	1069	786	1348	1136
1/1/60	500	369 (1)	853	629	1076	786	1359	1136
4/1/60	500	369 (1)	853	629	1076	786	1359	1136
7/1/60	417	369 (1)	656	629	802	786	1063	1136
10/1/60	417	354	656	542	802	642	1063	979
1/1/61	414	354	647	542	788	642	1041	979

(1) Kaiser price sheet.

[fol. 3737] Magnet Wire

Prior to August 16, 1960, Rome did not have a list price for magnet wire made with aluminum conductor. Prices announced on that date and still in effect for representative types and sizes of aluminum magnet wire sold by Rome are as follows:

Type	Size	Price Per Pound
(1) Rectangular, double paper, single cotton wrapped	.324" x .5"	90.35¢
	.020" x .5"	167.2¢
(2) Rectangular, heavy Formvar	.204" x .675"	98.2¢
	.032" x .675"	162.75¢
(3) Rectangular, double glass or double-glass dacron	.249" x .688"	139.95¢
	.030" x .688"	219.8 ¢
(4) Rectangular, double glass or double-glass dacron with silicone treated varnish	.249" x .688"	144.90¢
	.030" x .688"	232.85¢

Prior to September 11, 1958, Alcoa did not have a list price for magnet wire made with aluminum conductor. Prices in effect as of January 1, 1959, and each other designated date, for representative types and sizes of round aluminum magnet wire sold by Alcoa are as follows:

Film Insulated-Heavy Thickness
(Prices are per 100 pounds)

Dates	#12	#16	#20	#24
1/1/59	92.67	110.09	122.53	143.86
10/1/59	91.50	100.90	116.40	142.40
1/1/60	93.50	102.90	118.40	144.40
4/1/60	"	"	"	"
7/1/60	"	"	"	"
10/1/60	"	"	"	"
1/1/61	"	"	"	"

[fol. 3738]

1/1/59	86.15	99.58	109.83	128.80
10/1/59	85.30	93.40	104.60	124.50
1/1/60	87.30	95.40	106.60	126.50
4/1/60	"	"	"	"
7/1/60	"	"	"	"
10/1/60	"	"	"	"
1/1/61	"	"	"	"

Although copper magnet wire is fully substitutible for aluminum magnet wire, users do not make such substitution solely on the basis of equal current carrying capacity. A user considering the use of copper in place of aluminum magnet wire for a particular application has to consider space, load, temperature, and other operating conditions

of the equipment in which the magnet wire is to be used. He may, for example, find it advantageous to use a small copper wire with many windings rather than a larger copper wire with correspondingly fewer windings. Accordingly, it is impossible to identify the type and size of copper product that would normally be used if the aluminum products listed herein were not used.

(B) Generally, in substituting copper conductor for aluminum conductor the principal consideration is to secure equal current carrying capacity. This is generally secured by substituting a copper conductor two AWG sizes smaller than the aluminum conductor. There are situations, however, where mechanical strength, weight of the wire or cable, flex life, environmental conditions such as corrosive atmospheres, or temperature rise in the conductor with reference to the type of insulation, may require deviations from the two AWG size difference.

[fols. 3739-3740] As indicated in the answer to (A) with respect to Service Entrance Cable, where only short lengths of cable are usually involved, the choice of copper equivalent is based upon the service rating to be supplied.

[fol. 3741] Interrogatory 63

63. With respect to each of the following:

(A) EC aluminum pig
(B) EC aluminum ingot
(C) EC aluminum rod
(D) any combination of two or more of (A), (B) and (C)
(E) EC aluminum pig used in the production of
  (1) aluminum conductor wire and cable
  (2) aluminum conductor other than wire and cable
  (3) other products
(F) EC aluminum ingot used in the production of (1) aluminum conductor wire and cable, (2) aluminum conductor other than wire and cable, (3) other products
(G) EC aluminum rod used in the production of (1) aluminum conductor wire and cable, (2) aluminum

conductor other than wire and cable (3) other products

(H) any combination of two or more of (E) (F) and (G)

(i) state for each of the years 1954 through 1960, and for each quarter of 1960

(a) the total shipments, the total sales and the total production thereof, in quantity and dollar value, in the United States;

(b) the shipments thereof, the sales thereof and the production thereof, in quantity and dollar value, by each company.

(ii) give the name and address of each company producing and selling each, (a) prior to April 1, 1959, (b) as of September 1, 1960, and (c) as the latest date for which information is available.

[fol. 3742] (iii) give the location, for each company, of each plant where each is produced, and state the capacity of each such plant for the manufacture of each.

(iv) state the relative extent to which EC aluminum pig, ingot, and rod is used in each category specified in (E), (F), and (G).

Answer to Interrogatory 63

(i) (a) Defendants are without knowledge as to total shipments, sales or production in the United States of any of the products listed in (A)-(H) of this Interrogatory 63.

(i) (b) With the exception of information supplied by plaintiff in answer to defendants' Interrogatory 5(d) (ii), defendants are without knowledge as to shipments, sales or production of any of the products listed in (A)-(H) for companies other than Alcoa and Rome. Data for Alcoa and Rome for each of the designated periods are set forth in Table V.

(ii) To the best of defendants' knowledge, the following companies manufacture EC aluminum pig and ingot at the present time, and did so prior to April 1, 1959 and as of September 1, 1960.

Alcoa

Plants: Badin, North Carolina; Cressona, Pennsylvania; Lafayette, Indiana; Massena, New York; Rockdale, Texas; and Vancouver, Washington.

Aluminum Limited

Plants: Arvida, Quebec; Isle Maligne, Quebec; Kitimat, British Columbia; Shawinigan Falls, Quebec; Beauharnois, Quebec.

[fol. 3743] Anaconda Co.

Plants: Columbia Falls, Mont.

Harvey Aluminum, Inc.

Plants: The Dalles, Ore.

Kaiser Aluminum & Chemical Corp.

Plants: Ravenswood, W. Va., Spokane, Wash.

Ormet Corp.

Plants: Hannibal, Ohio.

Reynolds Metals Co.

Plants: Arkadelphia, Ark.; Listerhill, Ala.; Massena, N. Y.; Jones Mills, Ark.; Longview, Wash.; San Patricio, Tex.; Troutdale, Ore.

To the best of defendants' knowledge, each of the following companies (except Rome) manufacturers E. C. aluminum rod at the present time, and did so prior to April 1, 1959 and as of September 1, 1960:

Alcoa

Plants: Massena, N. Y.; Vancouver, Wash.

Anaconda Co.

Plant: Columbia Falls, Mont.

Essex Wire Corp.

Plant: Goshen, Ind.

General Cable Corp.

Plants: St. Louis, Mo.; Tampa, Fla.

Kaiser Aluminum & Chemical Corp.

Plant: Newark, Ohio

Olin Mathieson Chemical Corp. (Southern Electric)

Plant: Chattanooga, Tenn.

Reynolds Metals Co.

Plant: Listerhill, Ala.

[fols. 3744-3825] Rome Cable Corp.

Plant: Rome, N. Y. (acquired by Alcoa March 31, 1959; suspended the manufacture of E. C. aluminum rod, April 1960).

Southwire Co.

Plant: Carrollton, Ga.

(iii) The requested plant locations are given in the answer to (ii) of this Interrogatory 63. Defendants have no information with respect to the capacity of each such plant, for each product, for companies other than Alcoa and Rome. With respect to the plants of Alcoa and Rome, because all of the facilities used in the production of E. C. aluminum pig, ingot, and rod are also used in the production of other alloys not associated with electrical conductor, it is impossible to arrive at any meaningful capacity figures.

(iv) Defendants have no information with respect to the relative extent to which E. C. aluminum pig, ingot and rod is used in each category specified in (E), (F), and (G) of this Interrogatory 63 except as indicated in Table V.

[fol. 3826] Interrogatory 69

69. For each of the years 1950, 1952, and 1954 through 1960, and for each quarter of 1959 and 1960 state the total sales (in quantity and dollars) of overhead conductor wire and cable by (a) all companies in the United States, (b) Alcoa, (c) Rome, and (d) each other company, together with a breakdown showing:

(A) the amount thereof manufactured from (i) aluminum (ii) copper

(B) the various types of aluminum conductor and the sales of each in pounds and dollars

(C) the various types of copper conductor and the sales of each in pounds and dollars.

Answer to Interrogatory 69

There is no recognized product known as "overhead conductor wire and cable." The following conductor wire and cable products listed in defendants' answer to Interrogatory 44 can be used in overhead applications:

(1) Bare conductor wire
(2) Bare conductor cable
(3) ACSR
(4) Weatherproof wire
(5) Service drop cable
(6) Power cable under 601 volts
(7) Power cable 601 volts and higher
(8) Communication wire and cable

(1) Bare Conductor Wire:

As defendants' answer to Interrogatories 6, 7, and 9 indicates, bare aluminum conductor wire is not generally used in overhead applications; bare copper wire may be used [fol. 3827] in such applications.

(a) Defendants' knowledge as to the total sales of bare copper wire by all companies in the United States is derived solely from statistics published by the Bureau of the Census in its 1954 and 1958 Censuses of Manufactures. Since substantial quantities of bare copper wire sold for further fabrication are included in these statistics, they do not provide any basis for measuring the amount of such wire sold for overhead use. Defendants do not admit the accuracy or reliability of these statistics which are well known and readily available to plaintiff.

(b) Alcoa, prior to its acquisition of Rome, did not manufacture any copper conductor products. Alcoa has not sold any significant quantity of bare aluminum

conductor wire for use in overhead applications in any of the periods in question.

(c) To the best of defendants' knowledge, bare aluminum conductor wire sold by Rome during the periods in question was not used to any significant extent in overhead applications. Table VII sets forth Rome's total sales of bare copper wire for each of the periods in question and, to the extent that it is possible to do so, indicates the proportion of such bare copper wire that was used in overhead applications.

(d) Defendants are without knowledge as to the total sales of bare conductor wire for use in overhead applications by any company other than Alcoa and Rome for any of the periods in question.

(2) Bare Conductor Cable and (3) ACSR:

As indicated in defendants' answer to Interrogatories 6, 7, and 9, bare conductor cable, using either copper or aluminum as the conductor metal, and ACSR can be used in overhead applications.

(a) Defendants' knowledge as to the total sales by all companies in the United States of bare conductor cable [fol. 3828] and ACSR is derived solely from statistics published by BDSA and the Bureau of the Census. The Censuses of Manufactures for 1954 and 1958 purport to show total United States shipments of bare copper cable and of bare aluminum cable and ACSR. The BDSA "Facts for Industry" and "Current Industrial Reports" purport to show the United States shipments of ACSR and bare aluminum cable for each of the years 1954 through 1960, and for each quarter of 1959 and 1960. Neither the Bureau of the Census nor BDSA statistics purport to show the extent to which these products are used in overhead applications. Defendants do not admit the accuracy or reliability of any of these published statistics which are well known and readily available to plaintiff.

(b) Prior to its acquisition of Rome, Alcoa did not sell any bare copper cable. Alcoa's sales of bare aluminum cable and ACSR are shown in Table VII. It is defend-

ants' belief that most of such bare aluminum cable and ACSR was used in overhead applications.

(c) Table VII sets forth Rome's sales of bare conductor cable, both copper and aluminum, and ACSR and; to the extent that it is possible to do so, indicates the proportion of such products used in overhead applications.

(d) With the exception of information supplied by plaintiff in answer to defendants' Interrogatories 2 (e) (ii) and 5 (d) (ii), defendants have no knowledge as to the sales of bare conductor cable and ACSR by any company other than Alcoa and Rome.

(4) Weatherproof Wire:

This product, which may be made with either copper or aluminum as the conductor metal, is sold almost entirely for use in overhead applications.

[fol. 3829] (a) Defendants' knowledge of the total sales of weatherproof wire by all companies in the United States is derived solely from the 1954 and 1958 Censuses of Manufacturers which purport to show total United States shipments of this product. Defendants do not admit the accuracy or reliability of these statistics which are well known and readily available to plaintiff. Since the Census of Manufactures statistics do not differentiate between copper and aluminum, there are no published statistics which purport to show the amount of weatherproof wire manufactured from aluminum and from copper.

(b) Prior to its acquisition of Rome, Alcoa made no weatherproof wire using copper as the conductor metal. Alcoa's sales of weatherproof wire using aluminum as the conductor for each of the periods in question are given in Table VII.

(c) Rome's sales of weatherproof wire, both copper and aluminum, for each of the periods in question are given in Table VII.

(d) With the exception of information supplied by plaintiff in answer to defendants' Interrogatory 5 (d) (ii), defendants have no knowledge as to the sales of weatherproof wire by any company other than Alcoa and Rome.

(5) Service Drop Cable:

This product, which may be made with either copper or aluminum as the conductor metal, is sold almost entirely for use in overhead applications.

(a) Defendants' knowledge of the total United States sales of service drop cable is derived solely from the 1954 and 1958 Censuses of Manufactures which purport to show total United States shipments of this product. Defendants do not admit the accuracy or reliability of these published statistics which are well known and readily available to plaintiff. Since the Census of [fol. 3830] Manufactures does not differentiate between copper and aluminum, there are no published statistics purporting to show the amount of service drop cable manufactured from aluminum and from copper.

(b) Prior to its acquisition of Rome, Alcoa did not sell service drop cable using copper as the conductor metal. Alcoa's sales of service drop cable using aluminum as the conductor metal for each of the periods in question are given in Table VII.

(c) Rome's sales of service drop cable, both copper and aluminum, for each of the periods in question are given in Table VII.

(d) With the exception of information supplied by plaintiff in answer to Interrogatory 5 (d) (ii), defendants have no knowledge as to the sales of service drop cable by any company other than Alcoa and Rome.

(6) Power Cable Under 601 Volts and (7) Power Cable 601 Volts and Higher:

Certain types of insulated power cable are used in overhead applications. These may be made using either copper or aluminum as the conductor metal.

(a) Published statistics with respect to total United States shipments of power cable for each of the periods in question do not indicate the amount of power cable that is used in overhead applications, nor do such statistics indicate the amounts made from aluminum and from copper. Defendants, therefore, are without knowledge as to the total sales by all companies in the United States of power cable used overhead or as to the amounts thereof made from aluminum and from copper.

(b) Alcoa, prior to its acquisition of Rome, did not produce any power cable.

(c) Table VII sets forth Rome's sales of power cable, both copper and aluminum, for each of the periods in question and, to the extent it is possible to do so, indi- [fols. 3831-3834] cates the proportion thereof that was used in overhead applications.

(d) Defendants are without knowledge as to the total sales by any company other than Alcoa and Rome of power cable, either copper or aluminum, for use in overhead applications.

(8) Communication Wire and Cable:

Certain types of communication wire and cable are used in overhead applications. To the best of defendants' knowledge, this consists of copper telephone cable.

(a) Defendants' knowledge of the total United States sales of communication wire and cable used in overhead applications is derived solely from the 1954 and 1958 Censuses of Manufactures which purport to show total United States shipments of telephone cable. Defendants do not admit the accuracy or reliability of these pub-

lished statistics which are well known and readily available to plaintiff.

(b) and (c) Neither Alcoa nor Rome has ever manufactured communication wire and cable for use in overhead applications.

(d) Defendants have no knowledge as to the sales of communication wire and cable used in overhead applications by any other company.

[fol. 3835] Table II

On the basis of defendants' present knowledge, and subject to revision and amendment as defendants' trial preparation progresses, the attached table shows the following:

(1) the name and address of each company which has produced and sold the designated conductor wire and cable products since prior to April 1, 1959;
(2) whether the listed companies manufacture the designated products with copper, (C), aluminum, (A), or either, (CA), as the conductor metal;
(3) the location of each plant of each of the listed companies, and, insofar as defendants' have knowledge, the conductor wire and cable products made at each such plant; and
(4) whether any of the listed companies has either commenced or ceased the production and sale of any of the designated products (a) between April 1, 1959 and September 1, 1960 and (b) between September 1, 1960 and April 1, 1961.

[fol. 3836]

	Bare Wire	Bare Cable	ACSR	Communication	Appliance wire and cord	Magnet	Power under 601	Power over 601	Signal	Control	Weatherproof	Building	Service cable	Service entrance	Automotive and Aircraft	Marine	Portable Cords and Cables
Accurate Insulated Wire Company, New Haven, Conn.					C												
Ace Wire Mills, Patterson, New Jersey Subsidiary of Universal Mfg. Corp., Patterson, N.J.																	
Acme Wire Company, Hampden, Conn.						CA											
Advance Insulated Wire Co., Metuchen, N.J.																	
Alden Wire Corporation, Oceanside, N.Y.																	
A-K Manufacturing Company, Barrington, Ill.																	
Alpha Wire Corporation, New York Subsidiary of Loral Electronics																	
Aluminum Company of America, Pittsburgh, Pa.																	
Massena, N.Y.		A	A								A		A				
Vancouver, Wash.		A	A														
Rome Cable Corporation, Rome, N.Y.	CA	CA	A	C	C	CA	CA	CA	C	C	CA	CA	CA	CA		C	CA
REA Magnet Wire, Ft. Wayne, Indiana Lafayette, Indiana						CA C											
Anaconda American Brass Company, Waterbury, Conn Subsidiary of Anaconda Company	C																
American Electric Cable Company, Holyoke, Mass.																	
American Insulated Wire Corporation, Pawtucket and Warwick, R.I. (includes Acorn Insulated Wire, & International Wire & Cable) Subsidiary of Leviton Mfg. Co., Brooklyn, N.Y.	C				C		C	C			C	C		C			C
American Metal Moulding Company, Irvington, N.J.																	
Amphenol-Borg Electronics Corp., Maywood, Ill.					C												

[fol. 3837]

	Bare Wire	Bare Cable	ACSR	Communication	Appliance wire and cord	Magnet	Power under 601	Power over 601	Signal	Control	Weatherproof	Building	Service cable	Service entrance	Automotive and Aircraft	Marine	Portable Cords and Cables
Ampere Wire & Cable Corporation, Yonkers, N.Y.																	
Anaconda Wire & Cable Company	CA	CA	A	C	C	CA	C	C	C	C	CA	CA	CA	CA	C	C	C
Subsidiary of Anaconda Co.																	
Hastings Wire & Cable Co., Hastings, N.Y.	CA	CA	A	C			C	C	C	C	CA	CA	CA	CA			
Black Eagle, Mont.		A	A														
Maring Wire Co., Muskegon, Mich., Anderson, Ind.						CA					C						
Marion Insulated Wire & Rubber Corp., Marion, Ind.				C	C		C	C	C	C		CA	CA	CA			C
Sequoia Wire & Cable, Redwood City, Calif.				C	C												
California Wire & Cable, Orange, Calif.		A	A			CA	C	C	C	C	CA	CA	CA	CA			
Inland Wire & Cable, Sycamore, Ill.	CA	CA	A								CA						
Watkinsville, Ga.	CA	CA	A								CA		CA				
Kenosha, Wisc., Great Falls, Mont.	CA	CA	A														
Anchor Wire Corporation, Jamaica, New York																	
Andrew Corporation, Orlando Park, Illinois																	
Ansonia Wire & Cable Company, Ashton, R.I.				C	C				C	C							
Apex Wire & Cable Corporation, Brooklyn, N.Y.					C												C
Atlantic Wire & Cable Company, College Point, N.Y.																	
Automatic Electric Company, Melrose Park, Ill.																	
Subsidiary of General Tel. & Tel.						C											
Belden Manufacturing Company, Chicago, Ill., Richmond, Ind.					C	CA	C								C	C	C
Bergen Wire Rope Company, Lodi, N. J.																	
Subsidiary of Reeves Soundcraft Corp., Danbury, Conn.																	
Berkshire Electric Cable Company, Leeds, Mass.																	
Boston Insulated Wire & Cable, Dorchester, Mass.					C										C	C	

[fol. 3838]

	Bare Wire	Bare Cable	ACSR	Communication	Appliance wire and cord	Magnet	Power under 601	Power over 601	Signal	Control	Weatherproof	Building	Service cable	Service entrance	Automotive and Aircraft	Marine	Portable Cords and Cables
Bradford Kyle & Company, Plymouth, Mass.					C										C		
Brand, William & Co., Inc. Division of American Enka, Enka, N.C. Williamantic, Conn., Santa Monica, Calif.	C									O							
Bridgeport Brass Company Housatonic - Bridgeport, Conn., Warren, Ohio						C											
Bridgeport Insulated Wire Bridgeport, Conn., Stratford, Conn.																	
C&W Insulated Wire Company, Fort Wayne, Ind.																	
Calcon Mfg. Company, Washington, Pa. Subsidiary of Avis Industrial Corp.																	
Camden Wire Company, Camden, N.Y.	C	C															
Central Cable Corp., Jersey Shore, Pa. Freeport, Illinois, Atlanta, Ga.	CA	CA	A								CA		CA				
Chester Cable Corp., Chester, New York Subsidiary of Tennessee Corp.					C							C					
Circle Wire & Cable, Maspeth, N.Y. Subsidiary of Cerro Corp., New York Maspeth, N.Y., Hicksville, L.I., N.Y.	C	C			C		CA	CA			CA	CA	CA	CA		C	C
Cleveland Insulated Wire Company, Cleveland, Ohio																	
Coast Cable Company, Los Angeles, Calif.																	
Collyer Insulated Wire Company, Pawtucket, R.I.	C	C			C		CA	CA	C	C	CA	CA	CA	CA		C	C

[fol. 3839]

	Bare Wire	Bare Cable	ACSR	Communication	Appliance wire and cord	Magnet	Power under 601	Power over 601	Signal	Control	Weatherproof	Building	Service cable	Service entrance	Automotive and Aircraft	Marine	Portable cords and Cables
Colonial Wire & Cable Company, Locust Valley N.Y.												C		C			
Columbia Cable & Electric Corp., Brooklyn, N.Y.												C		C			
Continental Copper & Steel Industries, Inc. Hatfield Wire & Cable Div., Hillside, Union & Linden, N.J.	C				C		CA					CA		CA		C	C
National Wire Corp. (Incl. Spencer Wire Corp) Union, N.J.	C	C															
Continental Wire Corporation, Wallingford, Conn.					C												
Copperweld Steel Company, Pittsburgh, Pa. Glassport, Pa. Flexo Wire Company, Oswego, N.Y.	C	C															
Corona Insulated Wire Company, Brooklyn, N.Y.																	
Crescent Company, Inc., Pawtucket, R.I. Also known as Carol Cable & Lowell Insulated Wire					C		C								C	C	C
Crescent Insulated Wire & Cable Co., Trenton, N.J.					C		CA	CA	C	C		CA		CA		C	C
Dielectric Materials Company, Chicago, Illinois																	C
Eastern Insulated Wire Corporation, Wallingford, Conn. Subsidiary of Circle F. Mfg. Co., Trenton, N.J.					C												
Electric Autolite Company, Toledo, Ohio Port Huron, Mich., and Hazelton, Pa.					C	CA									C	C	C
Electric Parts Corporation, Georgetown, Ky. Also known as Complex Cable					C												C

[fol. 3840]

	Bare Wire	Bare Cable	ACSR	Communication	Appliance wire and cord	Magnet	Power under 601	Power over 601	Signal	Control	Weatherproof	Building	Service cable	Service entrance	Automotive and Aircraft	Marine	Portable Cords and Cables
	CA	CA	A		C	CA	CA	CA	C	C	CA	CA	CA	CA	C	C	C
Essex Wire Corporation, Ft. Wayne, Indiana																	
Diamond Wire & Cable, Sycamore, Ill.												C					
Paranite Wire & Cable, Tiffin Ohio (Midland Wire & Cable)	CA	CA	A								CA		CA				
Fort Wayne, Indiana						CA											
Philadelphia, Pa.																	
Anaheim, Calif.						C						CA					
Jonesboro, Indiana							CA					CA					
Hillsdale, Mich.																	
Dekalb, Ill. (Cords, Ltd.)					C												C
Marion, Indiana					C		CA	CA	C	C		CA			C		
Detroit, Michigan						CA									C		
Ettco Wire & Cable Corporation, Brooklyn, N.Y.												C		C			
Gavitt Wire & Cable Corporation, Brookfield, Mass. Subsidiary of American Hard Rubber Div. of Amerace Corp.					C												

[fol. 3841]

	Bare Wire	Bare Cable	ACSR	Communication	Appliance wire and cord	Magnet	Power under 601.	Power over 601	Signal	Control	Weatherproof	Building	Service cable	Service entrance	Automotive and Aircraft	Marine, Portable Cords and Cables
General Cable Corporation, New York, N.Y.	CA	CA	A	C	C	CA	CA	CA	C	C	CA	CA	CA	CA	C	C
Bayonne, New Jersey							CA	CA								C
Emeryville, Calif.				C			CA	CA								
Los Angeles, Calif.	CA	CA	A								CA					
Perth Amboy, N.J.	CA	CA	A				CA	CA	C	C	CA		CA	CA		C
Rome, N.Y.	C	C										CA				
St. Louis, Mo.	CA	CA				CA	CA	CA	C	C	CA	CA	CA	CA		
Monticello, Ill.				C												
Tampa, Fla.	A	A	A	C							CA					
Quincy, Mich.	A	A	A								A					
Bonham, Texas				C												
Sanger, Calif.					C				C	C		CA		CA		C
Elkton, Maryland																
Palatka, Fla.																
St. Petersburg, Fla.																
Cass City, Michigan																
Hamilton, Ontario				C												
Subsidiaries:																
Alphaduct Wire & Cable, New Brunswick, N.J.				C												
General Insulated Wirework, Providence, R.I.					C											C
Clifton Conduit, Memphis, Tenn.												C				
Baltimore, Md.																
New England Cable Co., Concord, N.H.																
Cornish Wire Company, North Adams, Mass.				C												C
Williamstown, Mass.																
Indiana Steel & Wire Co., Muncie, Ind.																

[fol. 3842]

	Bare Wire	Bare Cable	ACSR	Communication	Appliance wire and cord	Magnet	Power under 601	Power over 601	Signal	Control	Weatherproof	Building	Service cable	Service entrance	Automotive and Aircraft	Mining	Portable Cords and Cables
General Electric Company, Inc.				C	C	CA	CA	CA	C	C	CA	CA	CA	CA	C	C	C
Schenectady, N.Y.						CA											
Bridgeport, Conn.				C	C		CA	CA	C	C	CA	CA	CA	CA		C	
Lowell, Mass.					C		CA		C			CA		CA	C		
Oakland, Calif.				C	C	CA			C	C		CA			C		
Pittsfield, Mass.						CA											
Hickory, N.C.						CA											
Ft. Wayne, Ind.						CA											
Rome, Georgia						CA											
General Motors, Packard Electric Division, Warren, Ohio					C	C									C		C
Good Lite Electric Mfg. Corp., Bridgeport, Conn																	
Gordon Claude S. Company, Cleveland, Ohio Subsidiary of Cleveland Pneumatic Industries, Inc.																	
Hendrix Wire & Cable Corp., Boston, Mass.							CA				CA						
Holyoke Wire & Cable Corporation, Holyoke, Mass.					C												C
Hudson Wire Company	CA	CA				CA											
Wirsted, Conn.						CA											
Cassapolis, Mich.						C											
Oaening, N.Y.	CA	CA															
Imperial Wire Company, Inc., New Haven, Ind. Formerly New Haven Wire & Cable Subsidiary of Northern Imperial Corp.						C											
International Tel. & Tel.					C		C										C
Royal Electric Company, Pawtucket, R.I.						C											
Federal Tel. & Radio Division, Clifton, New Jersey				C													
Kellogg Switchboard & Supply Division, Chicago, Ill.																	

[fol. 3843]

	Bare Wire	Bare Cable	AGSR	Communication	Appliance wire and cord	Magnet	Power under 601	Power over 601	Signal	Control	Weatherproof	Building	Service cable	Service entrance	Automotive and Aircraft	Marine Portable Cords and Cables
International Wire Products Corporation, Midland Park, N.J. Subsidiary of Carlisle Corporation. Simplex Tinning & Wire Products Corp. (Affiliate of International)							•								•	
Jefferson Electric Company, Bellwood, Ill.																
Jordan Wire & Cable, Jordan, New York	C	C														
Judd Wire Mfg. Company, Turner's Falls, Mass.																
Kaiser Aluminum & Chemical Corporation, Oakland, Calif.	CA	CA	A		C		CA	CA	C	C	CA	CA	CA	CA	C	CC
U.S. Rubber, Wire Mill Division, Bristol, R.I. Newark, Ohio																
Kerite Company, Seymour, Conn.							CA	CA	C	C						
Kerrigan-Lewis Mfg. Company, Chicago, Ill.																
Laribee Wire & Equipment Corporation, Camden, N.Y. Subsidiary of Kenrich Petro-Chemicals Inc., N.Y.	C	C														
Lens Electric Mfg. Company, Chicago, Ill					C											
Levis Engineering Company, Naugatuck, Conn					C											
Magnet Wire Company, Chicago, Ill.						C										
Miller Electric Company, Pawtucket, R.I.					C											C
Monrose Products Company, Worcester, Mass.					C											

[fol. 3844]

	Bare Wire	Bare Cable	ACSR	Communication	Appliance wire and cord	Magnet	Power under 601	Power over 601	Signal	Control	Weatherproof	Building	Service cable	Service entrance	Automotive and Aircraft	Marine	Portable Cords and Cables
Narragansett Wire & Cable Co., Pawtucket, R.I. Texas Wire & Cable, Plane, Texas. Jordan Rogers Company, Orange, Calif.			A		C		CA	CA			CA	CA	CA	CA			C
National Electric Coil Company Division of McGraw Edison, Chicago, Ill. Columbus, Ohio - Bluefield, West Virginia	C					C											
National Electric Products Division of H.K. Porter, Pittsburgh, Pa. Ambridge, Pa. Pittsburgh, Pa.					C		CA	CA	C	C		CA		CA	C	C	C
National Standard Company, Niles, Michigan																	
National Tinsel Manufacturing Company, Manitowoc, Wisconsin																	
Nehring Electrical Works, Dekalb, Illinois	CA	CA	A		C						CA		CA				
Nessor Alloy Products Company, Newark, New Jersey																	
New England Electrical Works, Inc., Lisbon, Vt. Division of Montgomery Co., Windsor Lockes, Conn.																	
Nonotuck Mfg. Company, Holyoke, Mass. Subsidiary of Beryllium Corp., Reading, Pa.	C																
Northern Wire & Strip Mills, Cicero, Illinois																	

[fol. 3845]

	Bare Wire	Bare Cable	ACSR	Communication	Appliance wire and cord	Magnet	Power under 601	Power over 601	Signal	Control	Weatherproof	Building	Service cable	Service entrance	Automotive and Aircraft	Marine	Portable Cords and Cables
Okonite Company, Passaic, New Jersey Subsidiary of Kennecott Copper Corporation, N.Y.C. Kennecott Wire & Cable Division Okonite Callender Cable Patterson, N.J. Passaic, N.J. New Brunswick, N.J. Phillipsdale, R.I. Rumford, R.I.	C	C		C	C	C	CA	CA	C	C	C	CA	CA	CA	C	C	C
Olin Mathieson Chemical, Metal Div., New York Southern Electrical, Chattanooga, Tenn.	CA	CA	A								CA		CA				
Paragon Wire & Cable Corporation, Buffalo, New York					C												
Phalo Plastics Corporation, Worcester, Mass.	C	C		C	C	CA	C	C	C	C	C	C	C	C	C	C	C
Phelps Dodge Copper Products, Division of Phelps Dodge American Copper Products Div., Elizabeth, N.J. (Bayway) Habirshaw Cable & Wire, Yonkers, N.Y. Inca Manufacturing Company, Ft. Wayne, Ind. Indiana Rod & Wire Division, Ft. Wayne, Ind. Edlin Inc., Bethesda, Md.	C	C		C	C	C CA	C	C	C	C	C	C	C	C	C	C	C
Philadelphia Insulated Wire Company, Philadelphia, Pa. Subsidiary of Wilber B. Driver Inc., Newark, N.J.					C												
Plastic Wire & Cable Corporation, Jewett City, Conn.				C	C		C		C	C		C			C		C
Plastoid Corporation, Hamburg, N.J. Subsidiary of Television and Radar, Corp.				C	C							CA					C
Radio Wire Manufacturing Corporation, New Augusta, Ind.																	
Radix Wire Company, Cleveland, Ohio					C										C		C

[fol. 3846]

	Bare Wire	Bare Cable	ACSR	Communication	Appliance wire and cord	Magnet	Power under 601	Power over 601	Signal	Control	Weatherproof	Building	Service cable	Service entrance	Automotive and Aircraft	Marine	Portable Cords and Cables
Rego Insulated Wire Corporation, Hoboken, N.J.					C												C
Revere Corporation of America, Wallingford, Conn. Subsidiary of Neptune Meter Company of New York																	
Rex Corporation, West Action, Mass. Subsidiary of American Enka Corporation, Enka, N.C.					C												
Reynolds Metals Company, Richmond, Va., Listerhill, Ala.	A	A	A								CA		A				
Rhode Island Insulating Wire Company, Cranston, R.I., Providence, R.I. Subsidiary of Leviton Mfg. Co., Brooklyn, N.Y.					C												C
Robert Shaw Fulton Controls Beta Corporation, Richmond, Va. Acro Mfg. Company, Columbus, Ohio																	
Rockbestos Products Corporation, New Haven, Conn.					C		C	C	C	C					C		
Roebling's John A. & Sons Corporation, Trenton, N.J. Subsidiary of Colorado Fuel & Iron Corporation Trenton, N.J., and Roebling, N.J.	CA	AC	A	C	C	C	CA	CA	C	C	C	CA		C			C
Runzel Cord & Wire Company, Chicago, Ill.					C												C
Simplex Wire & Cable Corporation, Cambridge, Mass.				C	C		CA	CA	C	C		CA		C		C	C
Newington, N.H.				C			C										
Hi Temp Wires, Westbury, N.Y., Monrovia, Calif.				C	C												
Southwire Company, Carrollton, Ga.	CA	CA	A								CA	CA	CA				
Slopian, Arthur & Company, Bridgeport, Conn.																	

[Vol. 3847]

	Bare Wire	Bare Cable	ACSR	Communication	Appliance wire and cord	Magnet	Power under 601	Power over 601	Signal	Control	Weatherproof	Building	Service cable	Service entrance	Automotive and Aircraft	Marine	Portable Cords and Cables
Spargo Wire Company, Rome, N.Y.	C	C															
Sprague Electric Company, Bennington, Vt., North Adams, Mass.						C											
Springfield Wire & Tinsel Company, Springfield, Mass.																	
Standard Wire Company, Cranston, R.I.																	
Starring & Co., Inc., Bridgeport, Conn.																	
State Wire & Cable Corporation, Coxsackie, N.Y.																	
Stromberg Carlson Tel. Mfg. Company, Rochester, N.Y. Div. of General Dynamics Corp., New York																	
Suflex Corporation, Woodside, N.Y. Electra Insulation Corporation, Woodside, N.Y.																	
Superior Cable Corporation, Hickory, N.C.				C	C				C	C							
Suprenaut Manufacturing Company, Clinton, Mass.				C	CA												
Sweeco Wire Company, Winstead, Conn						C											
Tensolite Insulated Wire Company, Tarrytown, N.Y. Subsidiary of Carlisle Corporation, Carlisle, Pa.					C												
Tevco Insulated Wire, Burbank, Calif.																	
Therino Electric Company, Saddle Brook, N.J.																	
Times Wire & Cable Co., Wallingford, Conn. Division of International Silver Co., Meriden, Conn.																	

[fol. 3848]

	Bare Wire	Bare Cable	ACSR	Communication	Appliance wire and cord	Magnet	Power under 601	Power over 601	Signal	Control	Weatherproof	Building	Service cable	Service entrance	Automotive and Aircraft	Marine	Portable Cords and Cables
Triangle Conduit & Cable Company, New Brunswick, N.J.	C	C			C		CA	CA	C	C	C	CA		CA			
Trio Wire & Cable Company, Brooklyn, N.Y.					C												C
Union Plastic Corporation, Secaucus, N.Y.																	
United States Steel American Steel & Wire Division, Worcester, Mass.	CA	CA	A		C	CA	CA	CA	C	C	C	CA		CA		C	C
U.S. Wire & Cable Company, Union, N.J.																	
UP State Wire Company, Williamstown, N.Y.																	
Vector Mfg. Company, Houston, Tex. Subsidiary of Vector Enterprises, Houston, Texas																	
Victor Electric Wire & Cable, West Warwick, R.I.					C												C
Viking Wire Company, Danbury, Conn.																	
Walker Brothers, Conshohocken, Pa.					C		CA	CA				CA		CA			C
Warren Wire Company, Pownal, Vt. Wire Company of America, Alhambra, Calif.						C											
Western Electric Company Point Breeze Works, Baltimore, Maryland Kearny Works, Kearny, N.J. Hawthorne Works, Chicago, Ill. Tonawanda Plant, Buffalo, New York	C			CA	C	C											C

[fol. 3849]

	Bare Wire	Bare Cable	ACSR	Communication	Appliance wire and cord	Magnet	Power under 601	Power over 601	Signal	Control	Weatherproof	Building	Service cable	Service entrance	Automotive and Aircraft	Marine	Portable Cords and Cables
Western Insulated Wire Company, Los Angeles, Calif. Subsidiary of Penn Union Electric, Erie, Pa.					C		C	C									C
Westinghouse Electric Company, Inc., Cheektowaga, N.Y.						C											
Wheeler Insulated Wire Company, Inc., Waterbury, Conn. Subsidiary of Sperry Rand Corporation						C											
Whitaker Cable Corporation, North Kansas City, Mo.					C										C		C
Whitney-Blake Company, Hamden, Conn. Insulated Circuits Inc., Passaic, New Jersey Koiled Kords, New Haven, Conn.				C	C		C	C							C		C

[fol. 3850] Table III

Introduction

The following table describes the characteristics and end uses of various bare and insulated or covered wire and cable products. For the most part, these products have been made with either copper or aluminum as the conductor metal. Their end uses and construction are the same whether made with copper or with aluminum as the conductor metal. The descriptions contain references to various standards and specifications which describe properties and constructions and contain data to assist in selection and installation for end use. The following abbreviations used in the product descriptions represent the indicated organizations:

(1) ASTM—American Society for Testing Materials
(2) ASA—American Standards Association
(3) IPCEA—Insulated Power Cable Engineers Association
(4) NEMA—National Electrical Manufacturers Association
(5) MIL—Military
(6) REA—Rural Electrification Administration
(7) IMSA—International Municipal Signal Association
(8) AAR—Association of American Railroads
(9) AEIC—Association of Edison Illuminating Companies.

Unless otherwise indicated, these standards and specifications are applicable whether copper or aluminum is used.

The use of different conductor metals will result in certain differences in the physical, electrical, and chemical characteristics of the products described herein. Physically, aluminum is lighter in weight than copper, has less tensile strength and is less flexible. These physical differences will [fol. 3851] be most evident in bare conductor products but may also be reflected in the insulated or covered wire and cable products described herein. Electrically, aluminum has approximately 61% to 62% the conductivity of copper. This electrical difference will be reflected in the products de-

scribed below; and in general, a conductor product using aluminum as the conductor metal will have to be two AWG sizes larger if resistance equal to that obtained with copper is desired. (See answer to Interrogatory 61(*B*).) Chemically, copper and aluminum are different elements and have certain different chemical properties. Aluminum is more subject to corrosion than copper and has a tendency, which copper does not, to form an oxide having dielectric properties when exposed to the air. The physical, electrical, and chemical characteristics of copper and aluminum have been fully discussed in numerous technical publications which are readily available to plaintiff.

[fol. 3852] Bare Conductor Wire

Bare conductor wire consists of hard drawn, medium hard drawn or annealed solid copper or aluminum conductor in a wide variety of sizes. Bare conductor wire is used to transmit or distribute electricity and as a neutral or grounding conductor. The characteristics of bare conductor wire are described in the following standards and specifications:

(a) Hard drawn copper wire	ASTM B 1–56
(b) Medium hard drawn copper wire	ASTM B 2–52
(c) Soft or annealed copper wire	ASTM B 3–56
(d) Soft rectangular and square copper wire	ASTM B 48–58
(e) Tinned soft or annealed copper wire	ASTM B 33–58
(f) Tinned hard drawn and medium hard drawn copper wire	ASTM B 246–58
(g) Hard drawn aluminum wire	ASTM B 230–58
(h) Three-quarter hard aluminum wire	ASTM B 262–56
(i) Half-hard aluminum wire	ASTM B 323–58T
(j) Rectangular and square bare aluminum	ASTM B 324–58T

Bare Conductor Cable

Bare conductor cable consists of stranded copper or aluminum conductor supplied in a wide variety of types and sizes and tempers. It is used for the overhead transmission and distribution of electricity, for signal and telephone, and as a neutral and grounding conductor. The characteristics of bare conductor cable are described in the following standards and specifications:

[fol. 3853]

(a) Bunch stranded copper conductors	ASTM B 174–59
(b) Concentric-lay stranded copper conductors	ASTM B 8–59
(c) Rope-lay stranded copper conductors having bunch stranded members	ASTM B 172–58
(d) Rope-lay stranded copper conductors having concentric stranded members	ASTM B 173–58
(e) Concentric-lay stranded aluminum conductor	ASTM B 231–59

ACSR—Aluminum Cable Steel Reinforced

ACSR consists of a high tensile strength core of one or more wires, normally galvanized or aluminized steel, surrounded by a suitable number of hard drawn aluminum wires to give the desired electrical properties. The characteristics of ACSR are described in ASTM B 232-59T steel reinforced (ACSR) concentric-lay stranded aluminum conductors.

ACSR is used in overhead transmission and distribution of electricity, and is also covered with weather resistant materials for overhead lines.

Weatherproof Wire

Weatherproof wire is made from hard drawn, medium hard drawn, or annealed copper or hard drawn and medium hard drawn aluminum and has a weatherproof covering of either synthetic rubber, thermoplastic, or a fibrous covering (braid or knit). The characteristics of weatherproof wire are described in the following standards and specifications:

(a) Fibrous covering (braid or knit)	ASA C 8.18–1948
(b) Neoprene covering	ASA C 8.34–1954
(c) Polyethylene covering	ASA C 8.35–1947

[fol. 3854] Weatherproof wire is used on insulators in the overhead distribution of electricity and as signal wire.

Service Drop Cable

Service drop cable consists of one, two, or three insulated copper or aluminum conductors twisted around an uninsulated conductor. The uninsulated conductor acts as a neutral wire and is selected to provide sufficient mechanical strength to support the cable under the anticipated service conditions. The characteristics of the types of service drop cable

generally used are described in the following standards and specifications:

(a) Neoprene self-supporting service drop (multiplex)	IPCEA S-19-81 (3rd ed.)
(b) Polyethylene self-supporting service drop (multiplex)	IPCEA S-19-81 (2nd ed.)

Service drop cable runs overhead from the utility to the weatherhead on a building.

Service Entrance Cable

Service entrance cable consists of one or more insulated copper or aluminum conductors surrounded by a number of uninsulated strands applied with a specific length of lay, and then enclosed by a moisture resisting tape and saturated braid covering. This cable may also be supplied with an outer extruded neoprene covering replacing the tape and braid. The characteristics of service entrance cable are described in the following standards and specifications:

Types SE unarmoured, Style U	Underwriters' Laboratories Standard 854 for service cables

[fol. 3855] Service entrance cable is generally installed on the side of a house and runs from the weatherhead on the building to the meter or switchbox.

Building Wire

Building wire consists of a copper or aluminum conductor insulated with a suitable wall thickness of a vulcanized rubber compound or a thermoplastic compound (polyvinyl chloride). An outer covering of braid or thin neoprene compound or lead is used when rubber is employed as the insulator, while no outer covering is required when thermoplastic is used. More detailed constructions and characteristics of building wire are described in the following standards and specifications:

(a) Thermoplastic insulated	Underwriters' Laboratories Standard 83 or thermoplastic insulated wires
(b) Rubber insulated, braid covered	Underwriters' Laboratories Standard 44 for rubber covered wires and cables

(c) Rubber insulated, lead covered	Underwriters' Laboratories Standard 44 for rubber covered wires and cables
(d) Nonmetallic sheathed cable	Underwriters' Laboratories Standard 719 for nonmetallic sheathed and underground feeder cables
(e) Nonmetallic sheathed and underground feeder cable	Underwriters' Laboratories Standard 719 for nonmetallic sheathed and underground feeder cables

Building wire is used for general purpose wiring of branch and feeder circuits for residential, commercial, public, and industrial buildings.

[fol. 3856] Power Cable Under 601 Volts

Power cable under 601 volts consists of one or more solid or stranded, copper or aluminum conductors, with an appropriate thickness of a specified insulation. In multiple conductor designs, the conductors are twisted together with suitable fillers and binder, and an overall jacket. The characteristics of power cable under 601 volts are described in the following standards and specifications:

(a) Rubber insulated power cable	IPCEA S-19-81 (3rd Ed.)
(b) Thermoplastic insulated power cable	IPCEA S-61-402 (1st Ed.)
(c) Varnished cambric insulated power cable	IPCEA S-62-375
(d) Paper insulated lead covered power cable	AEIC
(e) Interlocked armored cable (rubber or thermoplastic insulated)	IPCEA S-19-81 (3rd Ed.)
(f) Lead sheathed cable (rubber or thermoplastic insulated)	IPCEA S-19-81 (3rd Ed.)
(g) Self-supporting aerial cable (rubber or thermoplastic insulated)	IPCEA S-19-81 (3rd Ed.)

Power cable under 601 volts is used for low voltage power feeders to and within structures and for low voltage power distribution systems, aerially, in conduit, in underground ducts, directly buried in earth, and on trays.

Power Cable 601 Volts and Higher

Power cable 601 volts and higher consists of one or more solid or stranded, copper or aluminum conductors, with an appropriate thickness of a specified insulation. A different

thickness of insulation is used for power cable 601 volts [fol. 3857] and higher than for power cable under 601 volts. In multiple conductor designs, as with power cable under 601 volts, the conductors are twisted together with suitable fillers and binder, and an overall jacket. The characteristics of power cable 601 volts and higher are described in the following standards and specifications:

(a) Rubber insulated power cable	IPCEA S-19-81 (3rd Ed.)
(b) Thermoplastic insulated power cable	IPCEA S-61-402 (1st Ed.)
(c) Varnished cambric insulated power cable	IPCEA S-62-375
(d) Paper insulated lead covered power cable	AEIC
(e) Interlocked armored cable (rubber or thermoplastic insulated)	IPCEA S-19-81 (3rd Ed.)
(f) Lead sheathed cable (rubber or thermoplastic insulated)	IPCEA S-19-81 (3rd Ed.)
(g) Self-supporting aerial cable (rubber or thermoplastic insulated)	IPCEA S-19-81 (3rd Ed.)

Power cable 601 volts and higher is used for high voltage power feeders to and within structures and for high voltage power distribution systems, aerially, in conduit, in underground ducts, directly buried in earth, submarine and on trays.

Magnet Wire

Magnet wire consists of round, square or rectangular copper or aluminum wire. Four general classes of insulation are usually employed as coverings for magnet wire: film coatings, including oleo-resinous varnishes, enamels, vinyl acetal, epoxy, and nylon; paper coverings; cotton [fol. 3858] coverings; and glass coverings, including fiberglass and combinations of glass and dacron. The characteristics of magnet wire are described in the following standards and specifications:

(a) Cotton covered, square and rectangular	NEMA MW 12 (Proposed)
(b) Cotton covered, round	NEMA MW 11-1953
(c) Paper covered, square and rectangular	NEMA MW 33-1957
(d) Paper covered, round	NEMA MW 31-1956
(e) Double paper, single cotton covered, square and rectangular	NEMA MW 32-1955

(f) Glass covered, square and rectangular	NEMA MW 42-1957
(g) Glass covered, silicone treated, square and rectangular	NEMA MW 43-1959
(h) Glass covered, silicone treated, round	NEMA MW 44 (Proposed)
(i) Glass covered, round	NEMA MW 41-1959
(j) Dacron-glass, square and rectangular	NEMA MW 46-1958
(k) Dacron-glass, round	NEMA MW 45-1959
(l) Heavy formvar, square and rectangular	NEMA MW 18-1955
(m) Heavy epoxy, square and rectangular	NEMA MW 14 (Proposed)

Magnet wire is used as an electrical winding material in coils for motors, generators, capacitors, transformers, solenoids, etc.

Communication Wire and Cable

Communication wire and cable consists of insulated copper or aluminum conductors. In multiple conductor con- [fol. 3859] structions, the desired number of conductors are twisted together with an overall binder and a jacket applied. The characteristics of communication wire and cable are described in the following standards and specifications:

(a) Polyethylene and PVC insulated multi-conductor instrumentation and interconnecting cables	ASTM D 1351-54T ASTM D 734-50T MIL-W-16878 MIL-W-76
(b) Polyethylene insulated single and multi-paired telephone cable	REA P-E-14
(c) Polyethylene and PVC insulated hook-up wire	U/L Appliance Wiring Materials Standards
(d) Paper telephone cable	Western Electric Type 268-85

Communication wire and cable is used in a variety of applications, including the following:

For instrumentation circuits, telemetering, circuit control testing, electronic computers, business machines, missiles and other similar applications; for interconnecting between electronic apparatus; for telegraph and telephone use generally including exchange areas, and plants, telephone switchboards, etc.; and for hook-up wire for radio, TV, and other electronic apparatus.

Control Wire and Cable

Control wire and cable consists of two or more solid or stranded, small, insulated copper or aluminum conductors. In multiple conductor designs, the desired number of conductors are twisted together with suitable fillers and binder, and an outer covering or jacket applied. The characteristics of control wire and cable are described in the following standards and specifications:

[fol. 3860]

(a) PVC machine tool and control wire	National Machine Tool Builders Association
(b) Polyethylene insulated multi-conductor control cable	Interim standard # 2 to IPCEA S-61-402
(c) PVC insulated multi-conductor control cable	IPCEA S-19-81 (2nd Ed.)
(d) Rubber insulated multi-conductor control cable	IPCEA S-19-81 (3rd Ed.)

Control wire and cable is used for operation and interconnection of protective devices, and for monitoring, data recording and conveyance of information, the latter including telemetering, pressure flow, indicating lights, etc. Control wire and cable is also used for wiring industrial equipment such as machine tools.

Signal Wire and Cable

Signal wire and cable consists of a rubber or thermoplastic insulated single or multiple copper or aluminum conductor cable intended for use overhead or underground in signal systems such as railway, traffic, fire alarm, or police alarm systems. The characteristics of signal wire and cable are described in the following standards and specifications:

(a) Rubber insulated fire alarm and traffic signal cables	IMSA # 5
(b) Polyethylene insulated fire alarm and traffic signal cables	IMSA # 19-1
(c) PVC insulated fire alarm and traffic signal cables	IMSA # 20
(d) Rubber insulated railroad signal wire	AAR # 111
(e) Rubber insulated railroad signal cable	AAR # 161, 240

[fol. 3861] Appliance Wire and Flexible Cord

Appliance wire consists of single or multiple concentric or bunched stranded copper or aluminum conductor wires designed for internal or accessory wirings of electrical appliances and equipment. It is insulated with rubber, thermoplastic compounds or fibrous materials of the type to which Underwriters' Laboratories appliance wiring materials labels may be applied. Typical characteristics of appliance wire are described in the following standards and specifications:

(a) PVC insulated appliance wire	U/L Appliance Wire Standard, ASTM D734–50T
(b) Types RF and RFH rubber insulated fixture wire	Underwriters' Laboratories standard 62 for flexible cord and fixture wire
(c) Types TF and TFF thermoplastic insulated fixture wire	Underwriters' Laboratories standard 62 for flexible cord and fixture wire

Flexible cords cover a broad range of construction in which the conductor consists of fine sizes of wire which are generally bunch stranded in order to give the desired degree of flexibility. In some cords, the conductors are laid parallel which gives an oval construction. Other types are made with two, three, or four conductors twisted with an outer jacket forming a finished round cord. These products employ two principle types of insulation and jackets—rubber insulation with rubber jackets, and thermoplastic insulation and jacket. Typical characteristics of flexible cords are described in the following standards and specifications:

(a) Type SV rubber insulated vacuum-cleaner cord	Underwriters' Laboratories standard 62 for flexible cord and fixture wire
(b) Type SJO rubber insulated junior hard-service cord	Underwriters' Laboratories standard 62 for flexible cord and fixture wire
(c) Type SO rubber insulated hard-service cord	Underwriters' Laboratories standard 62 for flexible cord and fixture wire

[fols. 3862-3863] Automotive and Aircraft Wire and Cable

Automotive and aircraft type wire and cable is used for ignition, starter, battery, or primary wiring systems in automotive vehicles and aircraft.

Marine Wire and Cable

Marine wire and cable includes copper wire and cable for use in the Merchant Marine service or for use on Navy vessels. It can consist of a wide variety of single or multiple conductors made in accordance either with MIL-C-915A for Navy use, or the recommended practice of American Institute of Electrical Engineers for electrical insulation on Merchant Marine vessels.

Portable Cord and Cable

Portable cord and cable consists of one or more insulated, stranded copper or aluminum conductors covered with an outer jacket of thermoplastic compound, neoprene, or synthetic rubber, or rubber, molded or unmolded. Portable cord generally has a conductor size 10 or smaller while portable cable is size 8 or larger. Portable cord and cable are used to supply electric power to mining machines, mining locomotives, portable power shovels, dredges, welding sets, concrete mixers, and electrical appliances.

[fol. 3864] Table V

Introduction

This table sets forth Alcoa's total production and total sales of (A) EC aluminum pig, (B) EC aluminum ingot, and (C) EC aluminum rod and Rome's total production and total sales of (C) EC aluminum rod. Rome did not produce or sell any EC aluminum pig or ingot.

In addition, this table sets forth Rome's sales of EC aluminum rod to be used in the production of (1) aluminum conductor wire and cable and (3) other products. No rod produced by Rome was sold for use in the production of (2) aluminum conductor other than wire and cable. With respect to Alcoa the table shows sales of EC aluminum pig, ingot, and rod to be used in the production of (1) aluminum conductor wire and cable, (2) aluminum conductor other than wire and cable, and (3) other products. All figures shown are subject to errors inherent in attempting to ascertain the end use to which a product was put by defendants' customers.

It is impossible to show the production by either Alcoa or Rome of EC pig, ingot, or rod used in each category specified in (E), (F), and (G) since such products are not earmarked for any particular use at the time of production. EC pig, ingot, or rod produced during any period can be (a) sold as such product in a current or subsequent period, (b) placed in inventory, or (c) further fabricated during the current period. The sales figures set forth in this table provide some indication of the extent to which total production over a period of years is sold for the designated end uses. All of Rome's EC rod that is not sold is utilized by Rome in the fabrication of conductor wire and cable products. EC pig that is not sold by Alcoa is utilized to make EC ingot. As indicated by defendants' answer to [fol. 3865] Interrogatory 65 (d), EC ingot which is not sold as such would be utilized in producing EC redraw rod or busbar. As also indicated in defendants' answer to Interrogatory 65 (d), EC rod which is not sold as such would be used in the production of conductor or non-conductor wire and cable products.

EC ALUMINUM PIG

(A) Alcoa

	Total Production		Total Sales		Sales for Use in Production of Aluminum Conductor Wire or Cable		Sales for Use in Production of Aluminum Conductor Other Than Wire or Cable		Sales for Use in Production of Other Products	
	Quantity	Value(1)	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1954	111,767,536	.204	2,763,426	562,342						
1955	110,541,573	.218	14,660,452	3,199,579	13,494,922	2,939,666	200,633	45,143	964,897	214,770
1956	119,006,544	.239	18,660,306	4,485,658	17,878,493	4,303,557	606,840	139,586	174,973	42,515
1957	126,902,329	.258	13,926,101	3,599,881	13,834,311	3,576,274			91,790	23,607
1958	85,252,670	.250	16,492,268	4,123,336	16,426,232	4,107,093			66,036	16,243
1959	100,003,705	.253	5,569,721	1,404,023	5,522,509	1,391,670			47,212	12,353
1960	85,300,334	.266	17,482	4,656					17,482	4,656
1960										
1st Qtr.	26,333,088	.265								
2nd Qtr.	22,818,381	.266	17,482	4,656					17,482	4,656
3rd Qtr.	18,353,933	.266								
4th Qtr.	17,794,932	.267								

(B) Rome

Rome neither produced nor sold EC aluminum pig.

(1) The value shown is the average sales revenue for EC pig sold by Alcoa and is representative of the value of this product.

Table V

[fol. 3867]

EC ALUMINUM INGOT

(A) Alcoa

	Total Production		Total Sales		Sales for Use in Production of Aluminum Conductor Wire or Cable		Sales for Use in Production of Aluminum Conductor Other Than Wire or Cable		Sales for Use in Production of Other Products	
	Quantity	Value(1)	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1954	123,630,956	.266	244	65						
1955	107,495,476	.273	71,207	18,826			40,452	10,922	30,755	7,904
1956	110,944,094	.303	227	68					227	68
1957	116,569,890	.306	70,915	21,709			70,915	21,709		
1958	93,737,583	.292	85,442	24,939			85,200	24,856	242	83
1959	109,570,231	.295	161,954	47,633			161,661	47,535	293	98
1960	99,217,362	.282	156,395	44,133			156,395	44,133		
1960										
1st Qtr.	31,056,911	.273	33,436	9,113			33,436	9,113		
2nd Qtr.	24,894,106	.292	60,563	17,693			60,563	17,693		
3rd Qtr.	21,840,044	.287	(1,208)	(354)			(1,208)	(354)		
4th Qtr.	21,426,301	.278	63,604	17,681			63,604	17,681		

(B) Rome

Rome neither produced nor sold EC aluminum ingot.

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(1) The value shown is the average sales revenue for EC ingot sold by Alcoa and approximates the value of this product. However, the value is not precisely accurate since the proportion of each size and shape of EC ingot comprising EC ingot sales is not exactly the same as the proportion of each size and shape of EC ingot comprising EC ingot production. This results from Alcoa's use of a substantial amount of this production for further fabrication in its own plants.

[fol. 3868]

EC ALUMINUM ROD

(A) Alcoa

	Total Production		Total Sales		Sales for Use in Production of Aluminum Conductor Wire or Cable		Sales for Use in Production of Aluminum Conductor Other Than Wire or Cable		Sales for Use in Production of Other Products	
	Quantity	Value(1)	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1954	114,692,611	.267	16,495,554	4,413,709	(2)	(2)	(2)	(2)	(2)	(2)
1955	101,563,685	.279	15,193,862	4,262,894	14,937,055	4,182,270	35,494	12,480	221,313	68,144
1956	95,029,699	.319	16,287,767	5,152,763	16,232,716	5,134,309	251	276	54,800	18,178
1957	91,103,694	.330	12,042,712	4,074,986	12,027,994	4,069,516			14,718	5,470
1958	79,677,436	.304	6,977,831	2,116,209	6,956,877	2,108,955			20,954	7,254
1959	102,151,389	.289	16,832,689	4,855,351	16,458,677	4,745,706			374,012	109,645
1960	91,375,549	.304	9,237,065	2,813,805	8,827,601	2,686,383			409,464	127,422
1960										
1st Qtr.	28,956,335	.304	3,614,701	1,096,807	3,545,376	1,076,111			66,325	20,696
2nd Qtr.	22,873,024	.303	1,891,486	571,910	1,725,458	521,086			166,028	50,824
3rd Qtr.	19,321,363	.306	2,698,101	826,748	2,596,328	793,787			101,773	32,961
4th Qtr.	20,224,827	.307	1,035,777	318,340	960,439	295,399			75,338	22,941

(1) The value shown is calculated based on the average sales revenue for EC rod sold by Alcoa and is representative of the value of this product.

(2) Data not available for the year 1954.

[fols. 3869-3873]

EC ALUMINUM ROD (Cont'd)

(B) Rome

	Total Production		Total Sales		Sales for Use in Production of Aluminum Conductor Wire or Cable		Sales for Use in Production of Aluminum Conductor Other Than Wire or Cable		Sales for Use in Production of Other Products	
	Quantity	Value(1)	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1954	1,818,226	485,466					Rome sold no EC			
1955	3,259,250	977,775	4,780	1,434	4,780	1,434	aluminum rod for			
1956	4,778,372	1,570,651	139,079	45,854	14,829	5,195	this purpose.		124,250	40,659
1957	3,796,028	1,300,140	417,878	143,138	75,430	26,219			342,448	116,919
1958	3,360,216	1,114,584	387,468	128,531	14,909	5,270			372,559	123,261
1959	4,287,705	1,377,640	494,193	158,780	59,863	19,920			434,330	138,860
1960										
1st Qtr.	1,126,758	358,478	122,536	38,985	-	-			122,536	38,985
2nd Qtr.	-	-	-	-	-	-			-	-
3rd Qtr.	-	-	-	-	-	-			-	-
4th Qtr.	-	-	-	-	-	-			-	-

(1) Value shown is derived for 1954 by multiplying production by annual average market price, because Rome sold no rods for these years, and for other years by multiplying production by annual average sales price. Rome suspended production of rod April 1, 1960.

[fol. 3874]

ALCOA

TABLE VII

Period	Bare Conductor Cable Aluminum A.C.S.R. Quantity	Bare Conductor Cable Aluminum A.C.S.R. Value	Weatherproof Wire and Cable Aluminum Quantity	Weatherproof Wire and Cable Aluminum Value	Service Drop Aluminum Quantity	Service Drop Aluminum Value
	#	$	#	$	#	$
1950	1,300,845	371,455	63,716,799	23,132,917	-	-
1952	5,567,477	1,789,030	76,122,240	30,125,297	283,241	236,890
1954	3,785,576	1,232,024	67,018,508	27,148,186	1,199,537	912,427
1955	5,493,545	1,846,328	55,162,255	22,463,329	1,904,160	1,528,721
1956	10,522,368	4,076,395	43,845,049	20,777,882	2,309,637	1,941,470
1957	7,723,724	2,988,308	45,124,217	21,038,105	2,176,276	1,725,238
1958	9,520,905	3,275,391	46,338,641	20,025,090	2,035,466	1,368,195
1959	9,210,930	3,093,038	49,245,338	20,140,681	2,303,079	1,447,283
1960	8,710,849	3,272,972	43,541,637	19,377,457	1,895,347	1,263,663
1959-1st Qtr.	1,749,385	614,227	11,672,340	4,742,495	484,090	299,545
-2nd Qtr.	2,417,910	795,993	12,576,986	5,106,936	561,371	367,756
-3rd Qtr.	3,301,126	1,069,281	14,145,605	5,674,103	646,636	386,908
-4th Qtr.	1,742,509	613,537	10,850,407	4,617,147	610,982	393,074
1960-1st Qtr.	2,219,056	819,422	10,122,301	4,473,444	423,113	268,414
-2nd Qtr.	2,404,265	884,894	13,865,053	6,066,862	479,956	316,776
3rd Qtr.	1,651,318	632,624	11,807,257	5,273,108	584,001	383,469
-4th Qtr.	2,436,210	936,032	7,747,026	3,564,043	408,277	295,004
					744,982	586,042

[fol. 3875]

ROME

	Bare Conductor Cable (1)					
	Copper(2)		Aluminum		A.C.S.R.	
	Quantity	Value	Quantity	Value	Quantity	Value
1950	N.A.	$ 996,579	-	-	-	-
1952	N.A.	964,698	-	-	-	-
1954	N.A.	1,203,240	32,517#	$ 11,900	291,792#	$ 82,247
1955	N.A.	1,744,249	70,838	25,544	242,142	73,653
1956	N.A.	1,443,232	176,138	71,982	555,304	186,427
1957	N.A.	1,017,606	106,041	42,985	551,888	181,723
1958	N.A.	824,489	70,036	32,529	665,384	207,715
1959	N.A.	1,194,222	184,445	66,259	1,645,292	470,841
1960	N.A.	1,105,545	11,210	4,696	355,011	107,482
1st Quarter 1959	N.A.	301,201	73,751	25,581	151,272	45,787
2nd " "	N.A.	328,496	10,902	3,778	416,432	121,894
3rd " "	N.A.	300,615	30,152	10,728	544,523	151,767
4th " "	N.A.	263,910	69,640	26,172	533,065	151,393
1st Quarter 1960	N.A.	261,089	21,742	9,239	183,245	56,386
2nd " "	N.A.	310,238	116	121	143,670	43,571
3rd " "	N.A.	306,344	-	-	28,096	7,525
4th " "	N.A.	227,874	(10,648)	(4,664)	-	-

(1) Includes only sales to utilities and distributors; sales to fabricators are excluded.
(2) Includes bare conductor wire sold by Rome to utilities and distributors.

[fol. 3876]

ROME

	Weatherproof Wire and Cable				Service Drop Cable			
	Copper		Aluminum		Copper		Aluminum	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1950	11,777,119# 42,579,983 Ft.	3,621,476 1,012,640	-	-	- 6,252,465 Ft.	- 745,755	-	-
1952	6,919,081# 26,727,426 Ft.	2,543,600 781,089	102,143# 2,468,256 Ft.	40,588 148,387	- 2,360,953 Ft.	- 360,759	- 4,366,035 Ft.	- 497,512
1954	5,925,108# 19,139,896 Ft.	2,411,756 767,871	373,156# 4,731,179 Ft.	154,588 254,913	- 2,180,069 Ft.	- 432,435	- 10,911,521 Ft.	- 1,212,341
1955	7,577,313# 20,364,006 Ft.	3,556,701 799,219	378,597# 7,618,779 Ft.	167,044 619,085	- 2,824,189 Ft.	- 536,859	- 12,952,032 Ft.	- 1,416,275
1956	5,484,907# 18,281,035 Ft.	2,538,847 859,512	273,998# 12,675,757 Ft.	129,264 901,958	- 2,453,176 Ft.	- 551,331	- 17,649,182 Ft.	- 2,084,897
1957	4,422,992# 15,583,106 Ft.	1,955,022 618,637	109,190# 6,873,758 Ft.	45,843 532,657	- 1,797,880 Ft.	- 357,994	- 12,309,835 Ft.	- 1,491,649
1958	3,118,079# 13,818,840 Ft.	1,240,150 499,250	212,9[illegible]# 6,517,[illegible] Ft.	55,185 426,620	- 1,508,458 Ft.	- 277,704	- 11,723,728 Ft.	- 1,250,364
1959	3,172,172# 12,457,361 Ft.	1,410,738 491,509	11,267# 5,519,586 Ft.	5,128 326,709	- 1,564,286 Ft.	- 315,798	- 13,399,820 Ft.	- 1,327,061
1960	2,948,456# 9,456,594 Ft.	1,336,592 388,836	- 4,772,415 Ft.	- 244,646	- 1,506,161 Ft.	- 255,268	- 13,349,711 Ft.	- 1,312,125
1st Quarter 1959	660,729# 3,154,029 Ft.	286,278 112,168	- 1,452,075 Ft.	- 92,390	- 415,465 Ft.	- 79,979	- 2,433,444 Ft.	- 238,972
2nd " "	762,988# 2,958,112 Ft.	342,076 115,355	260# 1,184,851 Ft.	35 75,982	- 332,075 Ft.	- 62,008	- 2,316,108 Ft.	- 233,310
3rd " "	833,347# 3,587,009 Ft.	370,328 164,786	5,848# 1,346,627 Ft.	2,706 74,506	- 404,195 Ft.	- 79,536	- 4,100,581 Ft.	- 392,428
4th " "	915,108# 2,758,211 Ft.	412,056 99,200	5,159# 1,536,033 Ft.	2,387 83,831	- 412,551 Ft.	- 94,275	- 4,549,687 Ft.	- 462,351
1st Quarter 1960	641,155# 2,196,526 Ft.	293,990 99,385	- 2,199,964 Ft.	- 93,681	- 283,778 Ft.	- 49,136	- 2,808,782 Ft.	- 265,023
2nd " "	958,521# 2,749,105 Ft.	432,942 116,943	- 986,535 Ft.	- 66,085	- 287,201 Ft.	- 51,128	- 3,441,569 Ft.	- 340,770
3rd " "	738,501# 2,253,107 Ft.	337,346 90,810	- 640,508 Ft.	- 35,726	- 488,609 Ft.	- 83,479	- 2,471,972 Ft.	- 227,772
4th " "	610,279# 2,257,856 Ft.	272,314 81,698	- 945,408 Ft.	- 49,154	- 446,582 Ft.	- 71,525	- 4,627,388 Ft.	- 478,560

[fol. 3877]

NONE

Power Cable Product Types (Under 601V)

	Street Lighting Cable		Tree Wire				Preassembled Aerial Cable				Triplex	
	Copper		Copper		Aluminum		Copper		Aluminum		Aluminum	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1950	454,567 Ft.	44,056	-	-	-	-	-	-	-	-	-	-
1952	635,421	84,275	-	-	-	-	-	-	-	-	-	-
1954	428,976	89,093	-	-	-	-	67,570 Ft.	58,940	-	-	-	-
1955	990,454	97,462	-	-	-	-	24,790	7,100	-	-	-	-
1956	1,240,540	122,792	9,625 Ft.	728	56,095 Ft.	13,879	22,410	17,072	2,750 Ft.	7,742	-	-
1957	1,094,695	98,144	4,260 Ft.	943	-	-	19,700	18,730	350	343	-	-
1958	1,025,310	83,935	-	-	-	-	24,975	25,495	79,044	30,887	-	-
1959	766,865	66,277	24,105	3,229	-	-	54,770	52,981	116,920	54,368	5,960 Ft.	5,376
1960	583,383	54,548	85,550	10,762	-	-	14,462	26,415	5,090	7,015	-	-
1st Quarter 1959	206,025	19,197	3,950	931	-	-	8,685	6,052	116,920	54,368	4,960	4,474
2nd " "	196,790	16,325	-	-	-	-	18,830	12,200	-	-	1,000	902
3rd " "	197,425	16,104	20,155	2,298	-	-	17,170	18,633	-	-	-	-
4th " "	166,625	14,651	-	-	-	-	10,085	16,096	-	-	-	-
1st Quarter 1960	145,825	13,973	79,520	9,542	-	-	2,445	4,067	-	-	-	-
2nd " "	218,348	20,531	-	-	-	-	5,137	9,850	2,690	3,751	-	-
3rd " "	97,570	10,198	3,100	502	-	-	5,080	9,173	2,400	3,264	-	-
4th " "	121,640	9,846	2,930	718	-	-	1,800	3,325	-	-	-	-

[fol. 3878]

ROME

Power Cable Product Types (Over 601V)

	Street Lighting Cable				Tree Wire			
	Copper		Aluminum		Copper		Aluminum	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1950	23,505 Ft.	1,700	-	-	-	-	-	-
1952	183,558 Ft.	10,517	300,240	14,233	-	-	-	-
1954	1,089,105 Ft.	67,192	-	-	-	-	-	-
1955	192,595 Ft.	42,334	-	-	19,435 Ft.	1,015	73,725 Ft.	16,651
1956	492,920 Ft.	49,464	-	-	31,560 Ft.	4,763	30,545 Ft.	5,599
1957	324,738 Ft.	27,013	-	-	105,526 Ft.	19,429	235,875 Ft.	48,443
1958	29,300 Ft.	3,047	15,135	1,453	120,800 Ft.	21,557	18,958 Ft.	4,656
1959	94,565 Ft.	8,798	-	-	139,310 Ft.	24,704	118,196 Ft.	17,980
1960	34,165 Ft.	3,753	-	-	212,680 Ft.	46,785	60,530 Ft.	10,550
1st Quarter 1959	3,990 Ft.	706	-	-	34,530 Ft.	4,689	9,080 Ft.	1,471
2nd " "	11,350 Ft.	1,117	-	-	80,560 Ft.	16,010	6,650 Ft.	1,452
3rd " "	63,725 Ft.	4,863	-	-	28,220 Ft.	4,005	50,450 Ft.	5,458
4th " "	15,500 Ft.	2,112	-	-	-	-	52,016 Ft.	9,599
1st Quarter 1960	22,885 Ft.	2,313	-	-	1,100 Ft.	284	12,050 Ft.	1,765
2nd " "	1,350 Ft.	281	-	-	16,235 Ft.	3,501	7,155 Ft.	1,612
3rd " "	3,790 Ft.	567	-	-	158,335 Ft.	38,207	27,105 Ft.	4,903
4th " "	6,140 Ft.	592	-	-	37,010 Ft.	4,793	14,220 Ft.	2,270

[fols. 3879-3880]

ROME

Power Cable Product Types (Over 601V)

	Preassembled Aerial Cable				Trimline			
	Copper		Aluminum		Copper		Aluminum	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1950	-	-	-	-	-	-	-	-
1952	-	-	-	-	-	-	-	-
1954	8,870 Ft.	15,468	-	-	-	-	-	-
1955	24,599	46,912	-	-	-	-	-	-
1956	147,980	240,934	-	-	-	-	-	-
1957	222,448	391,203	-	-	-	-	-	-
1958	112,237	192,897	-	-	-	-	4,060	4,503
1959	40,449	60,185	4,475 Ft.	12,670	12,860 Ft.	12,390	179,329	153,220
1960	26,380	74,663	23,700	17,577	3,350	3,148	150,845	124,086
1st Quarter 1959	9,945	28,493	-	-	-	-	29,304	27,998
2nd " "	5,671	1,974	-	-	2,660	3,570	43,845	38,690
3rd " "	9,805	11,281	-	-	6,650	6,363	59,194	49,067
4th " "	15,028	18,437	4,475	12,670	3,550	2,457	46,986	37,465
1st Quarter 1960	9,965	24,886	-	-	-	-	61,131	59,422
2nd " "	3,455	10,629	-	-	500	163	41,935	32,522
3rd " "	-	-	23,700	17,577	-	-	31,883	22,673
4th " "	12,960	39,148	-	-	2,850	2,985	15,896	9,469

[fol. 4437] IN THE UNITED STATES DISTRICT COURT, NORTHERN DISTRICT OF NEW YORK

Civil No. 8030

UNITED STATES OF AMERICA, Plaintiff,

against

ALUMINUM COMPANY OF AMERICA AND ROME CABLE CORPORATION, Defendants.

The Findings of Fact and Conclusions of Law, set out below, together with the opinion, filed herewith, will constitute the decision in this case.

FINDINGS OF FACT—Filed January 28, 1963

1. The defendants, Aluminum Company of America and Rome Cable Corporation, hereinafter referred to as Alcoa and Rome, maintain offices, transact business and are found within the Northern District of New York.

2. The defendant Alcoa is a corporation organized and existing under the laws of the State of Pennsylvania, with its principal office in Pittsburgh, Pennsylvania.

3. Alcoa is an integrated aluminum producer engaged in the manufacture and sale of primary aluminum, intermediate aluminum products, and various end products. It manufactures these products in several states and sells and ships such products throughout the United States in interstate commerce.

4. The defendant Rome is a wholly owned subsidiary of Alcoa, organized and existing under the laws of the State of Delaware, with its principal office at Rome, New York. It was organized by Alcoa for the purpose of holding the assets of its predecessor, also called Rome Cable Corporation, a New York corporation.

5. Rome manufactures, among other products, copper rod, electrical wire and cable, conduit and cable trough and cable installation devices. It manufactures these products in several states and sells and ships them in interstate commerce to its customers located in many states of the United States.

6. On March 31, 1959, defendant Alcoa acquired by stock [fol. 4438] transfer all of the assets of Rome-New York. Title to such assets was taken by the defendant Rome (Delaware) which also assumed Rome-New York's liabilities.

7. Alcoa's purpose in acquiring Rome was to acquire the ability to manufacture the more complicated insulated wire and cable products and diversify its operations. Rome's manufacture of aluminum products did not induce said acquisition.

8. In its search for a suitable company, Alcoa in 1958 retained the services of Ebasco Services, Inc. Ebasco was advised that Alcoa's purpose was to secure know-how in the insulating field.

9. While Alcoa considered other insulating companies, Rome was its first choice. This preference arose principally from the fact that Rome's personnel and organization were well and favorably known to Alcoa through their mutual association in a "tolling arrangement" entered into in 1952.

10. In the course of negotiations with Rome, Alcoa made it clear that, if acquired, Rome would operate as a separate division with a high degree of autonomy and increased responsibility with regard to the sale of wire, cable and conduit products.

11. The evidence does not establish that Alcoa's acquisition of Rome was part of a continuing program contemplating future expansion through mergers or acquisitions in wire and cable, conduit, or any related field.

12. Alcoa mines and processes bauxite, refines bauxite into alumina, and smelts alumina into aluminum. The aluminum, so produced, is sold either in alloyed or unalloyed form, as ingot, or is used by Alcoa in its own fabrication of a wide variety of semi-finished and finished products. Among the products fabricated by Alcoa are sheet and plate, extrusions, castings, forgings, wire, rod and bar, electrical conductors and accessories, conduit, foil, tubing, rivets and screw machine products, closures, and powder and paste.

13. Prior to the acquisition of Rome, Alcoa's participation in the electrical wire and cable field was limited to the manufacture and sale of bare all-aluminum cable, bare

[fol. 4439] aluminum conductor steel reinforced (ACSR), and polyethylene covered line wire and multiplex cable. It also sold neoprene covered line wire and multiplex cable manufactured for it by Rome. Alcoa made no electrical wire and cable products using copper as the conductor; nor did it make any of the more complicated insulated constructions, such as, among others, building wire, power cable, control cable, and magnet wire.

14. Bare wire and cable products constituted the great preponderance of Alcoa's sales in the electrical wire and cable field. In 1958, out of Alcoa's total conductor wire and cable shipments of 62.9 million pounds, ACSR and bare aluminum cable amounted to 56.9 million pounds, or more than 90 percent of the total.

15. While Alcoa continues to be the leading United States producer of primary aluminum and fabricated aluminum products, its position has declined markedly in recent years. (Opinion page 11).

16. Prior to the acquisition, Rome was primarily a manufacturer of electrical wire and cable. It had three manufacturing plants located at Rome, New York; Torrance, California; and Collegeville, Pennsylvania. It produced and sold bare wire and cable and a diversified line of insulated wire and cable products; it manufactured copper and aluminum rod for use in its own operations and for sale to other manufacturers; and it produced copper rod and certain wire and cable products on a toll basis using materials supplied by others. In addition, at its plant in Torrance, California, Rome manufactured steel rigid conduit and electrical metallic tubing (commonly referred to as EMT) and mechanical steel tubing. At its Cope Division plant in Collegeville, Pennsylvania, it manufactured a line of cable supporting systems, including cable trough and trays. In calendar year 1958, Rome's sales (exclusive of toll conversion) in its major product categories were approximately as follows: Wire and cable, $23.4 million; rod, 4 million (includes aluminum rod sales of $128 thousand); [fol. 4440] conduit (rigid and EMT) $6.5 million; and, Cope products, $1.3 million.

17. Rome's primary emphasis in the wire and cable field was on the manufacture of insulated wire and cable products. It was a skilled manufacturer of the more compli-

cated insulated products, and had in this area technical ability that Alcoa lacked.

18. Copper was by far the predominant metal used by Rome in its wire and cable operations. Its importance is shown by the fact that in the five years prior to the acquisition copper represented more than 90 percent of Rome's combined copper and aluminum purchases, and copper products accounted for more than 90 percent of its wire and cable sales revenue.

19. On March 7, 1952, Alcoa and Rome entered into a continuing agreement, referred to as a "tolling agreement", whereby Rome would cover bare aluminum wire furnished by Alcoa for the account of Alcoa. The agreement provided that Rome would cover or insulate bare aluminum wire with neoprene or polyethelene insulating materials. The arrangement permitted Alcoa to take advantage of the superior "know-how" of Rome in the matter of covering of bare wire products some of which were sold in competition with Rome.

20. Prior to the acquisition only five products were manufactured and sold by both Alcoa and Rome. These products can be identified as follows: (a) Aluminum Conductor Steel Reinforced (ACSR) and Aluminum Cable, Bare; (b) Covered Line Wire (also referred to as Weather-proof). This product consists of a copper or aluminum conductor covered with a synthetic rubber (neoprene), thermo-plastic (Polyethylene), or fibrous covering; (c) Multiplex Cable; (d) Conduit; (e) Aluminum Redraw Rod. Aluminum redraw rod is an intermediate aluminum product used in the fabrication of aluminum wire.

21. Prior to the acquisition, defendants manufactured and sold the overlap products referred to in Finding 20 as follows:

[fol. 4441] (a) ACSR and Aluminum Cable, Bare. Alcoa made ACSR and aluminum cable, bare, in a full range of sizes; Rome made only a limited range of sizes. Alcoa's total sales amounted to approximately $23,000,000 in 1958, of which approximately $8,000,000 represented sales in the size range Rome was able to make. Rome's sales in 1958 amounted to approximately $240,000.

(b) Covered Line Wire and Multiplex Cable. Alcoa did not sell these products until 1952 when it entered into a tolling arrangement with Rome under which Rome manufactured polyethylene and neoprene covered aluminum line wire and multiplex cable which Alcoa sold for its own account. In 1956, Alcoa started to produce its own polyethylene covered line wire and multiplex cable, and at the time of the acquisition it had under consideration a plan to install neoprene covering facilities. Rome produced covered line wire using copper or aluminum conductors and having either neoprene, polyethylene or fibrous covering. It also produced multiplex cable using copper and aluminum insulated conductors. Alcoa's covered line wire and multiplex sales in 1958 amounted to approximately $4,200,000; Rome's sales in that year, including both copper and aluminum, were approximately $3,700,000.

(c) Conduit. Prior to the acquisition, Rome manufactured steel conduit, both rigid and EMT; it made no aluminum conduit. Alcoa manufactured rigid aluminum conduit and aluminum EMT; it made no steel conduit. Alcoa's sales of aluminum conduit in 1958 amounted to approximately $525,000; Rome's sales of steel conduit amounted to about $6,500,000.

(d) Aluminum Redraw Rod. Prior to the acquisition Alcoa produced aluminum redraw rod on its rolling mills and Rome produced such rod by the Properzi method. Alcoa made sales of aluminum rod to other manufacturers of approximately $2,500,000 in 1958. Most of Rome's aluminum rod was consumed in its own operations, its sales to other manufacturers in 1958 amounting to only about $128,000.

22. Alcoa's net sales and operating revenues in 1958 amounted to approximately $753,000,000. Its sales in the overlap area, consisting of ACSR and aluminum cable, bare (sizes 336,400 cir. mils. and smaller), covered line wire and multiplex cable, conduit and aluminum rod, totalled approximately $15,300,000, or about 2 percent of its net sales and operating revenues. The ratio between Alcoa's

overlap and total sales for earlier years is approximately the same.

[fol. 4442] Lines of Commerce

Explanation

Items 1-10, set forth on pages 13 and 14 of the filed opinion, detail the lines of commerce urged by the plaintiff as properly established in this action. Reference to same is made here without the repetition thereof. The Findings below are intended to supplement those made in the discussion of the various items as same appears in pages 14 to 19 of said opinion.

Aluminum Conductor Lines

23. Item 1, aluminum conductor wire and cable, is a composite of Items 2 and 3 and is not a separate and distinct line of commerce here. (See Opinion, page 15).

24. Item 2, bare aluminum cable and ACSR (aluminum covered steel reinforced) have virtually displaced bare copper cable for use in overhead transmission lines. They are generally recognized as a separate product classification and the manufacture and sale of these products require special stranding equipment and designing skill. The parties have agreed that the manufacture and sale of bare aluminum cable and ACSR may be treated as a separate line of commerce for the purpose of this case and it is so found.

25. Item 3, insulated or covered aluminum wire and cable. The wire and cable industry defines insulated wire and cable products according to function or type, not according to the metal used as conductor.

26. Manufacturers of insulated wire and cable products regard themselves as insulators of wire and cable products, not as insulators of copper wire and cable on the one hand, or of aluminum wire and cable on the other.

27. The evidence establishes that wire and cable fabricators can draw, strand and insulate copper and aluminum interchangeably on the same equipment and with the same personnel. The only change required is the use of a different lubricant in the drawing operation and a cleanup of [fol. 4443] the drawing machine when it is to be used on a different metal.

28. Since copper and aluminum products are completely interchangeable from a performance standpoint, utility companies choose between copper and aluminum insulated or covered overhead products solely on the basis of economics. The decision requires evaluation of numerous economic factors in addition to the cost of the wire or cable itself.

29. While aluminum is used in various insulated wire and cable products, most such products, accounting for more than $1,250,000,000 out of total 1958 insulated wire and cable shipments of $1,320,000,000, are predominantly made from copper. Aluminum has gained its greatest acceptance in the insulated or covered field in products used in the overhead distribution of electric power, principally, covered line wire (weatherproof) and multiplex cable. Even with respect to these products, however, substantial quantities are sold using copper as the conductor.

30. Item 4. Aluminum ingot and rod used in the production of aluminum conductor wire and cable is a separate line of commerce. (See Opinion page 16).

Conductor Wire and Cable Lines

31. Item 5, Conductor wire and cable (aluminum and copper) as a line of commerce corresponds to the electrical wire and cable industry. It includes the manufacture and sale of all bare and insulated or covered electrical wire and cable products, whether made from copper or aluminum. There is a generally recognized electrical wire and cable industry and the parties agree that conductor wire and cable may be treated as a line of commerce for the purpose of this case.

32. Item 6, Conductor wire and cable, bare, (aluminum and copper) which consists of ACSR and aluminum cable, bare; bare conductor aluminum wire; and bare conductor copper wire and cable, is not a separate line of commerce here. (Opinion page 17).

[fol. 4444] 33. Item 7, Wire and cable, insulated or covered (aluminum and copper) line of commerce consists of the manufacture and sale of all insulated or covered wire and cable products, both copper and aluminum and it is

agreed that same constitutes a separate line of commerce here.

34. By item 8, Service drop cable (aluminum and copper), plaintiff refers exclusively to multiplex cable, both copper and aluminum. The evidence fails to establish that the manufacture and sale of multiplex cable is a line of commerce separate and distinct from the manufacture and sale of other insulated or covered wire and cable products.

35. Multiplex cable is only one of many products of the insulated wire and cable industry. It is one of the simplest of such products, being nothing more than one or more simple insulated conductors twisted together with a bare cable. It requires no unique production facilities.

36. Virtually any manufacturer of insulated wire and cable products is capable of making multiplex cable. A company equipped to manufacture building wire, power cable, control cable, or practically any other insulated wire and cable product can use its existing machinery and personnel to manufacture multiplex cable. Such companies constantly review their product lines, and switch from one product to another whenever it is profitable to do so.

37. Multiplex cable is not used exclusively as a service drop from the utility pole to the building, nor is it the only product used for that function.

(a) Weatherproof line wire in the form of two or three separate wires is extensively used for service drop purposes.

(b) Other cable, including Type K and Type SD cable, are used for service drop purposes.

(c) In addition to being used for service drop purposes, multiplex cable is also used as a self-supporting secondary line. The IPCEA-NEMA Standards Publications covering multiplex cable define the product as "neutral-supported secondary and service drop cables."

[fol. 4445] 38. Item 9, Conduit (aluminum and steel). The parties are agreed that the manufacture and sale of conduit, both aluminum and steel, may be treated as a line of commerce for the purpose of this case.

39. The evidence does not establish that the manufac-

ture and sale of aluminum conduit is a separate line of commerce.

40. Steel conduit and aluminum conduit are functionally interchangeable. Both are used to enclose and protect electrical wires and cables against external mechanical and chemical abuse. The evidence establishes that steel and aluminum conduit are in direct and substantial competition with each other.

41. The pricing of steel and aluminum conduit is directly related. Changes in the price of steel conduit cause corresponding changes in the price of aluminum conduit, and vice versa.

42. Aluminum conduit manufacturers meet strong and vigorous competition from the manufacturers of steel conduit, and vice versa.

The Geographic Market

43. The parties agree that the United States as a whole is a proper geographic market or "section of the country" within which the impact of the acquisition may be measured as to all of the lines of commerce, whether or not allowed herein.

44. It has not been established that the eleven western states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming) constitute an appropriate geographic market or "section of the country" with respect to either the conduit or the alleged aluminum conduit lines of commerce.

Competitive Effect in the Claimed Lines of Commerce

45(a) Statistics showing Alcoa and Rome market shares in the aluminum conductor lines of commerce, both before and since the acquisition, are set forth in the following tables.

[fol. 4446]

ACSR and Aluminum Cable, Bare

Year	Alcoa %	Rome %
1954	48.4	0.2
1955	43.2	0.1
1956	29.8	0.3
1957	32.3	0.3
1958	32.5	0.3
1959	31.4	0.7
1960	30.6	0.1
1961	26.1	

Aluminum Wire and Cable, Insulated or Covered

Year	Alcoa %	Rome %
1954	10.0	6.9
1955	10.8	6.9
1956	8.5	6.2
1957	9.4	5.3
1958	11.6	4.7
1959	12.2	4.4
1960	10.6	4.2
1961	7.3	5.7

Aluminum Conductor Wire and Cable

Year	Alcoa %	Rome %
1954	42.8	1.1
1955	36.6	1.5
1956	24.8	1.7
1957	27.4	1.4
1958	27.8	1.3
1959	26.9	1.5
1960	25.4	1.2
1961	23.5	1.3

45(b). The relative market position of Alcoa and Rome combined in each of the three alleged aluminum conductor lines of commerce declined substantially both before and since the acquisition.

[fol. 4447] Alcoa-Rome Market Percentages

				Decline Percentage Points		
	1954	1958	1961	1954–58	1958–61	1954–61
ACSR and Aluminum Cable, Bare	48.6	32.8	26.1	15.8	6.7	22.5
Aluminum Wire and Cable, Insulated or Covered	16.9	16.3	13.	.6	3.3	3.9
Aluminum Conductor Wire and Cable	43.9	29.1	24.8	14.8	4.3	19.1

46. There is no significant pattern or trend of mergers with respect to the manufacture and sale of aluminum conductor wire and cable products.

47. In addition to Alcoa's acquisition of Rome, the only acquisitions which relate in any way to aluminum conductor wire and cable products were Olin-Mathieson Chemical Corporation's acquisition of Southern Electrical Corporation in early 1957, Kaiser Aluminum and Chemical Corporation's acquisition of the Bristol plant of United States Rubber Corporation in early 1957, the Reynolds Metals Company's acquisition of the machinery of John A. Roebling's Sons Division of the Colorado Fuel and Iron Corporation in 1961.

48. Market statistics reflecting the market shares of the acquiring and acquired companies, both before and since the acquisitions are set forth in the following table:

Percentage Participation in Aluminum Conductor Wire and Cable

	1955	1956	1957	1958	1959
Southern Electrical	5.4	8.1			
Olin-Mathieson	0.0	0.0			
Combined Post-Acquisition			5.6	4.5	5.0
Kaiser	21.9	19.5			
U.S. Rubber	0.8	0.8			
Combined Post-Acquisition			18.8	23.1	19.0
Reynolds	8.0	8.1	9.0	10.4	10.8
Roebling	0.0	0.0	0.0	0.0	0.1

49. The evidence fails to establish that Olin's acquisition of Southern and Kaiser's acquisition of the Bristol Plant of U. S. Rubber has hurt or will adversely affect competing manufacturers of aluminum wire and cable products.

[fol. 4448] 50. No competing manufacturer of aluminum conductor wire and cable products has complained that this acquisition has or may adversely affect his competitive position. On the contrary, representatives of Central Cable, Southwire, General Cable, Essex, Nehring and other wire and cable manufacturers stated that in the three years since the acquisition there had been no adverse effect. No manufacturer-witness testified that he foresaw any future adverse effect, as a result of this acquisition.

51. The evidence fails to establish that Alcoa's ability to offer a broad line of insulated products, including those made from copper, gives it any substantial competitive advantage in the sale of aluminum wire and cable products.

52. The evidence establishes that prior to the acquisition, there was not substantial or vigorous competition between Alcoa and Rome in the sale of aluminum conductor wire and cable products. Alcoa's loss of business in such products from 1957 to 1959 was insignificant.

53. In regard particularly to the overlap wire and cable products, Rome was not an aggressive price competitor. It adhered to a policy of not going below the prices of its competitors. It rarely participated in competitive bidding for ACSR; on insulated or covered products, it would generally quote on the basis of its published price schedules. Rome's adherence to this policy is established by the testimony of utility purchasing agents who stated, without contradiction, that Rome was not an initiator of price reductions.

54. As recently as 1951, there were only four manufacturers of insulated wire and cable using aluminum conductor. The evidence establishes that as of April 1, 1961, there were at least 29 producers of insulated aluminum wire and cable.

55. Companies equipped to manufacture more complicated insulated copper wire and the cable products, such as building wire, power cable and control cable, can readily manufacture the more simple products such as line wire and multiplex cable, using either copper or aluminum con-
[fol. 4449] ductors, with its existing machinery and personnel.

56. The numerous manufacturers of insulated wire and cable constantly review their product lines and switch

readily from one product or conductor metal to another in accordance with market conditions. Such manufacturers not presently making insulated or covered aluminum products have considered whether or not to make such products, and would make them if profitable orders were obtained.

57. There has been substantial entry into the manufacture of ACSR and bare aluminum cable. Prior to 1940, Alcoa was virtually the only producer of these products; by 1950 there were 12 producers, most of whom were experienced copper wire and cable producers before getting into the ACSR field.

58. The evidence fails to establish or to permit the inference that any person has ceased or has been or probably will be deterred from entering into the manufacture and sale of aluminum conductor wire and cable products because of this acquisition.

59. Purchasers of the overlapping aluminum conductor products—ACSR and aluminum cable, bare, aluminum line wire, and aluminum multiplex cable—have not been and will not be adversely affected by the Rome acquisition.

60. Some of the utilities which formerly purchased from both Alcoa and Rome have sought to broaden the competitive base of their wire and cable purchasing. No difficulty has been encountered in expanding the supplier group.

61. Prior to the acquisition, Rome was a follower rather than an initiater of price reductions or concessions. It was rarely awarded business on the basis of competitive bidding.

62. The evidence establishes that there is vigorous competition among all manufacturers of aluminum conductor wire and cable products. The evidence fails to establish that any competitor of Alcoa and Rome, either integrated or non-integrated, has been or will be adversely affected by this acquisition.

[fol. 4450] 63. Non-integrated manufacturers of aluminum conductor wire and cable products will not be deprived of a source of aluminum as a result of Alcoa's acquisition of Rome.

64. Substantial quantities of aluminum are available from foreign sources. Canadian production alone in 1960 amounted to more than 1.5 billion pounds, or more than 35 percent of total U. S. primary aluminum production. Such foreign aluminum is suitable for use by wire and cable

fabricators and such fabricators have, in fact, purchased substantial amounts of foreign aluminum.

65. Alcoa's ability to supply non-integrated fabricators, including manufacturers of aluminum wire and cable, will not be affected by the acquisition of Rome. It has operated below capacity since 1957.

The following table shows Rome's pre-acquisition purchases of aluminum.

(Thousands of Pounds)

Year	Total U.S. Primary Aluminum Production	Alcoa Primary Aluminum Production	Rome Primary Aluminum Purchases	Rome Primary Aluminum Purchases: % of Total U.S. Primary Aluminum Production	Rome Primary Aluminum Purchases: % of Alcoa Primary Aluminum Production
1954	2,921,130#	1,331,874#	1,611#	.1%	.1%
1955	3,131,442	1,404,461	3,175	.1	.2
1956	3,357,908	1,512,278	5,258.	.2	.3
1957	3,295,418	1,424,095	3,236	.1	.2
1958	3,131,114	1,041,724	3,133	.1	.3

Under provisions of supply contracts with the General Services Administration, Alcoa is obligated to make available to non-integrated fabricators approximately 150,000,000 pounds of aluminum each year through 1971. Similar obligations on the part of Kaiser, Reynolds, and Harvey, make available to non-integrated users approximately 300,000,000 additional pounds of aluminum.

66. The acquisition of Rome by Alcoa will not bring about, enhance or aggravate any so-called "price squeeze" on non-integrated fabricators of aluminum wire and cable.

67. The evidence fails to establish that either Alcoa or Rome would have become a more significant factor in the manufacture and sale of aluminum wire and cable products if the acquisition had not occurred. Neither company had definite plans to expand its aluminum wire and cable production.

[fol. 4451] 68. The following table sets forth Rome's copper and aluminum wire and cable sales during the five full years preceding the acquisition.

(Thousands of Dollars)

Year	Copper Wire & Cable	Aluminum Wire & Cable	Total	Percent Copper
1954	$27,142	$1,770	$28,914	93.9%
1955	36,921	2,458	39,379	93.8
1956	39,119	3,646	42,765	91.5
1957	26,992	2,888	29,880	90.3
1958	21,261	2,191	23,452	90.7
1959 (1st Qr.)	5,891	509	6,400	92.0

69. The evidence establishes that there is vigorous competition in the manufacture and sale of aluminum wire and cable products, that both integrated and non-integrated companies participate therein, and that there has been no reduction in the vigor of such competition since the acquisition.

70. Since Rome was not a primary aluminum producer, Alcoa and Rome did not compete in the sale of aluminum ingot whether used in the production of aluminum conductor wire and cable or otherwise.

71. Rome sold only limited amounts of aluminum redraw rod, of which only a de minimis amount was sold for electrical conductor use.

(a) Rome's sales of aluminum rod and the amounts sold for non-conductor and for conductor use are set forth in the following table:

Year	Total EC Rod Sales	Sold for Non-Conductor	Sold for Conductor Use
	(Thousands of Pounds)		
1955	5	—	5
1956	139	124	15
1957	418	341	77
1958	387	372	15

(b) In its biggest year, 1957, Rome's rod sales for conductor use amounted to only about 3/10 of one percent of aluminum bar and rod sold by domestic primary aluminum producers to non-integrated producers of conductor wire and cable in that year. In addition, at least one other non-integrated fabricator sold aluminum rod, so that Rome's sales would be an even smaller percentage of the total.

[fol. 4452] 72. The evidence fails to establish that Rome probably would have become a more significant supplier of aluminum redraw rod to manufacturers of conductor wire and cable.

73. At the time of the acquisition and for several years prior thereto, Rome was producing its own aluminum redraw rod and purchased only de minimis amounts from others.

74. The evidence fails to establish that any competing supplier of aluminum ingot or rod has been or may be adversely affected by this acquisition.

75. The evidence fails to establish any reasonable prob-

ability that Alcoa's acquisition of Rome has or will substantially lessen competition or tend to create a monopoly in any of the alleged aluminum conductor lines of commerce.

76. The pre-acquisition market percentages of Alcoa and Rome are set forth in the following table, which gives figures for 1958:

(Thousands of Dollars)

Conductor Wire and Cable	Shipments	Percent of Industry
Industry	1,553,955	
Alcoa	28,521	1.8
Rome	22,001	1.4
Alcoa-Rome	50,522	3.2
Conductor Wire and Cable, Bare		
Industry	232,280	
Alcoa	24,020	10.3
Rome	4,579	2
Alcoa-Rome	28,599	12.3
Wire and Cable, Insulated or Covered		
Industry	1,321,675	
Alcoa	4,501	.3
Rome	17,422	1.3
Alcoa-Rome	21,923	1.6
Service Drop		
Alcoa		10.8
Rome		5.1
Alcoa-Rome		15.9

77. Alcoa and Rome were not substantially competitive in the manufacture and sale of bare conductor wire and cable products.

[fol. 4453] Industry and Alcoa and Rome shipments of bare conductor (aluminum and copper) products for 1958 are shown in the following table:

(Thousands of Dollars)

	Industry Shipments	Alcoa Shipments	%	Rome Shipments	%
ACSR and aluminum cable, bare	$62,392	23,883	10.2	258	.1
Bare conductor aluminum wire	13,395	137	.1	—	—
Bare conductor copper wire and cable	156,493	—	—	4,553	1.9
	232,280	24,020	10.3	4,811	2.0

78. Alcoa and Rome were not substantially competitive in the manufacture and sale of insulated or covered wire and cable products. Both before and since the acquisition, Rome has manufactured a relatively full line of insulated wire and cable products, chiefly made from copper. Alcoa's pre-acquisition participation in the insulated wire and cable field was limited to aluminum covered line wire and multiplex cable, amounting in 1958 to 3/10 of 1 percent of total insulated or covered wire and cable shipments.

79. Alcoa's acquisition of the assets of Rea Magnet Wire Company on January 18, 1960 is without significance to any issue in this case.

80. Since Alcoa sold only aluminum bare and insulated or covered wire and cable products, the facts found with respect to the alleged aluminum conductor lines of commerce are also pertinent to the broader conductor lines of commerce.

81. The electrical wire and cable industry, including both copper and aluminum products, is characterized by vigorous competition. Upwards of 200 companies manufacture and sell electrical wire and cable, among them being many strong, well-financed and highly reputable concerns.

82. The evidence fails to establish any trend toward concentration in the manufacture and sale of wire and cable products.

[fol. 4454] 83. On the basis of 1958 Census of Manufactures data, Alcoa in 1958 had 10.8 percent and Rome 5.1 percent of total industry shipments of service drop cable. The Census figures cannot be taken as a reliable measure of industry shipments of service drop products since they do not include weatherproof wire and used as service drop which is reported to Census under a different classification. There is no evidence as to the amount of weatherproof wire used as service drop.

84. There is no company that makes only multiplex cable. On the contrary, it is only one of numerous insulated wire and cable products made by insulating companies. It is among the simplest of such products, and any company equipped to manufacture any other insulated wire and cable product, can use its existing machinery and personnel to make multiplex cable.

85. The evidence establishes that manufacturers not presently making multiplex cable constantly review their product lines, have considered entering into the manufacture of multiplex cable, and would be capable of doing so if market conditions warranted.

86. Aluminum has gained greater acceptance in multiplex cable than in any other insulated product. Prior to the acquisition, Alcoa sold only aluminum multiplex cable and Rome's multiplex cable was approximately 80 percent aluminum. The same is true as to other insulators for which data are available. Accordingly, the facts established with respect to the lack of effect of this acquisition on competition in the aluminum conductor lines of commerce are pertinent here.

87. The evidence fails to establish any reasonable probability that Alcoa's acquisition of Rome has or will substantially lessen competition or tend to create a monopoly in any of the alleged conductor wire and cable lines of commerce.

[fol. 4455] Conduit

88. There is no reliable evidence as to the pre-acquisition market shares of either Alcoa or Rome with respect to conduit, both steel and aluminum, or aluminum alone.

Based upon a 1960 Bureau of the Census report, defendants' combined share of the total conduit market in 1960 was 6.9 percent. Based upon the same report, their combined 1960 share of conduit, other than steel, including aluminum conduit, was 26.5 percent.

The evidence shows the above report is based upon a survey undertaken for the first time in 1960 and lacks conclusiveness.

89. The evidence fails to establish that the acquisition has eliminated substantial actual or potential competition between Alcoa and Rome in the manufacture and sale of conduit or aluminum conduit.

90. Prior to the acquisition, Alcoa made and sold only aluminum conduit and Rome made and sold only steel conduit.

91. Alcoa's sales of aluminum conduit in the area where Rome sold most of its steel conduit were de minimis, rang-

ing between $10,000 and $54,000 per year in the five years preceding the acquisition.

92. There are no substantial barriers to entry. Any company having extruding equipment can enter the aluminum conduit field by adding equipment needed for threading, labeling and lubricating which can be purchased for from $10 to $15 thousand.

93. The number of companies owning extrusion equipment has increased from 39 in 1950 to 110 in 1955, and to 133 in 1960.

94. It has not been shown that any company has been or will be deterred from entering the conduit field as a result of the Rome acquisition.

95. It has not been shown that purchasers of conduit or aluminum conduit have been or may be adversely affected in any way by Alcoa's acquisition of Rome.

[fol. 4456] 96. It has not been established that any non-integrated manufacturer of aluminum conduit has been or may be adversely affected by this acquisition.

97. The decline in aluminum conduit prices since about 1958 is directly related to the competitive contest between steel and aluminum conduit.

98. The pricing of aluminum conduit to be competitive with steel was initiated by Hazelwood, a non-integrated producer, in about 1958 and continues as the result of such competition.

99. There is vigorous competition in the manufacture and sale of conduit and aluminum conduit. This competition has increased appreciably in recent years owing to the wider use and acceptance of aluminum conduit.

100. The evidence fails to establish any reasonable probability that Alcoa's acquisition of Rome has or will substantially lessen competition or tend to create a monopoly in the manufacture and sale of either aluminum conduit or conduit, including both steel and aluminum, in either the United States or the eleven western states.

Conclusions of Law

1. This Court has jurisdiction of the parties to and the subject matter of this action.

2. The manufacture and sale of each of the following products or product groups constitutes an appropriate line

of commerce within the meaning of Section 7 of the Clayton Act:

Item 2. ACSR and aluminum cable, bare.
Item 4. Aluminum ingot and rod used in the production of aluminum conductor wire and cable.
Item 5. Conductor wire and cable (aluminum and copper).
Item 7. Wire and cable, insulated and covered (aluminum and copper).
Item 9. Conduit (aluminum and steel).

[fol. 4457] 3. Plaintiff has failed to prove by a preponderance of the evidence that the manufacture and sale of any of the following products or product groups constitutes an appropriate line of commerce within the meaning of Section 7 of the Clayton Act:

Item 1. Aluminum conductor wire and cable.
Item 3. Insulated or covered aluminum wire and cable.
Item 6. Conductor wire and cable, bare (aluminum and copper).
Item 8. Service drop cable (aluminum and copper).
Item 10. Aluminum conduit.

4. The United States as a whole constitutes a section of the country within the meaning of Section 7 of the Clayton Act with respect to each of the ten lines of commerce alleged in this case.

5. Plaintiff has failed to prove by a preponderance of the evidence that the eleven western state area, consisting of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming, is an appropriate section of the country within the meaning of Section 7 of the Clayton Act with respect to either the conduit or the aluminum conduit line of commerce.

6. Plaintiff has failed to prove by a preponderance of the evidence that the effect of Alcoa's acquisition of the assets and properties of Rome may be substantially to lessen com-

petition or to tend to create a monopoly in any line of commerce in any section of the country.

7. Plaintiff has failed to prove by a preponderance of the evidence that the effect of Alcoa's acquisition of the assets and properties of Rome may be substantially to lessen competition or to tend to create a monopoly in any of the following lines of commerce, either in the United States as a whole or in the eleven western states (assuming that area to be an appropriate section of the country):

[fol. 4458] Item 2. ASCR and aluminum cable, bare.

Item 4. Aluminum ingot and rod used in the production of aluminum conductor wire and cable.

Item 5. Conductor wire and cable (aluminum and copper).

Item 7. Wire and cable, insulated and covered (aluminum and copper).

Item 9. Conduit (aluminum and steel).

8. Assuming each of the following to have been established as an appropriate line of commerce, plaintiff has failed to prove by a preponderance of the evidence that the effect of Alcoa's acquisition of the assets and properties of Rome may be to substantially lessen competition or to tend to create a monopoly therein, either in the United States as a whole or in the eleven western states (assuming that area to be an appropriate section of the country):

Item 1. Aluminum conductor wire and cable.

Item 3. Aluminum wire and cable, insulated or covered.

Item 6. Conductor wire and cable, bare (aluminum and copper).

Item 8. Service drop cable (aluminum and copper).

Item 10. Aluminum conduit.

9. Plaintiff has failed to prove by a preponderance of the evidence that the acquisition of the assets and properties of Rome by the defendant Alcoa violates Section 7 of the Clayton Act.

10. Plaintiff has failed to establish the claims or cause of action alleged in the complaint and the relief requested therein shall be and hereby is denied and this suit dismissed, and

Judgment is directed accordingly.

/s/ Stephen W. Brennan, U. S. District Judge.

Dated: January 28, 1963.

[fol. 4458a] [File endorsement omitted]

[fol. 4459] IN UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF NEW YORK

Civil No. 8030

UNITED STATES OF AMERICA, Plaintiff,

against

ALUMINUM COMPANY OF AMERICA and ROME CABLE CORPORATION, Defendants.

Appearances:

Honorable Justin J. Mahoney, United States Attorney, Attorney for Plaintiff, Federal Building, Albany, New York. Ferris, Hughes, Dorrance & Groben, Attorneys for Defendants, First National Bank Building, Utica, New York. Bergson & Borkland, Attorneys for Defendants, 918 16th Street, N.W., Washington, D. C. William K. Unverzagt, Esq., Attorney for Defendants, 1501 Alcoa Building, Pittsburgh 19, Penna.

Donald F. Melchior, Esq., Charles D. Mahaffie, Jr., Esq., Richard J. Wertheimer, Esq., Attorneys, Department of Justice, Washington, D.C., Of Counsel. Robert Groben, Esq., John Liddy, Esq., Attorneys, of Counsel. Herbert A.

Bergson, Esq., Howard Adler, Jr., Esq., Hugh Latimer, Esq., John Voortman, Esq., Attorneys of Counsel.

Antitrust Action—Violation of Section 7, Clayton Act

Tried Feb. 5—Mar. 1, 1962; Submitted Aug. 18, 1962.

Opinion—Decided January 28, 1963

Brennan, Judge

This is a civil antitrust action brought by the United States against the Aluminum Company of America, hereinafter referred to as "Alcoa" and the Rome Cable Corporation, hereinafter referred to as "Rome" to annul the acquisition by Alcoa of the stock and assets of Rome.

The complaint in this action was filed April 1, 1960 and charges that the acquisition, above referred to, is in violation of Section 7 of the Clayton Act, 15 U.S.C. §18. The complaint seeks the usual relief in this type of case—to wit: an order of divestiture and injunction against further acqui- [fol. 4460] sitions and such other and further relief as may be just and proper. Defendants' answers, while admitting certain allegations of the complaint, deny that the transaction involved is in violation of the statute. No question is raised as to the jurisdiction of this court.

On March 31, 1959, pursuant to a prior agreement, Alcoa acquired all of the assets of Rome by an exchange of stock of the two corporations. Title to the assets of Rome was taken in a newly formed corporation also known as the Rome Cable Corporation. The new company is a wholly owned subsidiary of Alcoa and, since the acquisition, has been operated as a division thereof. The crux of the litigation arises from plaintiff's contention that the effect of such acquisition may be substantially to lessen competition or tend to create a monopoly in certain lines of commerce consisting principally of wire and cable products—all in violation of Section 7 of the Clayton Act.

Brief reference is made at this point to the defendants and the general nature of their business activities in order to afford an insight into the more detailed discussions to follow.

Alcoa is a fully integrated aluminum producer. In the manufacturing process, it refines aluminum bearing ore into primary aluminum and converts same into intermediate and various aluminum end products. It manufactures such products in several states and sells and ships same in various forms throughout the United States and in foreign countries.

Rome was incorporated in 1936. It was and is primarily engaged in the manufacture of wire and cable products in which copper was and is the predominant metal used in its operations. In 1952 Rome installed equipment for the manufacture of aluminum rod from aluminum ingot purchased from primary producers. It began producing such rod for its own use in 1953. Thereafter it began to manufacture and sell certain types of aluminum wire and cable in addition to its broad line of copper products.

[fol. 4461] The Law

Before proceeding to discuss Alcoa's and Rome's position in the markets in which they are active participants, it would seem logical to refer briefly to the legal principles involved. An understanding of the language and purpose of the statute is essential as an approach is made to the decision which must necessarily involve the recognition of the prohibitions imposed and the application of same to the facts disclosed.

The basis of this action rests upon the provisions of Section 7 of the Clayton Act, 15 U.S.C. §18, the relevant part of which is quoted below.

> "No corporation engaged in commerce shall acquire, directly or indirectly, the whole or any part of the stock or other share capital and no corporation subject to the jurisdiction of the Federal Trade Commission shall acquire the whole or any part of the assets of another corporation engaged also in commerce, where in any line of commerce in any section of the country, the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly."

The language of the above statute, taken alone, poses problems both in its construction and application. The courts have proceeded upon a case-to-case basis to construe and apply the statute to the facts of a particular litigation. It

seems fair to state that the law involved is still in a state of development and that no formula, possessing rigidity, may be applied. This is necessarily so since the statute deals with reasonable probability in the constantly changing economy in which we live.

The recent decision of the Supreme Court in Brown Shoe Co. v. U. S., 370 U. S. 294 is, as stated therein, the first case coming before that court wherein an analysis of the scope and purposes of the statute, as it now exists, was necessary [fol. 4462] to the issue raised. It would seem to follow that reference to the holdings in that decision would be more profitable than to discuss how far the previous landmark decisions under the Sherman Act are applicable or to reconcile or distinguish decisions of circuit and district courts which had decided Section 7 cases prior to the Brown Shoe decision. The most often quoted decisions, referred to above, are either cited or are found in the notes in the Brown Shoe opinion and their application may be gathered from the text thereof.

The legislative history of the statute is discussed in the above Brown Shoe Co. decision and does not require repetition here. Such discussion appears to confirm some previously stated purposes of the statute and sets at rest certain controversies relative to the meaning and application thereof. This court's understanding thereof is summarized below and the quotations therein are, unless otherwise indicated, taken therefrom.

Congress considered that "... a rising tide of economic concentration in the American economy" was an evil to be curbed. Effective competition and the protection of small businesses were results to be accomplished. The statute was intended to supply a deficiency in the existing statute and to apply to all types of mergers. Its purpose was to curb monopolistic acts at their beginnings or incipiency rather than await their fruition and the standards for judging their legality are broader than, but may include, those applied in Sherman Act violations. All mergers however are not to be condemned. Condemnation is limited to those having "demonstrable anticompetitive effects" although such demonstration is satisfied by a probability. Certainty is not required. Proof of probability is sufficient provided the menace to competition is clear-cut as distinguished from

a temporary condition or an "ephemeral possibility". No particular tests are provided in the statute to measure either [fol. 4463] the product or geographic market. Neither are qualitative or quantitative tests controlling in measuring the effect of a merger. Both measurements must be made in the light of all the relevant factors which may vary in accordance with the facts of the particular acquisition under consideration.

In addition to the above summary of the discussion of the legislative history as gathered from the opinion in the Brown Shoe case, the decision therein, in its holdings seems to otherwise clarify the vagueness of the language of the statute and afford something of a guide to the trial courts in their application to the facts of the litigation before them.

The lines of commerce or product market may consist of both broad and submarket lines. No rigid formula exists for their determination. The realities of competition are the ultimate test. The broad market line may be extended to cover a product where there exists "the reasonable interchangeability of use or the cross-elasticity of demand between the product itself and substitutes for it". Seven "practical indicia" are set forth as factors to be considered in determining the boundaries of a submarket. They are (1) industry or public recognition of the submarket as a separate economic entity, (2) the product's peculiar characteristics and uses, (3) unique production facilities, (4) distinct customers, (5) distinct prices, (6) sensitivity to price changes, and (7) specialized vendors. The existence or nonexistence of each of the above indicia is not determinative of the problem in itself. All relevant facts must be considered and we are admonished "to recognize competition where in fact competition exists". Peculiar characteristics and uses may be one of such indicia but it is not determinative. To be of effective weight, they must be so peculiar as to render the product "non-competitive".

In determining the impact of the merger, the size of the share of the market foreclosed is not decisive unless it approaches monopoly proportions or is of de minimus effect. [fol. 4464] The market shares held by the merged companies are an index of market power to be applied in all aspects of the realities of competition in "an economically significant market". Mergers may not be condemned per se upon

the basis of such shares alone; same "will seldom be determinative". The purpose of the merger is a most important factor as is the existence of trends toward concentration in the industry. The testimony of those engaged in industry has its weight and significance although "It is competition, not competitors, which the Act protects". An evaluation of the competitive realities disclosed, based upon a pragmatic factual approach, would seem to be the obligation of the trier of the facts.

The Industry

The litigation involves principally the effect of the merger as tending to lessen competition in certain aluminum product lines of commerce. In the decision of Brown Shoe Co. Inc. v. U.S., supra, at 321, we find the following quotation: "... Congress indicated plainly that a merger had to be functionally viewed, in the context of its particular industry" and at page 329 the court refers to the examination of "economic and historical factors" as necessary to the decision. It follows that the facts must be weighed and the law applied with some understanding of the industry as a whole and the status of both Rome and Alcoa therein.

The history of the aluminum industry in this country from its beginning to World War II is for all practical purposes a history of Alcoa itself. The economic demands of World War II account for the entry of competing primary aluminum producers, the details of which may be gathered from the lengthy court decisions which involve the position of Alcoa in the business of aluminum production and the sale of aluminum products within the United States. Such details [fol. 4465] may be gathered from the decisions—U. S. v. Alcoa, 44 F. Supp. 97; U. S. v. Alcoa, 148 F. 2d 416; U. S. v. Alcoa, 91 F. Supp. 333 and U. S. v. Alcoa, 153 F. Supp. 132. It is sufficient to say that principally due to government action during the above period, Reynolds Metal Company and Kaiser Aluminum and Chemical Corporation shared with Alcoa, then and now, a place in the aluminum industry as fully integrated aluminum producers.

The above corporations are described in their activities as fully integrated in that their facilities permit the processing of the necessary materials from the mine through the intermediate stages to the finished aluminum product. Statistics

appear to be first available in the above process when same reaches the primary aluminum stage, so that for all practical purposes we are not particularly concerned with the status of industry prior to the production of primary aluminum. Three additional corporations have since 1955 joined Alcoa, Kaiser and Reynolds as such producers. These corporations —Ormet, Inc., (Olin Mathieson), Harvey Aluminum Company and Anaconda Aluminum Company, although not as fully integrated as Alcoa, Kaiser and Reynolds, are producers of primary aluminum. The above corporations are in a position to manufacture and sell aluminum billet, pig, ingot and rod which are termed intermediate products. Each of the above corporations, except Harvey, fabricates the intermediate products into numerous finished merchantable items, intended directly for consumer use. Included in such items are the wire and cable products urged as proper lines of commerce in this case. The five above companies, thus engaged in processing intermediate aluminum products, are considered as "integrated producers" as the term is used in this litigation.

[fol. 4466] An indication of the status of the above companies engaged in producing primary aluminum may be gathered from the exhibit set out below—

Aluminum Ingot Capacity Existing or Under Construction at the End of 1960
(Short Tons)

Company	Capacity	Percent of U.S. Total
United States Total	2,655,750	100.0
Aluminum Company of America	1,025,250	38.6
Reynolds Metals Company	701,000	26.4
Kaiser Aluminum & Chemical Corp.	609,500	23.0
Ormet, Inc.	180,000	6.8
Harvey Aluminum	75,000	2.8
Anaconda Aluminum Company	65,000	2.4

The above percentage of total capacity of Alcoa differs slightly from that provided by the defendant which is set at 35%. This may be accounted for by the fact that Alcoa abandoned construction of a plant in Indiana when it was apparent that there was an oversupply of capacity. No doubt production figures are more meaningful than the above since it appears that 15% of Alcoa's primary aluminum capacity was unused in 1960. Alcoa's percentage of United States primary aluminum for 1960 was 36% of

the total supply, having declined 9% from 1956. That Alcoa's percentage of such production has declined over a period of years is self-evident from the entry of new producers as indicated above but it would seem to be fair to say that the three principal producers supply around approximately 80% of such production. The record is indicative of a further increase in domestic aluminum capacity and production, both from the documentary evidence and [fol. 4467] the oral testimony. This increase would come about by entry of new producers and the increase in production capacity of Alcoa's present competitors.

Only brief reference need be made to the copper industry since it is involved only to a limited extent in this controversy. Copper products are manufactured from an ore from which intermediate products are refined and the end product eventually produced for consumer use. Like aluminum, there are companies which are so integrated as to be able to refine and produce copper products from the original ore to the finished items. Such companies sell intermediate products, such as ingot, to processors or fabricators, who then process same for ultimate use in their final form. There is no contention here that the merger involved has anti-competitive impact in the copper industry as a whole or upon the integrated copper producers or fabricators. No further discussion of the copper industry appears to be necessary.

We now turn to a brief discussion of the industry as it pertains to the particular lines of commerce involved in this litigation. The lines of commerce which are principally litigated here consist of those products capable of conducting electricity and are generally referred to as wire and cable products. While it is claimed that some of such lines involve both aluminum and copper, emphasis is placed principally upon aluminum wire and cable which are the end products of processing or fabricating an intermediate aluminum product such as ingot into the completed wire and cable which may be of various sizes, electrical conductive capacity and of different weight, size and strength.

There are a large number of firms engaged in the fabrication of wire and cable copper products. There are a lesser number of such fabricators engaged in the business of fabricating aluminum products. As the word "fabricators"

is used in this litigation, it is distinguished from the integrated aluminum and copper producers who also fabricate [fol. 4468] and sell their end products. Upwards of two hundred fabricators are engaged in the manufacture of both aluminum and copper wire and cable products. There is a vigorous competition as to wire and cable between the integrated companies among themselves and between those fabricators whose process of manufacture begins with the intermediate product purchased from a primary aluminum producer. This active competition is also evident as between aluminum and copper wire manufacturers whose product may be used interchangeably. In other words, there is a lively competition between aluminum and copper products in certain areas which is accounted for by the increasing use of aluminum products and the economic factors which apply thereto. Both the aluminum and copper industries are important factors in the present day economic and business life. They maintain effective and costly research departments designed to improve the efficiency of their products and to create new uses therefor. Both the copper and aluminum industry must meet competition at the intermediate manufacturing stage from foreign countries or concerns. Canada produces primary aluminum equal to about 35% of the total United States production and supplies a significant portion thereof which is available to this country's fabricators. European producers apparently furnish a small portion of primary aluminum for the use of American fabricators. In view of the above, no shortage in primary aluminum is foreseeable.

The Status of Alcoa and Rome in the Industry

Since Alcoa has not been engaged in the manufacture of copper products, its place in the industry, above described, is limited to the production, manufacture and sale of aluminum products. Its position in the aluminum industry is to some extent apparent in the above discussion.

[fol. 4469] Alcoa still maintains its position as the leading producer of primary aluminum. Its share in that market, as may be expected, has declined sharply since the entrance of competitors in that field. This decline has been reasonably consistent since the newcomers in the field

reached productive capacity. In 1948, Alcoa had 52% of United States primary aluminum production. It declined to 45% by 1956 and from 1956 to 1960, it declined to 36%. Its percentage of primary aluminum capacity has declined substantially in the same manner.

Alcoa manufactures and sells a variety of aluminum products. This litigation however involves primarily wire and cable products so that reference to its position in the market will be limited thereto. Alcoa pioneered the use of aluminum as an electrical conductor and sold substantially all of the aluminum cable used for electrical transmission in the United States prior to World War II. Since that time, Alcoa has encountered increased competition and its relative participation in the above market has declined materially. Its principal products in that field are bare aluminum cable and ACSR (aluminum covered steel reinforced). ACSR is a bare aluminum cable with a steel core primarily used by utilities in the overhead transmission of electric current. Alcoa's share in ACSR and bare aluminum cable declined from 48.4% in 1954 to 32.5% in 1958 and to 26.1% in 1961. Its second principal product is known as aluminum conductor wire and cable. Its share in that product declined from 42.8% in 1954 to 27.8% in 1958 and to 23.5% in 1961. The decline in the above market percentages is reasonably consistent between the dates above mentioned and continuing since the acquisition. Alcoa's third such product is known as aluminum wire and cable, insulated or covered. Its share in that item varied from 10% in 1954 to 11.6% in 1958 and to 7.3% in 1961. The comparatively recent increase in demand for covered or insulated aluminum conductor wire found Alcoa in an unfavorable market position. It manufactured line wire and multiplex cable with a polyethylene insulation or covering but it lacked [fol. 4470] the know-how and the facilities for the manufacture of the more complicated line of insulated aluminum wire and cable products.

In March 1952 Alcoa and Rome entered into a continuing agreement referred to as a "tolling agreement" whereby Rome would cover or insulate bare aluminum wire with the more complicated insulated constructions. This arrangement broadened the scope of Alcoa's ability to provide insulated wire products to its trade.

As already indicated, Rome was primarily the manufacturer of copper products, including wire and cable. It has been successful in its manufacturing efforts and expanded same so that at the time of its acquisition it had plants at Rome, New York; Torrance, California; and Collegeville, Pennsylvania. It maintained an active and efficient research department and sales organization. Prior to its acquisition by Alcoa, Rome was one of the ten largest manufacturers of copper conductor wire and cable in the United States. In 1952, Rome installed equipment for the manufacture of aluminum rod from aluminum ingot purchased from primary producers. It began producing such rod for its own use in 1953. Thereafter it began to manufacture and sell certain types of aluminum wire in addition to its broad line of copper products. In the course of its experience and research, Rome developed a special aptitude or skill in the matter of insulating wire and cable. It manufactured a relatively full line of the more complicated insulated wire and cable, designed and built to meet customers' requirements. This skill prompted the so-called "tolling arrangement" between Alcoa and Rome, referred to above.

At the time of the merger, here under consideration, only five products were manufactured and sold by both Alcoa and Rome and their direct competition in the market was limited thereto. These products may be identified as follows—(1) ACSR and bare aluminum cable; (2) covered [fol. 4471] line wire or weather-proof; (3) multiplex cable; (4) conduit; (5) aluminum redraw rod. The market shares of Rome and Alcoa in these competitive products, generally speaking, were not great and a further discussion of same may better be considered in the discussion of the impact of the merger upon or within the competitive market.

In this type of action, a burden is imposed upon the plaintiff to establish three essential elements, listed below, in order to establish a violation of the statute. (1) The relevant products markets or "lines of commerce"; (2) the geographic markets within which the impact of the merger may be measured as to each such line of commerce; and (3) the substantial lessening of competition or tendency to create a monopoly in any such line of commerce in the relevant geographic area. The proof as to these elements will be discussed in the order in which they are mentioned above.

Lines of Commerce

The Government offers proof as to ten lines of commerce and contends that each has been established thereby as applicable in this action. The defendants agree that four such lines of commerce are appropriate and disputes the relevancy of the remaining six lines and the sufficiency of the proof to establish same. There is set out below the list of specific products as contended by plaintiff, showing which are agreed upon and those in dispute. The position in which they appear below follows the order of the proof and the order in which they are discussed in the submitted briefs.

Item	1	Aluminum conductor wire and cable.	In issue.
"	2.	Bare aluminum cable and ACSR.	Agreed.
"	3.	Insulated or covered aluminum wire and cable.	In issue.
"	4.	Aluminum ingot and rod used in the production of aluminum conductor wire and cable.	In issue.
"	5.	Conductor wire and cable (aluminum and copper).	Agreed.

[fol. 4472]

Item	6.	Conductor wire and cable, bare (aluminum and copper.)	In issue.
"	7.	Wire and cable, insulated and covered (aluminum and copper).	Agreed.
"	8.	Service drop cable (aluminum and copper).	In issue.
"	9.	Conduit (aluminum and steel).	Agreed.
"	10.	Aluminum conduit.	In issue.

The Government relies in its brief upon the peculiar characteristics and uses test as the bases upon which a finding of the relevant lines of commerce may rest. This test may find support in such decisions as A. G. Spalding & Bros. Inc. v. F.T.C. 301 F.2d 585; Crown Zellerbach v. Federal Trade Commission, 296 F.2d 800 and U. S. v. Bethlehem Steel Corp., 168 F.Supp. 576 but by the decision in the Brown Shoe case, such test is but one of seven of the "practical indicia" which may serve as a guide in determining submarket lines. Even if so used, such characteristics and uses must be such as to render the product "generally non-competitive".

The consideration and determination of the lines of commerce issue is made having in mind the discussion of the problem in the Brown Shoe case and the rules or guides laid down therein and referred to above.

Items 1, 2 and 3 are generally referred to herein as the

aluminum conductor lines and are so related as to be discussed together.

Since Item 1 is a rather broad line and is simply a combination of Items 2 and 3, the latter two should first be determined. Item 2, bare aluminum cable and ACSR, is a heavy cable product which has practically displaced copper for use in overhead transmission lines. It is agreed that same constitutes a line of commerce here.

Item 3, insulated or covered aluminum wire and cable, is not a line of commerce because it is not recognized in the industry as a separate economic entity. While differing in some characteristics and preferred uses from its copper counterpart, they both perform the same functions and it is not "generally non-competitive" with copper. The Government's evidence shows in 1959 that insulated copper [fol. 4473] conductor comprised 22.8% of the gross additions to insulated overhead distribution lines. Both aluminum and copper wire may be produced interchangeably, using the same facilities. Covered aluminum wire has no distinct customers as distinguished from covered copper wire purchasers. Neither has it specialized vendors. Insulated aluminum and copper wire are generally functionally interchangeable. Their purchase and use are likewise principally dictated by economic factors. While aluminum wire and cable is sold at prices generally distinct from copper and does not have the same price sensitivity, these factors do not destroy the conclusion that covered aluminum wire and cable is in actual competition with its copper counterpart and may not be found as a line of commerce herein. A different conclusion would ignore the admonition, "But the boundaries of the relevant market must be drawn with sufficient breadth to include the competing products of each of the merging companies and to recognize competition where, in fact, competition exists".

Since Item I is a broad line embracing both Items 2 and 3 and Item 3 is held not to be a proper line of commerce, their combination cannot result in a line of commerce. To find that Item 1 is a line of commerce extends the outer boundaries of the market beyond its legal limits because covered copper wire and cable is interchangeable in use and there is cross-elasticity of the demand therefor between

insulated or covered aluminum and copper. To constitute a proper line of commerce, same must include the substitutes therefor which are reasonably interchangeable in use and for which there is a cross-elasticity of demand.

The above conclusion is fortified by the inconsistent position taken by the Government, at least as far as the vertical aspect of the merger is involved. The plaintiff contends here that insulated aluminum wire and cable is a line of commerce and therefore competitively distinct from insulated copper but agrees as to Item 7 that insulated alumi- [fol. 4474] num and insulated copper constitute a single line of commerce.

Item 4, aluminum ingot and rod, used in the production of aluminum conductor wire and cable is simply a grade of aluminum generally referred to as E.C. (electrical conductor). It is but one of 173 recognized aluminum alloys which may be manufactured interchangeably at the will of the producer. All six integrated primary aluminum producers produce various of such alloys including aluminum of E.C. grade which is required by industry standards to contain a minimum aluminum content of 99.45%. Generally the standard is met by the addition of a small percentage of boron to "a high purity pig". The purifying boron however may be added to the ingot during the course of the fabricating process. The rod represents a further product in the reduction of the ingot to the desired wire or cable size. It results from a continuing casting and rolling process and assumes a form or shape which is the starting point for most wire fabricators in their operation.

Although it may be doubtful that ingot and rod of the E.C. grade should be fragmented from the many aluminum alloys, it seems that it satisfies the most of the indicia laid down by the Brown Shoe decision and will be found as a line of commerce in this action.

Items 5, 6, 7 and 8 are generally referred to as conductor lines. They embrace both aluminum and copper wire and cable as distinguished from the four items discussed above which involve aluminum conductor only.

Item 5, conductor wire and cable (aluminum and copper), is a broad line covering all such products whether bare or insulated. Both litigants have agreed that same, together

with Item 7, wire and cable, insulated and covered, (aluminum and copper) may also be considered as a line of commerce here.

[fol. 4475] The first dispute arises when the defendants contend that the broad line, referred to above, may not be broken down by separating therefrom, as a separate line, Item 6, conductor wire and cable, bare. The court adopts such contention and holds that Item 6 does not constitute a proper line of commerce. Such a grouping would include bare aluminum wire and cable and ACSR. The Government has already asserted and agreed that such products are not competitive with copper or interchangeable therewith. In fact, these products are used in the overhead transmission field to the practical exclusion of copper. Grouping them together in Item 6 does not define a single product market. The Bureau of the Census has established separate product classifications for bare copper and for bare aluminum wire and cable. Because a broad line of commerce may be proper does not mean that it may be broken down into all possible fragments.

The proof as to Item 8, service drop cable (aluminum and copper), asserted by the Government as a line of commerce, is rather confusing. As so urged, it is referred to as multiplex cable and consists of one or more insulated conductors twisted around a cable or uninsulated conductor. This contention seems to again recognize that insulated aluminum is not competitively distinct from insulated copper wire and cable.

The product is or can be made by any manufacturer equipped to produce insulated wire or cable and is simply a separation of a particular item from the many other insulated products. Its use is primarily to carry electricity from the distribution point of the utility to the home or business place of the user and as secondary distribution lines carrying no more than 600 volts. The most popular type is of triplex construction and same is displacing open wire or weatherproof wire as a more popular product for service drop, especially in new construction. The evidence is inconclusive as to amount of product known as service drop as distinguished from its use for other purposes including secondary distribution. As just indicated, weatherproof wire is still used as a service drop product from the utility

pole to the entrance of the user's premises. No reliable data is available as to the extent of such use at the times [fol. 4476] relevant here. Two other types of cable, known as type "K" and type "SD" are presently used for the above purpose in particular localities. It would seem that to constitute a line of commerce, the substitutes for multiplex cable for secondary distribution use, weatherproof and the two types of cable, referred to above, may not be eliminated from consideration as a part of the service drop product line. Their absence, together with a consideration of the indicia, referred to herein, leaves the proof something less than convincing. If a product line is designated in terms of function, it must include all competitive substitutes accomplishing the same result. The Item is held not to be a relevant line of commerce herein.

The Geographic Market

The litigants have agreed that in respect to all of the above lines of commerce, whether or not allowed as such herein, the United States as a whole constitutes a section of the country within the contemplation of Section 7 of the Clayton Act.

Item 9, conduit (aluminum and steel), has been agreed upon as a line of commerce. This item includes both rigid conduit and electrical metallic tubing (EMT). It is simply a metallic enclosure to protect lines or cables carrying electric current from outside injury or harm.

Controversy again arises in the matter of the Government's contention that the above broad conduit line may be separated by a submarket line of aluminum conduit alone. The contention is based principally on the separate characteristics and uses test. This single test, as indicated above, is not conclusive; in fact it is not applicable where such characteristics and uses do not render it generally noncompetitive. Here the great weight of evidence is to the effect that aluminum and steel conduit are in direct and vigorous competition for the consumer trade. They are functionally interchangeable; alternate quotations are frequently sought by consumers and they react or are related in price change to each other. Aluminum conduit, taken [fol. 4477] alone, fails to meet the majority of the pre-

scribed tests as a separate submarket and the contention of plaintiff that Item ten is a relevant line of commerce is rejected.

The Geographic Market

There is no dispute but that the United States as a whole is an appropriate section of the country in which the impact of the merger may be considered as to both steel and aluminum conduit and aluminum conduit alone. The Government claims however, that eleven western states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming) also constitute an appropriate geographic market for both of the above products. The claim is based upon the fact that the greater portion of Rome's total sales of conduit prior to the merger was made to customers within that area. The above statement is also true as to sales made after the merger. The evidence fails to show that such sales were made in that area as a particular market. Rome's sales expanded from a six state area to a fourteen state area. The above eleven state area was used because data within same was available for comparison purposes. The evidence shows that freight rates and commercial realities are such that outside or eastern producers can ship conduit within the eleven state area and compete effectively with western producers.

In other words the purchaser within that area can turn for supplies to a producer located in any section of the country. Tampa Electric Co. v. Nashville Co., 365 U.S. 320 at 327. The eleven state area is rejected as a proper geographic market in which to measure the impact of either conduit lines of commerce.

[fol. 4478] The Competitive Effect of the Acquisition

The competitive effect of the acquisition upon the relevant lines of commerce, referred to above, is not determined in accordance with a rigid formula. Guides are furnished in the Brown Shoe decision and the cases cited therein. Reference will be made to those which seem to be pertinent here and will be applied to all claimed lines of commerce whether or not allowed as above.

Purpose

The "nature and purpose of the arrangement" is referred to as a most important factor and will first be discussed since it necessarily involves the participants' competitive problems and something of the background of the defendants previously referred to herein.

Alcoa was the prime mover in bringing about the acquisition. Its share in the aluminum market had declined as referred to herein. Its return on invested capital had declined from 9.3% in 1950 to 3.7% in 1961. It admittedly lacked the "know-how" to manufacture the more complicated types of insulated wire and cable for which there was a growing demand. Its principal wire and cable product was ACSR and bare aluminum cable. The need for product diversification was apparent. Rome was known to Alcoa as a substantial organization with special competence in the insulating field. The time required to obtain such competence from within its own organization and the expense involved seemed to foreclose such a program. Rome was first approached and negotiations failed. An engineering company was retained to explore the market to obtain an organization which would furnish the "know-how" in the insulated wire and cable field. Negotiations were reopened with Rome and the acquisition followed. Competition between Rome and Alcoa was limited to four wire and cable products. Rome's production thereof was not significant in amount.

[fol. 4479] All of the above indicates an effort to overcome a market disadvantage rather than to obtain a captive market for its product or to eliminate a competitor. The terms of the contract itself indicates an intention to retain Rome after the acquisition as an active participant in the market which it occupied.

Concentration

Another factor deemed important in providing a factual background for weighing the probable effect of the acquisition is the trend toward concentration in the industry involved. The Government contends that such a trend exists insofar as the aluminum conductor lines of commerce are

involved. In support of the contention, emphasis is placed upon the fact that the combined shares of the market produced by the five integrated producers is roughly averaged at 80%. This fact loses its significance when it is realized that the production of aluminum and the fabricating of its products were concentrated to the point of a monopoly less than twenty years ago and has undergone a gradual decentralization by the entry of new producers and fabricators since that time.

Alcoa has no history of acquisitions or mergers prior to the acquisition of Rome. Alcoa acquired equipment or assets of three other corporations but aluminum wire and cable products were not involved therein and same could in no way contribute to a concentration in that industry.

The Government cites the acquisition by Olin-Mathieson of the Southern Electric Corp. in 1957. The acquisition by Kaiser in the same year of the U. S. Rubber Co. plant at Bristol, R. I. and the acquisition of John A. Roeblings' Sons Co. by Reynolds in 1961 as indicating a merger trend. When examined, the facts hardly support such an indication. Olin-Mathieson manufactured no aluminum wire and cable products prior to its acquisition of Southern. U. S. [fol. 4480] Rubber's market share of said products was 0.8% and Roebling's share was never over 0.1% prior to their acquisition by Kaiser and Reynolds as above. More significantly as indicating lack of competitive impact in the product market referred to is the post-acquisition market shares of the above acquiring and acquired companies which show a decline therein as does the Alcoa-Rome market share.

The market situation as to the two principal aluminum conductor lines of commerce can be summarized by stating that as to ACSR and bare aluminum cable, the number of producers of those products increased from Alcoa, alone, in 1940 to twelve such producers in 1950 which number is practically unchanged to date. There were about four producers of insulated wire and cable in 1951 (although government allotments of aluminum for that purpose were issued to eight) and as of April 1, 1961, there were twenty-nine producers of such products.

Ease of Entry

Closely related to the question of trends of or concentration in the aluminum conductor lines of commerce is the question of the existence of barriers to the entry of additional competitors in that particular branch of the industry. This is sometime referred to as the "ease of entry."

The facts already stated above demonstrate that no serious impediment or barrier exists which would bar the entry of producers of wire and cable products. This is accounted for principally for the reason that similar techniques and the same machinery with but slight alterations may be used in the production of such copper and aluminum products. The fact that in ten years the number of producers of insulated wire and cable have risen from four to twenty-nine and most of the new entrants came from the ranks of insulated copper conductor producers is indicative that entry into the aluminum conductor field is dictated by the status of the competition rather than being controlled by actual [fol. 4481] economic barriers. That some companies have ceased making this product is not determinative. "It is competition, not competitors, which the Act protects." The evidence discloses that the withdrawal of certain producers from the production of this item was occasioned by an inability to make a profit and there is no evidence which would indicate that any potential producer has been unable to enter the industry when he thought that a profit could be made therein.

There is no doubt that problems are presented in the matter of the entry of a producer in the ACSR and bare aluminum cable market. The product itself involves specialized techniques and equipment especially in the larger sizes used in the overhead transmission field. In spite of difficulties, there are now twelve such producers, one of whom plans an extension of its facilities. The situation in the industry as to the ease of entry of competitors therein is of course not determinative but is simply another factor to be considered in the appraisal of the problem as a whole.

Market Shares

The market shares which Alcoa and Rome may control by the acquisition is one of the most important factors to be

considered. Since the shares in each line of commerce (whether allowed or not) are discussed in the briefs, they will be set out here and the ultimate conclusions to be drawn therefrom will be found in the detailed findings to be filed in connection with this opinion.

In 1958, the Alcoa and Rome market percentages in the three principal aluminum conductor lines as claimed by plaintiff appear below.

[fol. 4482]

	Alcoa	Rome
ACSR and Aluminum Cable, Bare	32.5	.3
Aluminum Wire and Cable, Insulated or Covered	11.6	4.7
Aluminum Conductor Wire and Cable	27.8	1.3

The decline in the combined market percentages of Alcoa and Rome in the above products appears below, which shows a generally continued decline therein both pre and post-acquisition.

				Decline (Percentage Points)		
	1954	1958	1961	1954-58	1958-61	1954-61
ACSR and Aluminum Cable, Bare	48.6	32.8	26.1	15.8	6.7	22.5
Aluminum Wire and Cable, Insulated or Covered	16.9	16.3	13	.6	3.3	3.9
Aluminum Conductor Wire and Cable	43.9	29.1	24.8	14.8	4.3	19.1

In 1958 the market percentage of Alcoa and Rome in the four conductor (aluminum and copper) lines of commerce are set out below.

	Alcoa	Rome
Conductor Wire and Cable	1.8	1.4
Conductor Wire and Cable, Bare	10.3	2.
Wire and Cable, Insulated or Covered	.3	1.3
Service Drop	10.8	5.1

The plaintiff contends that the above percentage table should be increased by the shipments of conductor wire and cable made by the Rea Magnet Wire Co. for 1958. This company was acquired by Alcoa in 1960. Same would seem unimportant from a competitive standpoint since its product was entirely copper wire of small size used principally in coils, transformers, etc. It made no product which competed with Rome. If such products were added, it would [fol. 4483] increase the total of Alcoa and Rome by 1.1%

for conductor wire and cable and 1.3% for wire and cable, insulated, and actually add little or nothing to the significance of the percentages involved.

There is no evidence that the market shares in the conductor lines of commerce have increased or diminished since the acquisition. It would be speculative to assume that the percentages have changed appreciably except perhaps in the case of service drop which is composed principally of aluminum as the conductor and would seem to be included within the insulated or covered aluminum wire line and therefore subject to the post-acquisition decline therein.

In the conduit lines of commerce, no probative preacquisition market data is available. At that time, Alcoa made only aluminum conduit while Rome made only steel conduit. Based upon a survey first made about 1960, Alcoa's share in the conduit market (aluminum and steel) was 3.4% and Rome's share was 3.5%. In aluminum conduit alone, the survey shows that in 1960 Alcoa's market share was 12.0%, and Rome's as agent for Alcoa was 14.5%. These later figures should not be construed as showing that Rome in the post-acquisition period actually manufactured aluminum conduit. It had no extruding facilities. The above percentage apparently represents sales of aluminum conduit completely manufactured by Alcoa but sold by Rome as its agent and conduit pipe produced by Alcoa and threaded at the California plant of Rome. The accuracy of the above market shares is seriously questioned by defendants which, together with their incompleteness, afford little, if any, basis for a finding of the effect of the acquisition upon competition in either of the alleged lines of commerce whether or not allowed as such.

The market shares of the defendants in aluminum ingot and rod line of commerce appear to be inconclusive. Rome was not a producer of primary aluminum and did not compete in that market. Rome's purchase of primary aluminum amounted to .2% of the total industry production and [fol. 4484] .3% of Alcoa's production. Rome manufactured its own rod and additionally sold a small amount thereof for conductor use to non-integrated producers of wire and cable. Percentagewise, such sales amounted to a fraction of one percent of the market.

Industry Evidence

In Brown Shoe, as in several other reported decisions, industry evidence as to the actual or potential effect of the acquisition upon suppliers and purchasers has been considered as a factor in determining the effect of the acquisition upon suppliers and purchasers. There is an entire absence of such evidence on the part of the Government. The passage of almost three years from the time of acquisition to the time of trial would seem to bring to light the anti-competitive effect of same if in fact it existed. Evidence to the contrary appears in the record. The defendants, through some eight or more witnesses, actively engaged in the aluminum wire and cable industry—all testified without exception that the acquisition has not had an adverse effect upon the purchasers of such products. No difficulty has been encountered in expanding their list of suppliers and that competition among such suppliers has not been affected.

The Dominant Position of Alcoa

Throughout the trial and in the submitted briefs, the Government has taken the position that Alcoa occupies a dominant position in the production of primary aluminum and in the manufacture of aluminum conductor wire and cable products. It is urged that this acquisition has enhanced that position and is therefore a factor in determining the competitive effects thereof. So much reliance is placed thereon that a brief discussion would seem appropriate.

Undoubtedly Alcoa is large in size, both physically and financially. Its activities are varied and extensive. Care [fol. 4485] however must be taken not to exaggerate its influence because of its size alone, especially in the absence of evidence of the abuse of the power which goes with size. U.S. v. U. S. Steel Corp., 251 U. S. 417; U. S. v. Swift & Co., 286 U. S. 106. The mere intrusion of "bigness" into a competitive market will not in itself violate the statute. Reynolds Metal Co. v. F.T.C., 309 F. 2d 223 at 230. Here the Government's contention as to the dominance of Alcoa appears to rest upon size alone without evidence as to the exercise of the power that goes with it. In 1957, Judge Cashin in U. S. v. Aluminum Company of America, 153 F. Supp. 132 at 167 found as a fact that Alcoa's relative share

of the aluminum market had declined at that time. That such decline has continued to date appears without contradiction in this case. An increase in the money value of products sold means nothing in the light of the increase in the total market and the decline in the rate of return on Alcoa's invested capital. The increase in the number and market shares of primary aluminum producers and wire and cable producers all point to the conclusion that Alcoa's position in the above markets is something less than dominant. In any event, if Alcoa has the power to dominate, the record fails to show that such power has been used to its own advantage. The position of Alcoa in the above mentioned markets is relevant in this proceeding as a part of the overall picture upon which the decision must be based but this court sees nothing therein from which it could find that such position and the use thereof are indicative of forbidden anti-competitive practices.

The Competitive Impact

In appraising the impact of the acquisition, we turn first to the relationship between Alcoa and Rome as a source of supply and as direct competitors.

[fol. 4486] The customer-supplier relationship, referred to as the vertical aspect, requires little comment. Rome's purchase from Alcoa of primary aluminum was about 3/10 of one percent of Alcoa's production of that product. This small amount is without significance from a competitive standpoint but indicates rather clearly that the acquisition did not involve the purchase by Alcoa of a captive market.

The market area in which both the acquiring and acquired companies manufactured and sold competing products was limited to four or five items previously mentioned herein. The combination of the manufacturing and selling facilities of the two companies on these items involves the horizontal aspect of the acquisition in its actual and probable effects upon competition.

In ACSR and bare aluminum cable, Rome's pre-acquisition share of the market was 0.3%. In fact, Rome competed only in the smaller sizes of the product while Alcoa manufactured and sold a full line thereof. The products known as covered line wire or weatherproof and multiplex

cable may be discussed together. These products have many end uses but are limited here to "service drop" which has been rejected as a line of commerce. In 1958, Alcoa's share in the service drop market, according to the figures of the Census of Manufacturers was 10.8% and Rome's was 5.1%. These figures do not however include the product known as weatherproof wire, also used as service drop, which was reported under a different classification. Pre-acquisition figures are not available as to the market shares of the defendants in the product known as conduit. During the above time period, Rome manufactured steel conduit, both rigid and thin or electrical metallic tubing (E.M.T.). Alcoa manufactured rigid aluminum conduit and aluminum E.M.T. so that competition between them was in effect the competition between steel and aluminum. The nature and extent of the inter-defendant competition, resulting from the above, may be gathered from the discussion of the market shares of [fol. 4487] the defendants in the conduit lines of commerce as contained herein and needs no repetition here. The same may be said of the item of redraw rod. The extent of the competition therein may also be gathered from the brief discussion herein of market shares of defendants in that item."

Considered only from the manufacturing level, the comparatively small percentages of the market which Rome held in the overlap or competing products would not alone condemn the acquisition especially in view of the purpose and the other relevant factors previously discussed.

The principal contention urged as violative of the statute arises from the premise that the integrated producers are involved in a struggle for monopoly power with the non-integrated producers as their opponents. The argument proceeds to the conclusion that the acquisition adds to the numerical and market strength of the integrated companies especially in the aluminum lines of commerce and is therefore to be condemned.

Without doubt, an integrated company enjoys advantages over its non-integrated competitor. Such advantages would include the ability to sell intermediate products as well as end or fabricated products. Thus at least two opportunities to make a profit are available. They are able to offer a broader line of products to the trade and their sales organ-

izations are likewise given more latitude and sales techniques extended. These advantages are not necessarily conducive to competitive strength in the lines of commerce involved. The financial outlay required, the obtaining and holding of the required skills, the constant research and experimentation, which are required of the seller of intermediate products, are burdens which the fabricator avoids but the integrated producer must carry.

The arraying of the integrated companies on one side and the non-integrated companies on the other overlooks entirely the active and vigorous competition among the integrated companies. In Alcoa's analysis of its lost business [fol. 4488] from 1957 to 1959, it appears that the larger portion of same was lost to integrated producers. Its loss of business to Rome during the same period was insignificant. Previous government action was designed to facilitate the entry of manufacturing competitors of Alcoa's products. Now that such competitors have come into existence, the realities of competition dictate that same may not be ignored or distorted in appraising the competitive market as a whole.

Plaintiff presents statistics tending to show that the market shares of the integrated companies in the aluminum conductor lines of commerce have increased from 1955 to 1959 while the shares of the non-integrated companies have decreased during the same period. This is accounted for principally by the addition of Anaconda and Olin-Mathieson (Ormet) to the list of integrated producers. More significant however is the fact that since the acquisition and up to 1961, the non-integrated companies have held or increased their market shares in the lines under discussion while the shares of the Alcoa-Rome combination have declined. In the ACSR and bare aluminum cable and aluminum conductor wire and cable lines, the non-integrated producers have retained their shares of the market, while the share of Alcoa-Rome in ACSR has dropped from 32.8% to 26.1%. In aluminum conductor, the non-integrated producers have retained their market shares while the share of Alcoa has decreased from 29.1% to 24.8%. In the insulated or covered line of commerce, the non-integrated producers market share has increased from 29.8% to 33.5% while the share of Alcoa-Rome has declined from 16.3% to 13.0%.

The above is proof of what has actually happened in the competitive market. It is a competitive reality much more convincing than arguments based upon speculative future market conditions. When such facts are supported by the oral testimony of utility purchasing agents and non-integrated manufacturers to the effect that the acquisition has not adversely affected their businesses, a finding of a sub-[fol. 4489] stantial lessening of competition is precluded. The fact that some four or five non-integrated producers have reduced or abandoned their aluminum conductor wire business since 1956 is offset by the entry of at least one new company and increase in their productive facilities by four others. The reduction in or abandonment of the manufacturing of these products were brought about principally by an inability to make a profit therein. This situation tends to confirm rather than to negate the existence of a vigorous competition in the products involved.

The plaintiff advances the argument that the acquisition has eliminated the "potential competition" which would have existed if Rome and Alcoa had separately expanded their facilities so as to include additional aluminum products or increased the production of the overlapping competing products. Like many business concerns, the defendants undoubtedly were constantly reviewing their product lines and exploring the possibilities of expansion. There is no evidence however that either had reached a firm conclusion that such an expansion had or would meet with the necessary approval of those in authority. Expansion from within rather than by acquisition may be preferable from the economist's point of view but the statute makes no such prohibition. The substantial lessening of competition, either actual or probable, is the test.

Considerable discussion is found in plaintiff's brief to the effect that this acquisition increased the problem of a "price squeeze" by the integrated producers or by Alcoa in particular. The discussion proceeds upon the theory that the price of primary aluminum to the fabricators may be so increased that they will be unable to make a profit from sale of the end products. This court does not understand just how the acquisition could affect the problem. Rome was not a primary aluminum producer and its acquisition by Alcoa did not affect either the production or price of that

product. Certainly the fabricator would like to buy his basic material as cheap as possible. This contention ignores the [fol. 4490] competition between primary aluminum producers and seems to assume without evidence to support it that such producers will abandon by an unconscionable pricing arrangement the market for primary aluminum and be content to sell only the end product. This overlooks entirely the present competitive situation among primary aluminum producers, the government required allotment of primary aluminum, and the availability of Canadian and foreign intermediate aluminum products. The argument is purely speculative and without evidence to support it.

Although the above discussion applies particularly to the three alleged aluminum conductor lines of commerce, the factors considered would also apply to aluminum ingot and rod used in the production of aluminum conductor wire and cable and to service drop cable which are urged as proper lines of commerce here by the plaintiff. No separate discussion of the competitive effect of the acquisition upon those two lines of commerce is necessary. While service drop is made with either an aluminum or copper conductor, the aluminum type presently predominates. The ease of entry into the business of manufacturing of service drop and the evidence that the Alcoa-Rome share of the market in insulated or covered aluminum conductor, which includes aluminum conductor service drop, has diminished since the acquisition, in particular prompts the conclusion that the acquisition does not violate the statute insofar as the service drop and aluminum ingot may be involved.

The competitive effect of the acquisition in the three principal conductor (aluminum and copper) lines of commerce is not particularly stressed in the plaintiff's briefs or argument. The market shares of Alcoa and Rome therein are not impressive. Alcoa's higher percentage of the market in conductor wire and cable, bare, is made up of ACSR and bare aluminum cable which comprises all but one-tenth of one percent of its market share. Rome's share in the same item (lacking one-tenth of one percent) is made up of bare conductor copper wire and cable which are not com- [fol. 4491] petitive with ACSR as indicated in the discussion of ACSR as an appropriate line of commerce. There is no evidence of post-acquisition trends in the lines now

considered. Likewise there is no evidence that the market, broadened by the inclusion of the competition afforded by the over two-hundred wire and cable producers (both aluminum and copper), will suffer actual or probable anti-competitive effects. There is evidence that such market comprises many strong and vigorous competitors. Alcoa obtained by the acquisition a diversification of its product line by the addition of Rome's copper wire and cable products. Rome however remains as the same source of supply of such products. Considering the same factors discussed herein and applying same to the items presently referred to leads to the conclusion that the statute is not violated as to the three conductor lines of commerce referred to above.

The approach to the consideration of the competitive effect of acquisition upon the conduit lines of commerce is handicapped by the absence of reliable market data. The Brown Shoe case opinion, in referring to the Congressional intent, uses the language "demonstrable anticompetitive effects" as the type of mergers to be invalidated by the statute. Prior to the acquisition, Alcoa manufactured only aluminum conduit, Rome only steel. We have no evidence of the pre-acquisition share of either company in the market. We do have a hesitating and inconclusive estimate of Rome sales in the eleven western states which is rejected as a proper geographic market. The available post-acquisition data lacks the reliability upon which a demonstrable anticompetitive effect may rest. In 1960, the Bureau of the Census compiled figures that defendants' market share of conduit, both steel and aluminum, was 6.9%. This percentage was allocated 3.4% to Alcoa and 3.5% to Rome. The same report attributes the defendants' combined share of aluminum conduit at 26.5%. The above was the first such survey made by the Bureau and forms [fol. 4492] for same were sent only to those who designated themselves as producers of conduit in 1958 and 1959. The evidence shows that at least three aluminum producers entered the conduit field in the 1958-1960 time period.

Again plaintiff appears to stress the status of the defendants in the aluminum conduit line as having anticompetitive effects. Although aluminum conduit has been rejected as a relevant line of commerce here, brief comment will be made relative thereto. Entry to the aluminum con-

duit market requires only an outlay of ten to fifteen thousand dollars by those producers owning extruding equipment. In 1950, there were fifty such owners. The number increased to one hundred and ten in 1955 and to one hundred thirty-three in 1960. The ease of entry is further corroborated by the substantial number of new producers of aluminum conduit in recent years. This is due to the increased demand for the product and provides an active competitive market therein. There is a failure of proof to show that the statute is violated by the acquisition as to either of the conduit lines of commerce as claimed by the plaintiff.

Using the pragmatic practical approach, an appraisal of the acquisition here involved designates same as the combination of an aluminum and an essentially copper manufacturing company. Such an acquisition implies advantages to the acquiring company. Such advantages are not to be condemned unless they portend or approach monopoly proportions. It is the loss to competition rather than the advantage gained that invokes the statute here. Alcoa gained an increase in its scientific knowledge and ability in insulating techniques and a diversification of its line of salable products. This would seem to be a legitimate end in the face of its declining market. There is less need than usual to speculate here upon the effect of the acquisition upon competition. Not only do we have industry evidence as to the actual effect from competitors and purchasers but we also have the factual results of almost three years of market experience. After consideration of all of the evi- [fol. 4493] dence offered herein, it is concluded that the acquisition by Alcoa of the capital stock of Rome has not been shown to be in violation of Section 7 of the Clayton Act; that the claim of the complaint has not been established and that same should be dismissed.

This opinion, together with the Findings of Fact and Conclusions of Law, to be filed herewith, will constitute the Findings and Conclusions of this court and judgment is directed accordingly.

So ordered.

Stephen W. Brennan, United States District Judge.

[fol. 4493a] [File endorsement omitted]

[fol. 4499a] UNITED STATES DISTRICT COURT, NORTHERN DISTRICT OF NEW YORK

Chambers of Judge Stephen W. Brennan

Utica 1, New York

February 21, 1963.

Honorable Justin J. Mahoney,
United States Attorney,
Federal Building,
Albany, N. Y.,

Donald F. Melchior, Esq.
Attorney, Department of Justice,
Washington, D. C.,

Ferris, Hughes, Dorrance & Groben,
Attorneys at Law,
First National Bank Building,
Utica, N. Y. Attention: Robert Groben, Esq.

Bergson & Borkland,
Attorneys at Law,
918 16th Street, N. W.,
Washington, D. C. Attention: Herbert A. Bergson, Esq.

William K. Unverzagt, Esq.
Attorney at Law,
1501 Alcoa Building,
Pittsburgh 19, Penna.

Re: United States of America vs. Aluminum Co. of America and Rome Cable Corporation-Civil No. 8030

Dear Sirs:

As you know, the defendants moved under the provisions of 52(b) F.R.C.P. that this court make four additional findings of fact to supplement the findings already filed. I have received the plaintiff's memo in opposition. Same has been considered and it is concluded that the motion should be granted.

Accordingly, I enclose copy of the instrument making the requested additional findings, the original of which was filed in the Clerk's office today.

Additional Finding No. 1 was not opposed by the Government and requires no comment.

Additional Findings Nos. 2 and 3 are opposed by the plaintiff principally because the product line was not found by the court to be a relevant line of commerce. I think the finding should be made for the reason if an appellate court finds that I am in error, as to the line of commerce issue, the findings tend to show facts which would be relevant in determining the effect on competition therein.

[fol. 4499b] I think that additional Finding No. 4 is intended to broaden the holding in the original opinion and decision to the determination that aluminum conductor wire and cable is not a line of commerce considered as either a "broad line or submarket line." The opinion and findings, as originally made, seem to limit the consideration of the product as a broad line. I am in entire agreement that the item cannot be found as a narrow or submarket line and I am making the finding for the purpose of settling that question.

Very truly yours, Stephen W. Brennan, U.S. District Judge.

SWB/ec, encl.

[fol. 4500] IN UNITED STATES DISTRICT COURT, NORTHERN DISTRICT OF NEW YORK.

Civil No. 8030

UNITED STATES OF AMERICA, Plaintiff,

v.

ALUMINUM COMPANY OF AMERICA AND ROME CABLE CORPORATION, Defendants.

ADDITIONAL FINDINGS OF FACT—February 21, 1963

Pursuant to a motion made by the defendants under the provisions of 52(b) Federal Rules of Civil Procedure, the court makes the additional Findings of Fact which are set out below, same to be considered as supplemental to the Findings and Conclusions previously filed.

1. Because of the closer manufacturing controls required, E. C. grade aluminum, like other alloys, is sold at a premium; however, the price of E. C. aluminum ingot changes directly and correspondingly with the basic price of aluminum ingot.

2. In 1956, the year of Rome's greatest primary aluminum purchases, such purchases amounted to less than 7/10 of 1 percent of total primary aluminum sold to non-integrated fabricators.

3. In view of the ability of aluminum producers to make E. C. and other types and alloys of aluminum interchangeably in accordance with orders received, there is no basis for an inference that other producers will be foreclosed from a substantial market for primary aluminum as a result of Alcoa's acquisition of Rome.

4. Item 1, aluminum conductor wire and cable, excludes insulated copper products and therefore does not include all wire and cable products for which there is reasonable interchangeability of use or cross-elasticity of demand. In addition, the evidence fails to establish that the combination of [fol. 4501] bare and insulated aluminum wire and cable, considered as a whole, is generally recognized in the industry as a seperate economic entity or submarket; nor, in

view of facts found with respect to Item 3, insulated or covered aluminum wire and cable (Findings 25 to 29, inclusive; Opinion pp. 14-15) does the evidence establish that aluminum conductor wire and cable, including both bare and insulated products, has competitively significant peculiar characteristics and uses, is made on unique production facilities, or is sold by specialized vendors to a distinct class of customers.

Stephen W. Brennan, United States District Judge.

Dated: February 21, 1963.

[fol. 4501a] [File endorsement omitted]

[fol. 4502] IN UNITED STATES DISTRICT COURT, NORTHERN DISTRICT OF NEW YORK

Civil No. 8030

UNITED STATES OF AMERICA, Plaintiff,

v.

ALUMINUM COMPANY OF AMERICA AND ROME CABLE CORPORATION, Defendants.

NOTICE OF APPEAL TO THE SUPREME COURT OF THE UNITED STATES—Filed March 29, 1963

I. Notice is hereby given that the United States of America, the plaintiffs above named, hereby appeals to the Supreme Court of the United States from the final judgment entered in this action on January 28, 1963 dismissing this action. This appeal is taken pursuant to Section 2 of the Expediting Act, 32 Stat. 823, as amended, 15 U.S.C. 29.

II. The Clerk will please prepare a transcript of the record in this cause for transmission to the Clerk of the Supreme Court of the United States, and include therein the entire record before the district court including all

papers filed with the Clerk of the Court in this proceeding, the transcript of the trial proceedings, all exhibits and proposed findings submitted by the parties, and this Notice of Appeal.

III. The question presented by this appeal is whether the acquisition by the Aluminum Company of America of the capital stock and assets of Rome Cable Corporation violated Section 7 of the Clayton Act.

/s./ Robert. B. Hummel, Attorney, Department of Justice. /s./ Justin J. Mahoney, United States Attorney, New Federal Building, Albany, New York.

[fol. 4503] Certificate of Service omitted in printing.

[fol. 4503a] [File endorsement omitted.]

[fol. 4504] Clerk's Certificate to foregoing transcript omitted in printing.

[fol. 4503] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 3

Aluminum Company of America

Pittsburgh 19, Pa.

April 2, 1959.

Leon E. Hickman,
Vice President
& General Counsel
Victor R. Hansen, Esquire,
Assistant Attorney General,
Antitrust Division,
United States Department of Justice,
Washington, D. C.

Dear Judge Hansen:

I hand you herewith a loose leaf notebook containing most of the data requested in your letters of February 2nd addressed to Alcoa and Rome Cable Coporation concerning the acquisition of the assets of Rome by Alcoa. The two companies are submitting this single reply because your letters make the same requests of both and ask each for data which can only be supplied by the other. A word of explanation as to the omissions:

Rome is in the electrical conductor business. Alcoa is in the aluminum business on a fully integrated basis, from foreign bauxite and steamships to automobile pistons, building panels and cooking utensils, to mention only five of hundreds of items covered by your questions but which have nothing to do with the electrical conductor business. To spare ourselves a task which would have required months of effort on the part of a great many people and to save you the chore of sorting relevant from irrelevant data, we have taken the liberty of limiting your questions, insofar as they apply to Alcoa, to electrical conductor products and those products which underlie them. This limitation has been applied specifically in answering your questions numbered 9, 10, 11, 17 and 21.

For the same reason Alcoa's response to questions 6, 7 and 8 has been limited to companies, plants and products which are concerned with electrical conductor products or a product underlying them.

[fol. 4506] In answering the first question we did not include congratulatory personal letters between officials at the time of the Alcoa-Rome agreement or the correspondence since the agreement relating to the mechanics of transferring the Rome properties to Alcoa.

I believe we have supplied you all the information which is relevant to the questions raised by your letter. If you need further data, we shall do our best to be cooperative.

With cordial regards, I am

Sincerely, Leon E. Hickman, Vice President & General Counsel.

LEH/im: Enclosure
Held by A.T.

[fol. 4507] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 5

Aluminum Company of America

Pittsburgh 19, Pa.

January 21, 1959.

Frank L. Magee,
President
Rome Cable Corporation,
Rome,
New York.

Gentlemen:

Aluminum Company of America (Alcoa) offers to acquire from Rome Cable Corporation (Rome) all the assets, properties, contract rights, business and good will of Rome (herein collectively called assets), of every kind and description and wherever located, for a consideration of 355,226

shares of common stock of Alcoa and the assumption by Alcoa of all debts, obligations, liabilities and contract duties of Rome (herein collectively called liabilities). The transaction we propose would be an acquisition of assets for stock and not a statutory merger or consolidation.

We are agreeable to having the transaction effected in such a way as to be a non-taxable reorganization under the provisions of the United States Internal Revenue Code, and, if you request, would condition any agreement resulting from acceptance of this offer upon your obtaining a favorable ruling from the Internal Revenue Service in this respect.

The obligation of Alcoa arising out of acceptance of this offer shall be subject to the conditions that Rome shall have taken all such corporate action as shall be necessary for the performance of its obligations thus arising; that Rome have good and marketable title to all the assets which it purports to transfer and that such assets are subsisting on the day of closing; that Rome shall not have incurred any obligations, disposed of any assets or engaged in any transactions after March 31, 1958, other than in the ordinary course of business; that, except for liabilities incurred in the ordinary course of business after March 31, 1958, there shall be no liabilities other than such as are shown on the published balance sheet of Rome as of March 31, 1958; and that, as of the day of closing, there shall have been no change in the condition of Rome, financial or otherwise, as shown in the said balance sheet as of March 31, 1958, other than changes which occurred in the ordinary course of business and did not have a material adverse effect on Rome's business, properties or financial condition.

[fol. 4508] The obligation of Rome arising out of acceptance of this offer shall be subject to the conditions that the shares of common stock of Alcoa to be acquired by Rome shall be validly issued and that, as of the day of closing, there shall have been no change in the condition of Alcoa, financial or otherwise, as shown in its published balance sheet as of December 31, 1958, other than (1) changes which occurred in the ordinary course of business and (2) changes which occurred outside the ordinary course of business but did not have a material adverse effect on Alcoa's business, properties or financial condition.

The agreement to be executed by Alcoa and Rome, if this offer is accepted, shall contain such other and further terms, provisions, conditions and warranties as are normally contained in such agreements.

This offer, which is made by authority of the Executive Committee of the Board of Directors of Alcoa, is open for acceptance on or before January 31, 1959, and may be accepted by the signing and returning of the enclosed duplicate copy of this letter.

Very truly yours, Aluminum Company of America,
By Frank L. Magee, President.

The foregoing offer is accepted this 22nd day of January, 1959.

Rome Cable Corporation, By /s/ A. D. Ross Fraser, President.

[fol. 4509] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 6

Aluminum Company of America

January 21, 1959.

Mr. A. D. Ross Fraser,
President,
Rome Cable Corporation,
Rome, New York.

Dear Ross:

If the directors and shareholders of Rome Cable Corporation approve the sale of your company to Alcoa, the most challenging opportunity confronting us both is how to consolidate personnel to the best advantage. When we were last together, we spent more time on that than any other matter. We have continued to give it a priority in our thinking because, above all else, we want to maintain the high esprit de corps of the Rome organization and to open to every man and woman in your organization improved op-

portunities under the new program. Our thinking runs along the following lines:

(1) *All manufacturing and selling activities of Rome Cable Corporation conducted at Rome, New York, will be continued in that location.*

(2) *A new corporation, to be known as Rome Cable Company, will be formed to take over the properties of the present Rome company.* Its Board of Directors would necessarily consist of a small number of Rome and Alcoa officers selected with an eye to functional coordination of activities. You and the present officers of Rome Cable Corporation will be expected to hold the same offices in the new company as you hold in the old, subject only to such changes as time and changing circumstances indicate would be in our common interest. Likewise, the rest of your organization will be carried over intact into the new company. Initial salaries in the new company would be the same as in the old, subject to such adjustments as joint study indicates to be equitable. Alcoa employee benefits will be made available to Rome employees as promptly as they qualify, as we discussed in some detail when you were in Pittsburgh.

[fol. 4510] (3) *We would expect to consolidate in the new company all electrical wire, cable and conduit activities of both Rome and Alcoa.* This will greatly expand the scope of activity, and, consequently, the responsibility and opportunity of the Rome organization. For example, the transfer to it of Alcoa's bare conductor business alone will greatly enlarge its operations. We would expect to move into the new company additional products in the electrical conductor field or related areas as we gain experience in working together. Insofar as products new to Rome are moved into its orbit, it will probably be advisable to transfer experienced Alcoa personnel to the Rome operation.

(4) *The new company will operate functionally as a Division of Alcoa.* In addition to full responsibility for products manufactured directly by it, it will have a functional responsibility for such Alcoa products as are manufactured, through the existing Alcoa organization, in Alcoa plants but sold by the Rome organization. Quite possibly, the activities of the new company will subdivide into five

categories: (a) insulated wire, (b) bare conductor, (c) accessories, (d) conduit, and (e) Cope.

(5) *We would expect the new company to continue the present sales organization of Rome, subject only to such modifications as experience might indicate to be in the common interest.* Insofar as Rome selling activity is expanded by merchandising Alcoa products, experienced Alcoa personnel will be available for transfer to the Rome Company. We regard the effective consolidation of the marketing organization of the two companies as one of our major problems if we are to gain the full benefit of our proposed agreement. However, we are certain that this can be achieved, as our Pittsburgh discussions indicated.

(6) *Purchasing.* We would expect the purchasing activities of the new company, particularly in copper and steel for conduit, to be handled through its own organization, but in coordination with Alcoa's purchases in the same or related fields.

(7) *Research.* Both Rome and Alcoa are research-minded. We would expect the new company to continue the Rome Research Center in Rome, but to greatly expand its usefulness by coordinating its programs with the research staff of Alcoa.

(8) *Modifications in the light of experience.* I am sure you realize that while we speak in complete candor and good faith, these policies must always be subject to modification or change as experience may dictate. A rigid commitment on these points would be no more in your interest than ours; [fol. 4511] for example, tax considerations may ultimately make it advisable to liquidate the new company into Alcoa and, thereafter, operate it as one of the Divisions of Alcoa. Some of your people are quite likely to find additional opportunities for advancement in the Alcoa organization. No decision can be reached now as to where it would be advisable to manufacture new products or additional production of existing products.

There is an element of faith in this, as in all worthwhile matters. We are counting on your people, strengthened by the support that Alcoa can give them, to develop the wire and cable business of Rome well beyond its present poten-

tial. We can go far together if we maintain a mutual confidence and a willingness to adapt our program to changing circumstances. Subject only to those inevitable contingencies, this letter expresses our full thinking to date.

With cordial regards, I am

Sincerely, /s/ Frank L. Magee, President

FLM:frl

[fol. 4512] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 7

Rome, New York—January 22, 1959.

WESTERN UNION

W. P. Marshall, President

Rome Cable Corporation and Aluminum Company of America today announced plans to affiliate.

Frank L. Magee, President of ALCOA and A. D. Ross Fraser, President of Rome Cable, announce that agreement had been reached on a plan by which ALCOA will acquire all the properties of Rome Cable for 355,226 shares of ALCOA common stock. This will permit distribution to Rome shareholders of 3 shares of ALCOA common stock on each 5 shares of Rome common stock. The agreement is contingent upon the approval of Rome Shareholders who will meet on March 25, 1959. If approved, it will take effect immediately.

ALCOA and Rome plan to combine their electrical conductor, conduit and accessory activities in a new company to be called Rome Cable Company. The present members of Rome's management will continue in their present capacities in the newly formed company. Mr. H. T. Dyett will retire as Chairman of the Board of Rome Cable, when and if the agreement is consummated, rather than at the Annual Meeting in June as previously planned, but he will serve on the Board of Directors of the new company.

ALCOA plans to continue the fundamental policies established by the Rome management, and no major changes in personnel or operating procedures are anticipated.

Rome Cable Corporation shares currently are listed on the New York Stock Exchange. The company has approximately 2500 share holders. Rome Cable's net sales for the year ending March 31, 1958 amounted to $40,615,000. Annual sales have averaged $47,000,000 over the past five years. The company has approximately 1500 employees. It operates manufacturing plants at Rome, New York, Torrance, California, and Collegeville, Pa., as well as sales offices in principal cities of the United States. Rome is best known for its broad line of quality insulated wire and cable products—chiefly made of copper—and steel conduit and other wiring systems. Its products are sold to electric utilities, electrical manufacturers, other wire fabricators, industrial users, wholesalers, mines and oil companies. A number of specialty products are made for the military services, especially for use in the missile program.

Rome Cable was founded twenty-three years ago and has grown rapidly during that time. It is well known in the electrical industry for the emphasis it has placed on research and development activities. During 1958 the company opened a new research center at Rome, New York in order to stimulate further progress in the development of new products and new and improved manufacturing processes and practices. Nearly 40 per cent of the company's sales during the year ending March 31, 1958 came from items that Rome did not manufacture prior to 1950.

[fol. 4513] For more than sixty years ALCOA has pioneered the development of aluminum as an electrical conductor. It produces aluminum wire and cable, bus conductors, conductor accessories, conduit and windings of aluminum sheet and foil for electrical transformers and condensers. One of the company's research laboratories is devoted exclusively to the development of new products and processes for the electrical conductor industry.

"Our proposed affiliation with ALCOA", Mr. Fraser said, "is very much in the best interests of Rome's employees, share owners and customers. It will make possible more complete service to customers by taking advantage of

the combined production and marketing of ALCOA's line of aluminum conductor products as well as bare and insulated wire and cable products produced by Rome. The coordinated research and development activities of Rome and ALCOA will provide improved services to the electrical industry."

"The plan that will be submitted to Rome's shareholders", Mr. Magee said, "will make possible greatly improved service to the rapidly growing electrical industry. For many years Alcoa has specialized in the production and sale of bare aluminum conductors with emphasis on the popular aluminum cable steel reinforced (ACSR) for electrical transmission and distribution lines. More recently Alcoa has been offering a limited line of insulated aluminum conductors. Rome Cable's complete facilities for the production and sale of many types of insulated wire and cable as well as bare copper conductors will fully complement Alcoa's facilities and enable the new organization to meet the increasingly complex requirements of the electrical industry."

Pacific Coast Stock Exchange, 301 Pine Street, San Francisco 4, Calif. Mr. Thomas P. Phelan, Exec. V.P., Pacific Coast Stock Exchange, 618 South Spring Street, Los Angeles, Calif.

Mr. James R. Leedham, New York Stock Exchange, Department of Stock List, 11 Wall Street, New York, New York. Dow Jones & Co. Inc., 44 Broad Street, New York, New York.

[fol. 4514] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 8

Rome Cable Corporation, Rome, N. Y.

January 23, 1959.

Telephone statement by A. D. R. Fraser, President of Rome Cable Corporation to Mr. Paul Windels, Jr. the Regional Administrator of Securities Exchange Commission—New York

On October 20, 1958 in the course of a regular business call on Mr. Ralph V. Davies, Vice President and Director of the Aluminum Company of America, Pittsburgh, Pa., I was asked the question if we were interested in an affiliation with ALCOA, and if so if we would set a price. I stated I would check with Mr. H. T. Dyett, Chairman of the Board of Rome Cable. As a result, Mr. H. T. Dyett, Chairman of the Board, J. H. Dyett, Executive Vice President and I, A. D. Ross Fraser, President of Rome Cable met in New York on October 29, 1958, with Mr. R. V. Davies and Mr. L. E. Hickman, both Vice Presidents and Directors of ALCOA. At that time we indicated that the matter had not been discussed with our Board, and a figure was given to Messrs. Davies and Hickman.

On Friday, October 31, 1958 Mr. Davies called Mr. H. T. Dyett and stated that our proposed figure was too high. Mr. H. T. Dyett stated that in view of the fact that the matter had not been submitted to the Board of Directors of Rome Cable, and in fairness to share owners of Rome Cable, would ALCOA indicate a figure which they felt was more satisfactory.

No meetings or negotiations of any sort were held until Wednesday, January 14, 1959 in Pittsburgh, Pa., at which time Messrs. I. W. Wilson, Chairman of ALCOA, Frank L. Magee, President, Ralph V. Davies, Vice President, Leon E. Hickman, Vice President, all four of whom are Directors of ALCOA and Philip T. Coffin, Manager Electrical Industry Sales, met with John H. Dyett, Executive Vice President, Gerard A. Weiss, Secretary and me, A. D. Ross Fraser,

President of Rome Cable Corporation. This conversation resulted in ALCOA making a verbal offer to Rome Cable Corporation on that day of buying the assets for a total of 355,226 shares of ALCOA Common Stock. Written proposal from ALCOA did not reach us in Rome until Tuesday, January 20, 1959. Favorable action on the proposal was taken by the Board of Directors of Rome Cable during the morning of January 22, 1959.

/s/ A. D. R. Fraser, President.

[fol. 4515] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 9

Rome Cable Corporation

No.

Proxy for Special Meeting of Share Owners

Know all men by these presents, that the undersigned, a holder of Common Stock of Rome Cable Corporation, hereby constitutes and appoints Harry W. Barnard, Herbert T. Dyett, and A. D. Ross Fraser, and each or any of them, with power of substitution, and in place of each, in case of substitution, his substitute, the attorneys, agents and proxies for and in the name, place and stead of the undersigned, to attend at the special meeting of the holders of Common Stock of said Corporation to be held at the office of said Corporation, 421 Ridge Street, Rome, New York, on Wednesday, March 25, 1959, at 10:00 o'clock A. M., and at any and all adjournments thereof, and to cast the number of votes the undersigned would be entitled to vote.

(a) In favor of ☐

Against ☐

approving and ratifying the Plan and Agreement, dated February 17, 1959, entered into by Rome Cable Corporation and Aluminum Company of America and Authorizing the taking of all necessary or convenient and proper steps, in-

cluding without limitation the filing of appropriate certificates with the Secretary of State of the State of New York, to effectuate said Plan and Agreement, all as set forth in the notice of special meeting, dated March 3, 1959, and in the proxy statement accompanying said notice, copies of which have been received by the undersigned; and

The Board of Directors Recommends a Vote in Favor of the Proposed Plan.

(b) upon any and all other business that may lawfully come before the meeting,

hereby revoking any proxy heretofore given designating others to act in respect of the same shares.

This Proxy is to be Voted in Favor of the Proposal Referred to in Clause (a) Above, Unless the Undersigned Has Indicated a Direction for a Contrary Vote by His Mark Placed in the Brackets Following the Word "Against", in Which Event This Proxy Shall be Voted Accordingly.

A majority of said attorneys, agents and proxies, or their substitutes, who shall be present and act at the meeting (or, if only one should be present and act, then that one) shall have and may exercise all the powers hereby conferred.

This proxy delegates discretionary authority in respect of all matters which may come before the meeting, not known or determined at the time of mailing the notice of meeting.

In Witness Whereof, the undersigned has executed this instrument this — day of March, 1959.

—— ——.

Please make the signature or signatures on this proxy conform with names stencilled hereon.

If shares are held in joint names, please sign this proxy with the names of both owners.

When signing as Attorney, Executor, Administrator, Custodian or Guardian, please give your full title as such.

Note: Stockholders who do not expect to attend the meeting are requested to fill in, sign and return promptly, this Proxy, which is solicited on behalf of the Management of the Corporation. Please use the post-paid envelope enclosed for your convenience.

[fol. 4516] Rome Cable Corporation,
Rome, N. Y.

To Our Share Owners:

It was announced on January 22, 1959 that the Board of Directors of your Company had unanimously voted to refer to share owners an offer from Aluminum Company of America (Alcoa) to acquire all the assets of Rome Cable for 355,226 shares of Alcoa common stock.

There is enclosed with this letter a Notice of a Special Meeting of Share Owners, to be held March 25, 1959, together with a Proxy and a Proxy Statement. An affirmative vote of share owners representing two-thirds of the outstanding common stock of Rome is required to approve the purchase agreement. The vote of every share owner is important. Therefore, if you do not expect to be able to attend the special meeting please sign and return the enclosed proxy in time to reach us prior to March 25, 1959.

Alcoa is the country's largest and oldest producer of aluminum and aluminum products. It is fully integrated. More than sixty years ago Alcoa pioneered in the use of aluminum as an electrical conductor and ever since that time has been active in the development of new aluminum products and processes for the electrical industry. Within this field Alcoa today specializes in the manufacture of bare steel reinforced aluminum cable for electrical transmission lines.

On the other hand, your Company has specialized in the manufacture of copper wire and cable for a wide variety of uses. It was also one of the pioneers in the production of insulated aluminum conductor.

The management of Rome Cable has given the most careful consideration to Alcoa's offer and is strongly of the opinion that acceptance of this offer is in the best interest of the share owners of Rome Cable. The enclosed Proxy Statement gives you detailed financial information on each company and also a summary of the ranges of the prices of common stock of each company during 1957 and 1958 and for the first two months of 1959. If the share owners accept Alcoa's offer, you acquire stock in a diversified fully integrated aluminum producer.

Alcoa proposes to operate the Rome properties through

a new Company which will headquarter in Rome and will bear that name. This new Company, led by Rome's present management and combining Rome's experience in copper with Alcoa's know-how in aluminum, will be in a position to serve the fast growing electrical industry more comprehensively than either of the two companies can do today. Both Alcoa and Rome are research minded; we believe the coordination of Rome and Alcoa research and development activities in the electrical field will lead to the creation of new products for and improved services to electrical product users.

If the agreement is approved, Rome's share owners will receive six-tenths (6/10) of a share of Alcoa common stock for each share of Rome common stock as soon after share owners' approval as the transaction can be consummated.

Your management urges you to vote *in favor of* the proposals to be considered at the special meeting of share owners and to sign and send in your proxy promptly, if you are unable to attend the special meeting in person.

By Order of the Board of Directors, Rome Cable Corporation, H. T. Dyett, Chairman of the Board, A. D. R. Fraser, President.

March 3, 1959

[fol. 4517] Rome Cable Corporation

Notice of Special Meeting of Share Owners to be Held March 25, 1959

Notice is Hereby Given that a Special Meeting of Share Owners of Rome Cable Corporation will be held at the office of the Corporation, 421 Ridge Street, Rome, New York on Wednesday, Mareh 25, 1959 at 10:00 A. M., Eastern Standard Time, for the following purposes:

(1) To consider and, if deemed advisable, to approve and ratify a certain Plan and Agreement dated February 17, 1959 entered into by Rome Cable Corporation and Aluminum Company of America and, for the purpose of effectuating such Plan and Agreement and in accordance with the provisions thereof:

(a) To authorize the transfer of all or substantially all of the assets of Rome Cable Corporation to Aluminum Company of America or a wholly-owned subsidiary of Aluminum Company of America for such number of shares of common stock of Aluminum Company of America as shall be equal to six-tenths (6/10) of the number of shares of common stock of Rome Cable Corporation outstanding at the time of such transfer (and within three months thereafter by virtue of the exercise of certain options to purchase common stock of Rome Cable Corporation) and the assumption by Aluminum Company of America or by such subsidiary of Aluminum Company of America of the liabilities of Rome Cable Corporation;

(b) To authorize and consent to, subject to effecting such transfer, the dissolution of the Corporation in accordance with the provisions of Article 10 of the Stock Corporation Law of the State of New York and the distribution to the share owners of Rome Cable Corporation, in complete liquidation thereof, of the shares of common stock of Aluminum Company of America, received upon such transfer, upon the basis of six-tenths (6/10) of a share of Aluminum Company of America for each share of Rome Cable Corporation;

(c) To authorize the amendment of the Certificate of Incorporation of Rome Cable Corporation so as to change the corporate name to "RTC Liquidating Corporation"; and

(d) To authorize any and all other action necessary or desirable and proper to carry out such Plan and Agreement and effectuate the purposes thereof.

(2) To transact such other business as many properly come before the meeting or any adjournment thereof.

A copy of said Plan and Agreement is included in the Proxy Statement annexed to this Notice.

The Board of Directors has fixed the close of business on

February 27, 1959 as the record date for the determination of share owners of the Company entitled to notice of, and to vote at, the meeting.

By order of the Board of Directors, Gerard A. Weiss, Secretary.

March 3, 1959

Note: Share owners who do not expect to attend the meeting are requested to fill in, date, sign and return promptly, the accompanying Proxy, *which is solicited on behalf of the Management of the Corporation.* Please use the post-paid envelope enclosed for your convenience.

[fol. 4518] Rome Cable Corporation

Proxy Statement for Special Meeting of Share Owners to be Held March 25, 1959

This statement is furnished in connection with the solicitation of proxies by the management of Rome Cable Corporation (hereinafter sometimes called Rome, Rome Cable or the Corporation) to be voted at a Special Meeting of Share Owners of the Corporation to be held on Wednesday, March 25, 1959, and at any and all adjournments thereof, at the office of the Corporation, 421 Ridge Street, Rome, New York, for the purposes set forth in the accompanying Notice of Special Meeting of Share Owners dated March 3, 1959. A proxy in the form submitted herewith may be revoked by the person giving it at any time before its exercise.

The shares represented by the proxies received and not revoked will be voted in accordance with the specifications made on such proxies, or in the absence of specific instructions, they will be voted in favor of the proposed Plan and Agreement.

The Proposed Plan and Agreement

The Special Meeting of the Share Owners has been called to consider and take action upon a proposed Plan and Agreement (hereinafter called the Plan) between the Corporation and Aluminum Company of America (hereinafter some-

times called Alcoa or the Company) which contemplates the transfer by the Corporation of all or substantially all of its assets to a wholly-owned subsidiary (hereinafter referred to as Subsidiary) of Alcoa or to Alcoa in exchange for shares of common stock of Alcoa equal in number to six-tenths (6/10) of the shares of the Corporation's common stock outstanding at the time of such transfer (or within three months thereafter by virtue of the exercise of options to purchase shares of common stock of the Corporation) and the assumption by the Subsidiary or by Alcoa of the Corporation's liabilities, the subsequent dissolution of the Corporation and the distribution of such shares of Alcoa common stock to the Corporation's share owners in complete liquidation, on the basis of six-tenths (6/10) of a share of Alcoa common stock for each share of the Corporation's common stock.

A copy of the Plan is annexed hereto as Exhibit A. Any summaries contained in this Proxy Statement of any of the provisions of the Plan do not purport to be complete statements of such provisions and are qualified in their entirety by reference to such Exhibit.

The Plan provides that its consummation is subject to certain conditions, including the receipt of opinions of counsel with respect to various legal matters, and there having been, prior to closing, no changes in the condition of the Corporation, financial or otherwise, as shown in its balance sheet as of March 31, 1958, other than changes which occurred in the ordinary course of business, and none of such changes (other than as reflected in the Corporation's balance sheet as of December 31, 1958) having had a material adverse effect on the Corporation's financial condition, results of its operations or its properties, and there having been, prior to closing, no changes in the condition of Alcoa, financial or otherwise, as shown in its balance sheet as of December 31, 1958, other than (i) changes which occurred in the ordinary course of business, and (ii) changes which occurred outside the ordinary course of business but did not have a material adverse effect on Alcoa's financial condition, results of its operations or properties.

The Plan contemplates that the transfer of the Corporation's assets in exchange for stock of Alcoa will take place on March 31, 1959, if approved by the share owners of the

Corporation. However, under the terms of the Plan, either the Corporation or Alcoa may postpone the closing to a date not later than April 30, 1959. Alcoa and the Corporation, by mutual consent, may postpone the Closing Date beyond April 30, 1959. If, by mutual agreement of Alcoa and the Corporation, the period within which the closing may be held is extended beyond April 30, 1959, the shareholders of the Corporation may direct the termination of the Plan by the affirmative vote of holders of record of a majority of the outstanding shares of the Corporation represented and voting at any annual meeting of shareholders of the Corporation held after December 31, 1959, if the period of such [fol. 4519] extension has not expired or the closing shall not have been held prior to the date of such annual meeting. By mutual consent, the Boards of Directors or the Executive Committees of Alcoa and the Corporation may terminate the Plan at any time and may amend or modify the Plan; provided, however, that no such amendment or modification shall change the number of shares of common stock of Alcoa to be delivered to the Corporation under the Plan or make any material change in the provisions of the Plan relating to the transfer of the Corporation's assets to and the assumption of its liabilities by the Subsidiary and the distribution to the Corporation's shareholders of such shares of common stock of Alcoa against surrender by such shareholders for cancellation of their certificates for outstanding shares of common stock of the Corporation, or alter the shareholders' right to terminate the Plan as provided therein.

In determining that the proposal and the consideration offered to Rome by Alcoa were fair and should be submitted to Rome stockholders the Board of Directors of Rome took into account, among other things, the financial records of Rome and Alcoa (including earnings, dividends and book values), the anticipated potentials of each Company with respect to the future, the increasing importance of aluminum to the electrical industry, and the relative market values of the shares of both companies.

There are and have been no material relationships between the Corporation or any of its officers or directors on the one hand and Alcoa or any of its officers or directors on the other hand other than normal relationships of buyer and

seller of products and services. Alcoa is a partial supplier of aluminum pig to the Corporation. Total purchases of aluminum pig represent approximately 3% of the Corporation's total purchases of raw materials. The Corporation performs certain services for Alcoa with respect to the covering of aluminum wire and cable, the revenue from which in 1958 constituted about 2% of the Corporation's gross sales.

The management recommends that the share owners vote in favor of the Plan, for the reasons given above and for the reasons given in the letter from Mr. H. T. Dyett, Chairman of the Board of the Corporation and Mr. A. D. R. Fraser, President of the Corporation, which letter accompanies this proxy statement and in which the Board of Directors concurs.

The Assistant Attorney General in charge of the Antitrust Division of the United States Department of Justice has requested information from both the Corporation and Alcoa concerning the proposed transactions, the plants and products of both companies and other matters. In the letters requesting this information it was stated that while the proposed transaction does raise certain questions under the Antitrust Laws, the letter was not meant to imply that there would necessarily be a violation of such laws.

Promptly after the transfer of the Corporation's assets, notice thereof will be mailed to share owners of the Corporation, accompanied by instructions with respect to the surrender of their certificates for shares of stock of the Corporation in exchange for certificates for shares of common stock of Alcoa.

Fractional Interests

In the distribution of Alcoa common stock upon the liquidation of the Corporation no fractional shares will be issued, but arrangements will be made with an exchange agent so that for a period of 120 days after the effective date of the transfer of the Corporation's assets, a holder of certificates for shares of stock of the Corporation who would otherwise be entitled to a fractional share, may, upon surrender of his certificate or certificates of common stock of the Corporation, give instruction to the exchange agent to purchase the

additional fractional share required to make up a full share or to sell the fractional share to which he is entitled. If no instruction for the purchase or sale of a fractional interest is given upon surrender of the certificate for shares of stock of the Corporation, the exchange agent will sell any such fractional interest for the account of the holder thereof.

After the expiration of the 120 day period the exchange agent, as agent for all share owners of the Corporation who are, according to the stock transfer books and records of Rome as of the close of business on the day of the expiration of such period, entitled to a fractional interest in any share of Alcoa common stock, will sell shares of Alcoa common stock equivalent to the aggregate of fractional share interests of such share owners. Thereafter such share owners will, to the extent that they have any rights with respect to fractional shares of common stock of Alcoa, be entitled only to their proportionate share of the net proceeds realized by the exchange agent in the aforesaid sale of shares of common stock of Alcoa.

[fol. 4520] Federal Tax Status

Counsel to the Corporation have advised the Corporation that in their opinion no gain or loss for Federal income tax purposes will be recognized to the Corporation upon consummation of the transactions provided for in the Plan, or to the share owners of the Corporation upon the distribution to them, in liquidation, of whole shares of common stock of Alcoa as contemplated by the Plan; but that, in the case of holders of common stock of Rome Cable Corporation who sell fractional interests in shares of common stock of Alcoa, gain or loss will be recognized for Federal income tax purposes. A ruling to this effect, based upon the assumption that the Subsidiary will acquire the assets of the Corporation directly from the Corporation, has been received from the Office of the Commissioner of Internal Revenue (U. S. Treasury Department). A ruling to the same effect, based upon the assumption that Alcoa elects, pursuant to its right under Section 5.4 of the Plan, to acquire the assets of the Corporation and to transfer them thereafter to the Subsidiary, has been requested from the Office of the Commissioner of Internal Revenue (U. S. Treasury Department).

Voting Securities and Vote Required

The only outstanding voting securities of the Corporation as of February 27, 1959, consisted of 561,802 shares of Common Stock, each share of which entitles the holder to one vote. Since the Plan contemplates the transfer of substantially all of the Corporation's assets and the dissolution of the Corporation, the approval of the Plan requires, under New York law, the affirmative vote of holders of record of two-thirds of the outstanding shares of the Corporation entitled to vote thereon.

Common Stock of Rome Cable Corporation

Dividend rights

The holders of common stock are entitled to such dividends as the Board of Directors may determine to pay out of funds available therefor, subject, however, to the limitations imposed by the promissory notes from the Corporation to The Connecticut Mutual Life Insurance Company, Massachusetts Mutual Life Insurance Company and J. P. Morgan & Co. Incorporated, dated as of July 25, 1957. As of December 31, 1958 the amount so available was $2,052,000. See note C of the Notes to the Corporation's Financial Statements, p. 28.

Voting rights

Each share of common stock has one vote.

Liquidation rights

After creditors have been satisfied, the common stock is entitled to the balance of the assets.

Preemptive rights

Except as otherwise provided by statute and except with respect to the issuance of shares covered by the Corporation's stock option plan (See caption "Stock Option Plan", page 12), the holders of common stock have preemptive and subscription rights.

Liability to assessment

The outstanding shares of common stock are fully paid and non-assessable, except that stockholders of every New

York corporation are (in the event of nonpayment by the Corporation) personally liable for debts, wages or salaries owing to employees other than contractors for services performed for the Corporation.

Change of Corporate Name

It is contemplated that the Alcoa subsidiary which acquires the Corporation's business upon consummation of the Plan will thereafter continue such business under the name "Rome Cable Corporation" or other name including [fol. 4521] the name "Rome". Accordingly, it is proposed to change the present name of Rome Cable Corporation to "RTC Liquidating Corporation" by amending its Certificate of Incorporation immediately prior to or promptly after the transfer of the Corporation's assets.

Comparisons of Net Income, Dividends Declared and Book Values

The following tabulation compares the net income, dividends declared and book values per share of common stock of Rome and Alcoa and, since the exchange contemplated by the Plan is at the rate of 6/10 of a share of Alcoa common stock for each share of Rome common stock, the tabulation also shows the net income, dividends declared and book value equivalent to 6/10 of a share of Alcoa common stock. Since Alcoa's fiscal year is the calendar year and Rome's fiscal year ends March 31, a direct comparison for identical periods is not possible. Therefore, the comparison shown in the following tabulation is of periods having the greatest time in common—a comparison of Alcoa data for a calendar year with Rome data for the fiscal year ending the following March 31, providing a common period of nine months. Thus, each year shown in the table below refers to the following periods: for Alcoa—its fiscal year ending on December 31 of such year; for Rome—its fiscal year ending on March 31 of the following year, except that, in the case of 1958, Rome's data are for the calendar year ending December 31 and were determined as set forth in Note 3 to the table.

	Alcoa		Rome
Net Income:	Per Share (1)	Per 6/10 of a Share (1)	Per Share (2)
1954	$ 2.95	$ 1.77	$ 1.57
1955	4.18	2.51	3.64
1956	4.24	2.54	4.04
1957	3.55	2.13	1.82
1958	1.96	1.18	.65 (3)
Dividends Declared:			
1954	.80	.48	1.19
1955	1.05	.63	1.29
1956	1.20	.72	1.39
1957	1.20	.72	1.30
1958	1.20	.72	1.00
Book Value:			
Dec. 31, 1958	$30.09	$18.05	$28.91

(1) Net income per share or per 6/10 of a share is based upon the number of shares of common stock outstanding at the end of each year after giving effect to the dividends declared on the preferred stock and after giving effect to the 2-for-1 common stock split-up in 1955. Dividends declared per share and per 6/10 of a share are stated after giving effect to the 2-for-1 common stock split-up in 1955.

(2) Net income per share and dividends declared per share are based on the number of common shares outstanding at the end of each period after giving effect to stock dividends of 10% in 1956 and 5% in 1957.

(3) Net income of Rome for the calendar year 1958 has been constructed by adding to the unaudited figures for the nine-month period ending December 31, 1958 the computed figures for the first three months of 1958 derived by subtracting from audited figures for the year ending March 31, 1958 interim unaudited figures for the nine-month period ending December 31, 1957.

The pro-forma net income per share of common stock of Alcoa for the year ended December 31, 1958, based upon a combination of the income of Alcoa and Rome (the net income of Rome having been computed as set forth in foot note (3) above) and reduced by the sum of (i) the assumed applicable amortization of the excess of the aggregate market value of the shares of common stock of Alcoa to be issued over the net book value of the assets of Rome to be acquired and (ii) the dividends declared on the preferred stock of Alcoa, divided by the total number of shares of common stock of Alcoa which would have been outstanding at December 31, 1958 assuming all Rome shares outstanding and under option were exchanged for Alcoa common stock as proposed, amounts to $1.89. The pro-forma net income equivalent to 6/10 of a share of Alcoa common stock so computed is $1.13.

[fol. 4522] The pro-forma book value per share of common stock of Alcoa at December 31, 1958, based upon a combina-

tion of the net assets of Alcoa and Rome increased by the excess of the aggregate market value of the shares of common stock of Alcoa to be issued over the net book value of the assets of Rome to be acquired, and reduced by the sum of (i) the assumed applicable amortization of the above excess and (ii) the redemption value of the preferred stock of Alcoa, divided by the total number of shares of common stock of Alcoa which would have been outstanding at December 31, 1958, assuming all Rome shares outstanding and under option were exchanged for Alcoa common stock as proposed, amounts to $30.98. The pro-forma book value equivalent to 6/10 of a share of Alcoa common stock so computed is $18.59.

Market Prices

From August 9, 1937 until July 24, 1957 the common stock of the Corporation was admitted to dealing on the American Stock Exchange (formerly called New York Curb Exchange). On July 24, 1957 the common stock of the Corporation was admitted to dealing on the New York Stock Exchange and dealing in the stock on the American Stock Exchange ceased. The following table sets forth the reported high and low sales prices, for the periods indicated, of the common stock of the Corporation on the American Stock Exchange through July 23, 1957 and thereafter on the New York Stock Exchange, and for the common stock of Alcoa on the New York Stock Exchange, and it also sets forth the market values of 6/10 of a share of Alcoa common stock, based upon the market prices of a whole share of Alcoa common stock.

	Alcoa Common Stock				Rome Cable Common Stock	
	Per Share		Per 6/10 of a Share (1)		Per Share	
	High	Low	High	Low	High	Low
1957 First Quarter	93¾	80	56¼	48	29⅛	26
Second Quarter	100⅞	88½	60½	53⅛	29⅜	26
Third Quarter	102	71¾	61¼	43	32	26¼
Fourth Quarter	77½	59¾	46½	35⅞	26¾	20⅞
1958 First Quarter	74½	60⅜	44¾	36¼	21⅞	18½
Second Quarter	71⅜	62½	42⅞	37½	21⅛	17¾
Third Quarter	90	69⅛	54	41½	23⅞	20¼
Fourth Quarter	96½	82⅜	57⅞	49⅝	32½	22
1959 January 1 thru February 27, 1959	93¾	81	56¼	48⅝	47⅞	30½

(1) Adjusted to the nearest ⅛.

On February 27, 1959 the closing price on the New York Stock Exchange for the common stock of Rome Cable Corporation was $46.50 per share and the closing price on the New York Stock Exchange for the common stock of Alcoa was $83.125 per share. The market value of 6/10 of a share of common stock of Alcoa, based upon the closing price on February 27, 1959, was $49.875.

[fol. 4523] Rome Cable Corporation

Summary of Earnings

The summary of earnings with respect to the five years ended March 31, 1958, has been examined by Ernst & Ernst, independent public accountants, whose report thereon appears in this Proxy Statement. The summary, insofar as it relates to the three years ended March 31, 1958, should be read in conjunction with the financial statements and related notes included in this Proxy Statement. The unaudited figures for the nine months periods ended December 31, 1958 and 1957, include all known adjustments, which consisted solely of normal recurring accruals, considered necessary for a fair presentation of the results for the periods indicated, but are not presented as being indicative of the sales and operating results that may be expected for the full fiscal year.

	Nine Months ended December 31, 1958 (Unaudited)	Nine Months ended December 31, 1957 (Unaudited)	Year ended March 31, 1958	1957	1956	1955	1954
					(In thousands)		
Net sales	$27,735	$32,239	$40,614	$52,790	$56,996	$39,186	$43,771
Cost of products sold	24,773	27,498	34,805	44,560	49,742	34,955	36,653
Distribution, administrative and general expenses	2,241	2,666	3,511	3,414	2,930	2,355	2,663
	$27,014	$30,164	$38,316	$47,974	$52,672	$37,310	$39,316
	$ 721	$ 2,075	$ 2,298	$ 4,816	$ 4,324	$ 1,876	$ 4,455
Interest expense	166	149	211	157	149	133	87
Other charges—credits*	6*	3*	9*	53	18*	5*	20
	$ 160	$ 146	$ 202	$ 210	$ 131	$ 128	$— 107
	$ 561	$ 1,929	$ 2,096	$ 4,606	$ 4,193	$ 1,748	$ 4,348
Provision for federal taxes on income	285	997	1,077	2,450	2,170	817	2,798
NET EARNINGS	$ 276	$ 932	$ 1,019	$ 2,256	$ 2,023	$ 931	$ 1,550
Net earnings per share of Common Stock outstanding at the end of the fiscal year or period (adjusted in 1956, 1955 and 1954, for subsequent common stock dividends)	$.50	$1.67	$1.82	$4.04	$3.64	$1.57	$2.68
Dividends paid or payable per share:							
In cash per share of Common Stock outstanding at the end of the fiscal year or period (adjusted in 1956, 1955 and 1954, for subsequent common stock dividends)	$.75	$1.05	$1.30	$1.39	$1.29	$1.19	$1.21
In Common Stock	—	—	—	5%	10%	—	—

Note—Reference is made to Note E of Notes to Financial Statements.

Materials represent a high percentage of the sales dollar of Rome's products. During the above period copper, the largest material component, climbed from 30 cents in 1954 to a world price of 54¢ in 1956 and fell to approximately 20 cents in early 1958 thus making wide swings in dollar volume not truly reflecting physical volume. As an example, while sales dollars for the year ended March 31, 1956 actually increased 45% above the previous year the physical volume increase was only 18%. The drastic and steady decline in world price of copper accentuating need for customer inventory liquidation caused an earlier reduction in incoming order volume in the copper fabrication business than was true of industry generally. Unrealistic competitive price reductions despite sizable operational cost reductions affected earnings in fiscal year 1957 and 1958.

[fol. 4524] Aluminum Company of America and Consolidated Subsidiary Companies

Summary of Consolidated Income

The following summary of consolidated income (including the related notes) of Aluminum Company of America and consolidated subsidiary companies has been examined by Lybrand, Ross Bros. & Montgomery, independent certified public accountants, whose opinion with respect thereto appears elsewhere in this Proxy Statement. The summary should be read in conjunction with the consolidated financial statements and related notes of Aluminum Company of America and consolidated subsidiary companies appearing elsewhere herein.

	Years				
	1958	1957	1956	1955	1954
			(In thousands)		
Income:					
Net sales and operating revenues	$753,140	$869,378	$864,416	$845,028	$708,344
Income from securities and investments	1,661	1,988	2,311	2,013	2,768
Other income, including adjustments applicable to prior years, net	3,343	4,095	3,058	1,704	1,893
Total	758,144	875,461	869,785	848,745	713,005
Costs and expenses (A):					
Cost of goods sold and operating expenses	568,788	615,878	595,902	578,911	510,476
Selling, general administrative and other expenses	97,324	100,371	89,937	82,399	70,927
Interest expense	17,647	14,644	9,375	10,584	12,214
Total	683,759	730,893	695,214	671,894	593,617
Income before United States and foreign taxes on income	74,385	144,568	174,571	176,851	119,388
Provision for United States and foreign taxes on income:					
United States:					
Income taxes—current	23,440	51,855	62,459	67,670	36,028
Income taxes—future	2,600	11,650	17,250	17,550	16,538
Foreign	5,460	5,495	5,241	4,030	4,947
	31,500	69,000	84,950	89,250	57,513

Net income (B)	42,885	75,568	89,621	87,661	61,875
Dividends declared on Preferred Stock	2,475	2,475	2,475	2,475	2,475
Net income applicable to Common Stock	$ 40,410	$ 73,093	$ 87,146	$ 85,126	$ 59,400

Notes:

(A) Provision for depreciation and depletion of properties, plants and facilities and amortization of intangible assets included in costs and expenses, expressed in thousands, were as follows: 1958—$65,660; 1957—$57,659; 1956—$50,771; 1955—$45,114; and 1954—$40,653.

(B) Beginning with the year ended December 31, 1956, the last-in first-out method was adopted for determining cost of substantially all inventories, instead of the average cost method theretofore generally used. Also, at December 31, 1956, intercompany profits in inventories, which had previously been computed and eliminated in consolidation before considering income taxes payable by subsidiaries on such profits, were eliminated on an after-tax basis. The combined effect of these changes on the net income for 1956 was not material.

The Company and consolidated domestic subsidiary companies have used the sum-of-the-years-digits method of computing depreciation of property assets acquired since December 31, 1953, in lieu of the straight-line method theretofore used. The effect of this change on net income for 1954 was not material.

Net income includes the earnings of subsidiaries in Canada, Venezuela and Suriname, expressed in thousands in United States currency, as follows: 1958—$7,774; 1957—$6,126; 1956—$5,877; 1955—$4,914; and 1954—$6,995. Translation into United States currency was made at official or current rates of exchange, except that allowances for depreciation and depletion were translated at rates prevailing at the time of acquisition of the related assets, and Canadian dollars were translated at par.

Net sales and operating revenues increased progressively from 1954 to 1957. These changes are attributable to the increased demand for Alcoa's products and expansion of its facilities. A definite increase in demand in relationship to supply occurred in 1955 over 1954. Net sales and operating revenues decreased in 1958 partially as a result of a decline [fol. 4525] in general business conditions and partially as a reflection of an excess of aluminum capacity in the industry in relation to the then current demand. Increases in net income from 1954 through 1956 resulted from the increase in net sales and operating revenues and generally satisfactory profit margins. In spite of an increase in net sales and operating revenues in 1957 a decrease in net income was experienced due principally to a decrease in shipments of fabricated products and lower profit margin. The decrease in 1958 net income is attributed to the lower level of operations as well as to the decrease in profit margin as a result of competitive price cutting which, while evident in 1957, was more fully felt in 1958 as evidenced by the Company's reduction in its price of primary aluminum pig of 2¢ per pound in April, 1958 followed by an increase of only 7/10th of 1¢ per pound in August, 1958.

Proposed Accounting Treatment of Acquisition by Alcoa

The Plan contemplates that either the assets of Rome will be transferred to the Subsidiary in exchange for stock of Alcoa which had theretofore been issued to the Subsidiary or the assets of Rome will be transferred directly to Alcoa for its stock and then such assets will be retransferred by Alcoa to its Subsidiary for the Subsidiary's capital stock.

Alcoa will issue to the Subsidiary, or directly to the Corporation, such number of shares of common stock of Alcoa as shall be required for delivery to the Corporation in payment for the assets of the Corporation. In return, Alcoa will receive all of the shares of capital stock of the Subsidiary which will be recorded as an investment in the accounts of Alcoa at the aggregate market value of such shares of common stock of Alcoa on January 22, 1959, that being the date on which the offer of Alcoa to purchase the assets of the Corporation was accepted by the Corporation's Board of Directors. The aggregate par value of such shares of

common stock of Alcoa will be added to the common stock account of Alcoa and the balance will be recorded as additional capital.

It is expected that the aggregate market value so determined of the shares of common stock of Alcoa which will be issued will exceed the net book value of the assets of the Corporation which are to be acquired by the Subsidiary. In the accounts of the Subsidiary this excess will be allocated to appropriate specific assets and written off over the lives of such assets or will otherwise be amortized in accordance with generally accepted accounting principles.

History and Business of Rome Cable Corporation

Organization

The Corporation was incorporated under the laws of the State of New York on January 20, 1936. It has three plants which are located in Rome, New York, Torrance, California and Collegeville, Pennsylvania. Its executive offices and research center are located in Rome, New York.

Products

The Corporation manufactures in its Rome, New York plant; copper rods and the following wire and cable products for use in the transmission of electrical energy: bare wire, weatherproof wire, magnet wire, building wire, heavy duty flexible cords and cables, mining and welding cables, power and control cables, service drop and service entrance cable, hook-up wire, instrumentation and missile cables as well as many custom built cables for industry and Government.

Copper rolled into copper rod in its own rod mill and drawn into copper wire is the major metal used in the above products. The Corporation also produces copper rods for sale to customers. Like other prime fabricators in the wire and cable industry the Corporation also processes copper wire bars supplied by customers into copper rods and various copper wire and cable products, on a fabricating charge basis. A number of wire products are made from aluminum rods rolled in its own mill.

At its Torrance plant the Corporation manufactures rigid and thin wall steel conduit and mechanical steel tubing. At

its Collegeville plant it manufactures expanded steel cable troughs, cable pulling devices and certain tools and equipment used for the installation and maintenance of underground electrical transmission and distribution power systems.

Marketing

The Corporation markets its products through its own sales offices, salesmen and sales agents. It has 18 sales offices and 10 warehouses throughout the United States. About one-half of the Corporation's products are sold to electrical [fol. 4526] wholesalers who in turn sell to contractors, utilities, industrials, and municipalities. About one-fifth is sold directly to other wire and cable manufacturers, 14% to electrical equipment, electronic and other industrials, and 10% to utjlities. The balance goes to a miscellany of other users, including the Government.

Plants

The Rome plant is located on a 236 acre tract in Rome, New York which the Corporation owns in fee. Buildings cover a total of 894,000 square feet. Buildings are essentially steel, brick and concrete construction, with the exception of the new research center, completed in 1958, which is of steel and glass window-wall construction. The executive offices are located in Rome, N. Y.

The Torrance plant is located on an 11 acre tract in Torrance, California which the Corporation owns in fee. The floor space of the buildings is 146,000 square feet. General construction is of steel, concrete, wood and brick.

The Collegeville plant is located on a two acre tract in Collegeville, Pennsylvania which the Corporation owns in fee. The buildings are of steel, concrete, wood and brick construction, having an area of 45,000 square feet.

Raw Materials

Raw materials used by the Corporation in the manufacture of its products in the order of their importance are: copper, steel, natural and synthetic rubber, polyvinyl and polyethylene plastics, aluminum, zinc and lead, all of which

are purchased from others. The Corporation's purchases of wire bar copper represents approximately 60% of its raw material purchases. Steel for the Torrance plant, purchased in sheet form, represents approximately 15% of the raw material purchases. Aluminum purchased in the form of pig represents approximately 3% of its raw material requirements.

Employee Relations

As of December 31, 1958 the Corporation had 1450 employees, including 933 hourly paid workers. The Corporation has never had a strike or any work stoppage due to labor difficulties in its entire history.

Security Holdings of Directors and Officers

The number of shares of Common Stock of the Corporation beneficially owned, as of February 20, 1959, by the directors and officers of the Corporation and their associates, according to information furnished by such directors and officers, was as follows:

Name	Shares of Rome Cable Corporation Common Stock beneficially owned as of February 20, 1959 By Individual	By Associates
Harry W. Barnard	7,010	265
		7518(1)
		2000(2)
Herbert T. Dyett	50,601	1820(3)
John H. Dyett	31,304	3990(4)
		2425(4)
		6849(4)
		7518(1)
		2000(2)
Charles H. Ellis	3,991	210
Alfred S. Foote	300	
A. D. Ross Fraser	6,000	377
		7518(1)
Glenn Koger	446	
Hal A. Kroeger	2,700	
John L. Loeb	7,737	(5)
Frederick S. Marks	1,042	86
		2000(2)
Glenn E. Rolston	3,167	
Jay T. Sarles	1,886	1492
Rudolph A. Schatzel	3,425	315
[fol. 4527]		
James H. Sharp	100	23
Gerard A. Weiss	359	112
Allan Ziegler	133	

(1) H. W. Barnard, J. H. Dyett and A. D. R. Fraser are officers of Rome Cable Foundation, Inc., holder of 7,518 shares, but in which they have no beneficial interest.

(2) H. W. Barnard, J. H. Dyett and F. S. Marks are officers of Herbert T. Dyett Foundation, Inc., holder of 2,000 shares, but in which they have no beneficial interest.

(3) John H. Dyett is a son of H. T. Dyett.

(4) Certain associates of J. H. Dyett hold 3,990 shares but in which he has no beneficial interest, and there were held in Trust for Julia W. Dyett, wife of J. H. Dyett, 2,425 shares in which J. H. Dyett is a Trustee but in which he has no beneficial interest. J. H. Dyett is Trustee of a trust holding 6,849 shares for Charlotte D. White, his sister, but in which he has no beneficial interest.

(5) On February 20, 1959 certain associates of John L. Loeb were beneficial owners of common stock of the Corporation as follows: Frances L. Loeb, wife of John L. Loeb, 3,465 shares; children of John L. Loeb 6,898 shares; and there were held in trust under Trust indenture 3,636 shares in which John L. Loeb is Trustee for his children, but in which he has no beneficial interest, and 2,756 shares in which Frances L. Loeb is Trustee for their children, but in which she has no beneficial interest. Carl M. Loeb Rhoades & Co. were holders of record but not beneficial owners of 34,079 shares of common stock.

Stock Option Plan

A Stock Option Plan for certain key employees covering 36,000 shares of Common Stock was approved by the share owners on June 20, 1956. On the same date options to purchase 32,800 shares were granted to 31 officers and key employees at $26.85 per share (95% of fair market value). On January 4, 1957 a 5% stock dividend was paid which pursuant to the plan increased the number of shares reserved for issuance to 37,800 and the number of shares subject to option to 34,440 at $25.57 per share. The options were exercisable in cumulative annual installments and enforceable for ten years. As of December 10, 1958, options to purchase 17,535 shares were exercisable but no options had been exercised, and options to purchase additional shares were to become exercisable as follows: 5,250 on June 20, 1959, 4,515 on June 20, 1960, 3,990 on June 20, 1961, 3,150 on June 20, 1962. On December 10, 1958 the Stock Option Committee waived the cumulative provisions of the options and thereupon options at $25.57 per share (aggregating $880,630) for a total of 34,440 shares became exercisable immediately. As of December 10, 1958, the fair market value of Rome Cable Corporation Common Stock was $26.00 per share (aggregating $895,440 on 34,440 shares). Any option may be terminated by the Stock Option Committee upon sixty days notice to the optionee. As of February 20, 1959, no options had been exercised. The Plan provides that shares of stock of the Corporation purchased by the exercise of stock options within three months after the Closing Date are exchangeable for Alcoa common stock on the basis of 6/10 of a share of Alcoa common stock for each share of Rome common stock. The Plan alternatively provides that by mutual agreement of Rome and Alcoa, Alcoa will assume the options outstanding at the Closing Date to the end that there may be purchased thereunder 6/10 of one share of Alcoa common stock at the price of $25.57 for each share of Rome common stock that might have been purchased by exercise of the options on or prior to the Closing Date. In either event, it is intended that all options will be terminated, as is permitted under the terms of the options, within three months after the Closing Date.

History and Business of Aluminum Company of America and Other Data Relating to It

References to the "Company" in the following discussion of the history and business of Alcoa shall be taken to mean Aluminum Company of America.

Organization of Alcoa

The Company was incorporated under the laws of the Commonwealth of Pennsylvania on July 29, 1925, through the merger and consolidation of Aluminum Company of America, a Pennsylvania corporation incorporated on September 18, 1888, and Canadian Manufacturing and Development Company, a Pennsylvania corporation incorporated on May 6, 1925. The principal offices of the Company are located in the Alcoa Building, Mellon Square, Pittsburgh 19, Pennsylvania.

[fol. 4528] Alcoa's Capital Structure

The capitalization of the Company on December 31, 1958, was as follows:

Title of Issue	Originally Authorized	Outstanding
Long-Term Debt(1)		
Sinking Fund Debentures		
3⅛%, due 1964	$125,000,000	$ 52,500,000
3%, due 1979	100,000,000	83,400,000
4¼%, due 1982	125,000,000	119,800,000
3⅞%, due 1983	125,000,000	125,000,000
Notes Payable		
2.55%, due 1967	40,000,000	20,000,000
3%, due 1973	60,000,000	60,000,000
Capital Stock		
Serial Preferred Stock (par value $100 per share)	1,000,000 shs.	
$3.75 Cumulative Preferred Stock	660,000 shs.	659,909 shs.
Common Stock (par value $1 per share)	50,000,000 shs.	20,644,966 shs.(2)

(1) Outstanding long-term debt is exclusive of debt due within one year, and exclusive of miscellaneous long-term debt of the Company and its subsidiaries in an aggregate amount of approximately $2,000,000. See Note 3 to Notes to Consolidated Financial Statements for debt maturities.

(2) If all the shares of Common Stock covered by options under the Employees' Stock Option Plan had been issued and outstanding on December 31, 1958, there would have been 20,981,316 shares of Common Stock outstanding on that date.

Alcoa's Business and Properties

The Company, with its subsidiaries, is an integrated producer and fabricator of aluminum. Its principal operations include mining and processing of bauxite, an aluminum-bearing ore; transportation of bauxite to the United States; production of alumina from bauxite; smelting of aluminum from alumina; making of aluminum alloys; and fabrication of aluminum and aluminum alloys into semi-finished and finished products.

The Company's bauxite is mined principally in Surinam, South America, under concessions which will expire in 2032. The Company estimates its lands held under concessions contain sufficient ore to supply the Company's requirements, at anticipated consumption rates, for the term of the concessions. Surinam bauxite is transported to the United States in ships owned or chartered by subsidiaries of the Company. In connection with the transportation of bauxite, a subsidiary conducts a general shipping business in the Caribbean and to a smaller degree in other areas. Some bauxite is also mined on Company-owned and leased properties in Arkansas. These properties are estimated to contain sufficient bauxite reserves to supply the Company's Arkansas alumina plant, at the 1957-1958 rate of consumption, for at least forty years. Bauxite is being produced from each mining area at a favorable unit cost in relation to prevailing aluminum prices.

A subsidiary of the Company has a concession from the government of the Dominican Republic to explore for and produce bauxite from a number of exploitation parcels. The concession, as amended, covers approximately 22,000 acres and expires in 2007. Bauxite mining and shipping facilities have been provided and ore shipments began in early 1959. The Point Comfort, Texas, alumina plant, which went into partial production early in 1959, is designed to process Dominican-type as well as other types of bauxite.

Bauxite is refined into alumina at Company plants in Mobile, Alabama, Bauxite, Arkansas, and Point Comfort, Texas.

Aluminum is produced from alumina by an electrolytic process requiring large amounts of electric power generated within reasonable proximity of each of the Company's

smelting plants. A substantial portion of such power is generated by the Company or its subsidiaries and the remainder is purchased from others under long-term contracts, supplemented by short-term or spot purchases to meet short-term needs. It is believed that the Company is in a position to generate or purchase sufficient electric power to operate its smelting plants satisfactorily, except for conditions beyond its control, including variations in the availability of water power due to stream flow conditions.

The Company's principal contract to purchase power for its Alcoa, Tennessee, plant expires December 31, 1962; its principal contracts to purchase power for its Wenatchee, Washington, and Vancouver, Washington plants expire in 1971; and its principal contracts to purchase power for its Massena, New York, plant expire in 1997 and 1999, with a substantial curtailment possible under one of the contracts as early as about 1986. The Company has no reason to believe that an extension of the contracts expiring in 1962 and 1971 cannot be negotiated at an appropriate time.

[fol: 4529] In the generation of power by the Company or subsidiaries, any of several sources of energy are used—gas, coal, lignite or water. Where the Company uses gas (Point Comfort), it has reserves either owned or under contract estimated to be sufficient for operation at anticipated maximum consumption rates for approximately seven years. The Company has no reason to believe that it would be unable to procure natural gas at market prices when additional amounts thereof are needed. Where it uses lignite (Rockdale, Texas), it has reserves either owned or under contract estimated to be sufficient for operation at anticipated consumption rates for over fifty years. Where it plans to use coal (Evansville, Indiana), it has acquired reserves estimated to be sufficient for the operation of the plant as presently planned for about sixty years. In its use of water power in connection with the generation of electric power for the Company's Alcoa plant, the Company operates subject to a Federal Power Commission license effective until March 1, 2005. A similar license in connection with use of wate power for the generation of electric power for the Badin, North Carolina, plant is effective until May 1, 2008.

The operation of the Company's hydroelectric facilities

in the Little Tennessee Valley is integrated with the operations of the Tennessee Valley Authority (T. V. A.) pursuant to the terms of an agreement effective until December 31, 1962, and thereafter from year to year until terminated by three years' prior notice.

Fluorspar for the production of chemicals used in the smelting of aluminum or for sale to others is mined in Hardin County, Illinois, where the Company operates a crushing and beneficiation mill. The Company has mining rights in Illinois, Kentucky, Colorado and Idaho covering properties estimated to contain sufficient ore to supply the fluoride requirements of the Company and its subsidiaries, on the basis of their 1957-1958 use in the smelting of aluminum, for approximately twenty years.

During 1958, the Company's production of primary aluminum amounted to about one-third of the total produced in the United States. The Company's total production of primary aluminum, measured in short tons, for each of the years 1954 through 1958 was as follows: 1954—666,000; 1955—702,000; 1956—756,000; 1957—712,000; and 1958—529,000. Contractual and spot purchases of aluminum for the same years, measured in short tons, were: 1954—92,300; 1955—78,700; 1956—111,900; 1957—82,400; and 1958—79,200. Current schedules call for production in 1959 of about 568,000 short tons. It is estimated that purchases of aluminum in 1959 will amount to about 51,000 short tons, which includes 49,000 short tons to be procured under existing purchase agreements.

Primary aluminum is fabricated, cast or otherwise processed at seventeen plants of the Company located in twelve states. These plants are generally located near the various market areas for the products produced by the Company. Information with respect to each of these fabricating plants is shown in the following tabulation:

Location	Principal Products	Floor Space (Sq. ft.) (Approximate)
Alcoa, Tennessee		
North Plant	Sheet and plate	2,460,000
West Plant	Sheet and plate, foil, powder and paste, and welded tube	1,625,000
Bridgeport, Connecticut	Castings (sand, plaster process and permanent mold)	400,000
Chillicothe, Ohio	Cooking utensils	130,000
Cleveland, Ohio	Castings (sand, plaster process and permanent mold), hammer and press forgings and magnesium castings (permanent mold) and forgings	1,812,000
Cressona, Pennsylvania	Extrusions (including impact extrusions)	1,500,000
Davenport, Iowa	Sheet, plate and foil	3,200,000
Detroit, Michigan	Castings (sand, plaster process and permanent mold)	369,000
Edgewater, New Jersey	Sheet, foil and impact extrusions	1,083,000
Garwood, New Jersey	Die Castings (including magnesium)	163,000
Hillside, Illinois	Die castings	243,000
Lafayette, Indiana	Tube and extrusions	1,879,000
Lancaster, Pennsylvania	Rivets and fasteners, screw machine products and nails	250,000
Massena, New York	Wire, rod, bar and structural shapes, bare wire and cable, covered wire and cable, and cable accessories	2,520,000
New Kensington, Pa.	Tube, extrusions, foil, powder, paste, cooking utensils, jobbing products, magnesium extrusions and other products	2,260,000
Richmond, Indiana	Bottle and jar closures, and collapsible tubes	270,000
Vancouver, Washington	Rod, wire, extrusions, bare wire and cable and cable accessories	445,000
Vernon, California	Castings (sand, plaster process and permanent mold) and forgings (including magnesium), rivets, extrusions and tube	1,222,000

[fol. 4530] Principal products manufactured and marketed by the Company include, in addition to primary aluminum, sheet and plate, extruded products, castings, wire, rod and bar, forgings, electrical conductors and accessories, foil, tubing, certain chemical products, rivets and screw machine products, impact extrusion products, jobbing products, closures, and powder and paste. The Company produces and markets "Alcoa Wrap" household foil and "Wear-Ever" cooking utensils.

Net sales and operating revenues from 1954 through 1958, in thousands of dollars, were as follows:

Years	Primary Aluminum (Pig and Ingot)		Fabricated Products	Other Sales and Misc. Revenues(1)	Operating Revenues(2)	Total Net Sales and Operating Revenues(3)
	Tons	Amounts				
1954	317,766	$132,726	$493,619	$43,375	$38,624	$708,344
1955	238,448	112,694	647,327	39,671	45,336	845,028
1956	204,149	107,732	667,822	43,421	45,441	864,416
1957	246,885	132,975	639,385	46,722	50,296	869,378
1958	211,436	109,955	561,788	31,744	49,653	753,140

(1) Includes bauxite, alumina in various forms, and other products.
(2) Includes revenues from shipping and other operations.
(3) The figures in this column include the following approximate percentages of total net sales to, and operating revenues from, the U. S. Government: 1954—16%; 1955—6%; 1956—1%. 1957—7%; 1958—7%.

During 1958, Alcoa completed shipments of primary aluminum to General Services Administration under contracts entered into in 1950-1951 in connection with expansions of Alcoa's smelting facilities. Such shipments for 1958 were about 7% below those of 1957.

Alcoa reduced its price of primary aluminum pig by 2¢ per pound to 24¢ per pound on April 1, 1958, following world market aluminum price reductions. Alcoa increased its price of primary aluminum pig by 7/10 of 1¢ per pound to 24.7¢ per pound on August 1, 1958. At the times of both primary aluminum price changes, appropriate adjustments were made in the published prices of other products sold by Alcoa.

In order to improve its position in the highly competitive markets in which its products are sold, the Company, many years ago, initiated an intensive and coordinated research and development program. It is the policy of the Company to pursue this program vigorously to stimulate the development of new and improved products of aluminum and new and expanding markets for aluminum.

Alcoa's Property Additions and Retirements

Property expenditures, retirements and net additions to the plant accounts for the years 1954 through 1958 are shown in the following table:

Years	Expenditures	Retirements	Net Additions
1954	$ 67,151,000	$12,061,000	$ 55,090,000
1955	79,521,000	17,113,000	62,408,000
1956	139,311,000	17,834,000	121,477,000
1957	207,500,000	18,106,000	189,394,000
1958	81,600,000	21,051,000	60,549,000
Total	$575,083,000	$86,165,000	$488,918,000

Important facilities added or expanded during this period include smelting plants at Wenatchee and Rockdale, alumina and alumina chemicals plants at Bauxite, addition of one potline to the five existing potlines at the Point Comfort smelting plant, a plant at Lancaster for the production of aluminum fasteners and screw machine products, a new foil mill at Davenport, and various additions to fabricating facilities, particularly at the Davenport and Alcoa plants. In addition to major plant expansions, additional equipment and miscellaneous additional facilities were added. These

included ore-carrying ships and hydroelectric developments, including a new dam and generating station at Chilhowee, Tennessee.

[fol. 4531] In 1956, the Company started construction of a smelting plant and steam-electric generating facilities near Evansville, Indiana, designed to produce approximately 150,000 tons of aluminum per year. Acquisition of the necessary coal reserves for fuel is now substantially completed. The steam-electric generating station and the first of five planned units of the smelting plant will be essentially completed in 1959. The Company has not decided when to complete the remainder of the work.

In 1956, construction of an alumina plant on the Texas coast near the Point Comfort smelter was started. One of the four units of this plant was completed early in 1959 and it is expected that a second unit will be completed in 1960. The Company has not decided when to complete the remainder of the work. Additional smelting facilities at Massena and at Point Comfort were started in 1956 and were completed in 1958, with the exception of one potline at Massena.

The Company and the Government of Suriname have entered into an agreement under which the Company will construct in that country an aluminum smelting plant and hydroelectric facilities to furnish necessary electrical energy. The smelting plant would be designed to produce approximately 60,000 tons of aluminum annually. The agreement also provides that at a later date the Company will construct an alumina refining plant to process local bauxite. Concessions for mining and exploration for bauxite have also been extended and enlarged under the agreement. It is presently estimated that the total investment in the project will eventually be approximately $150,000,000.

The Company presently estimates that the outlay for additional facilities for 1959 will be approximately $65,000,000. It is expected that cash on hand and to be generated in the normal course of business will be sufficient to finance these facilities.

Description of Alcoa's Capital Stock

By Article Fifth of the Articles of Incorporation, as amended, of the Company, it is authorized to issue 1,000,000 shares of Serial Preferred Stock of the par value of $100 per share and 50,000,000 shares of Common Stock of the par value of $1 per share.

Pursuant to said Article Fifth, the Serial Preferred Stock may be issued in one or more series and the Board of Directors is authorized to divide shares of Serial Preferred Stock into series and to determine the number of shares of any series, and, subject to the provisions of said Article, to determine the rate of dividend (including the date from which dividends shall be cumulative), the price at, and the terms and conditions on, which shares may be redeemed, the amounts payable on shares in the event of voluntary or involuntary liquidation and sinking fund and conversion provisions, if any.

The Board of Directors has by resolution established a series of Serial Preferred Stock designated "$3.75 Cumulative Preferred Stock" and consisting initially of 660,000 shares.

The complete terms and provisions relating to the capital stock of the Company are contained in said Article Fifth of the Articles of Incorporation, as amended, and the said resolution of the Board of Directors, copies of which are filed with the Securities and Exchange Commission, to which copies reference is made, and the summaries herein relating to such stock are qualified in their entirety by such reference.

(a) *Dividend rights.* The holders of Common Stock are entitled to receive dividends, when and as declared by the Board of Directors, but no dividend shall be declared or paid on the Common Stock unless all quarterly dividends accrued on the Serial Preferred Stock and the dividend thereon for the current quarter shall have been paid or declared and set apart.

(b) *Voting rights.* Holders of Common Stock are entitled to one vote per share and to cumulative voting rights in the election of directors.

The holders of Serial Preferred Stock have no voting rights except as otherwise provided by law and except that:

(i) If at any time the amount of any dividends on Serial Preferred Stock which have accrued and which have not been paid or declared and set apart shall be at least equal to the amount of four quarter-yearly dividends, the holders of Serial Preferred Stock shall have one vote per share, provided, however, that such voting rights of the holders of Serial Preferred Stock shall continue only until all quarter-yearly dividends accrued on the Serial Preferred Stock have been paid or declared and set apart.

[fol. 4532] (ii) Without the consent of the holders of at least a majority in some cases, and two-thirds in other cases, of the shares of Serial Preferred Stock at the time outstanding, the Company may not take certain designated actions, particularly action relating to or affecting such Serial Preferred Stock, or any class of stock ranking on a parity with or senior to it as to dividends or assets, or involving merger or consolidation with certain designated results as to any class of stock ranking senior to or on a parity with the Serial Preferred Stock, or involving the disposition of all or substantially all of the Company's property or business or the voluntary liquidation, dissolution or winding up of its affairs.

(c) *Liquidation rights.* Upon any liquidation, dissolution or winding up of the Company, whether voluntary or involuntary, after payments to holders of Serial Preferred Stock of such amount as shall have been fixed by the Board of Directors, plus accrued dividends, the remaining assets of the Company shall belong to and be divided among the holders of Common Stock. The consolidation or merger of the Company with or into any other corporation or corporations in pursuance of applicable statutes providing therefor shall not be deemed to be a liquidation, dissolution or winding up of the Company.

Upon any voluntary or involuntary liquidation, dissolution or winding up of the Company, the holders of $3.75 Cumulative Preferred Stock shall be entitled to $100 per share, plus accrued dividends.

(d) *Preemptive or other subscription rights.* The holders of Common Stock have no right to participate in any right

of subscription to any increased or additional capital stock of the Company.

(e) *Liability to assessment by the Company.* The Common Stock is non-assessable.

Transfer Agents for the Common Stock are Mellon National Bank and Trust Company, Pittsburgh, and Bankers Trust Company, New York. Registrars are Fidelity Trust Company, Pittsburgh, and Guaranty Trust Company, New York. The Common Stock of the Company is listed on the New York Stock Exchange.

Information Concerning Alcoa's Directors and Officers

The directors and officers of the Company, and their positions and offices, are as follows:

Name of Director or Officer	Positions and Offices Held
M. M. Anderson	Director and Vice President
R. V. Davies	Director and Vice President
Leon E. Hickman	Director, Vice President and General Counsel, Member of the Executive Committee
Alfred M. Hunt	Director and Secretary
Roy A. Hunt	Director and Chairman of the Executive Committee
Frank L. Magee	Director and President, Member of the Executive Committee
Richard K. Mellon	Director, Member of the Executive Committee
George J. Stanley	Director
I. W. Wilson	Director and Chairman of the Board, Member of the Executive Committee
George W. Wyckoff	Director
N. R. Althauser	Vice President and Controller

Name of Director or Officer	Positions and Offices Held
F. J. Close	Vice President
H. C. Erskine	Vice President
Lewis P. Favorite	Vice President
B. J. Fletcher	Vice President
J. P. Haight	Vice President
Arthur P. Hall	Vice President
R. O. Keefer	Vice President
Lawrence Litchfield, Jr.	Vice President
Robert B. McKee	Vice President
Edward B. Wilber	Vice President and Treasurer
R. E. Coulter	Assistant Treasurer
C. W. Head	Assistant Treasurer
Matt. W. Stanley	Assistant Treasurer
S. T. Gustina	Assistant Controller
C. C. Conner	Assistant Secretary
Harry Flynn	Assistant General Counsel
William K. Unverzagt	Assistant General Counsel

Each of the officers has been in the employ of the Company for more than five years. From March 1, 1951 until April 30, 1954, Mr. Wilber was President of American Lumber & Treating Co., in which the Company had an interest. Prior to that time he was employed by the Company for many years.

[fol. 4533] Direct Remuneration and Retirement Plan Data—Alcoa's Directors and Officers

The direct remuneration for 1958 of each of the three highest paid officers and of each director whose aggregate remuneration accrued by the Company during 1958 exceeded $30,000, and for all directors and officers as a group, together with their estimated retirement benefits, are as follows:

Name of Individual or Identity of Group	Capacities in Which Remuneration Was Received	Aggregate Remuneration (1)	Estimated Annual Retirement Benefits (2)
M. M. Anderson	Vice President	$ 112,000	$ 30,528
R. V. Davies	Vice President	107,000	24,491
Leon E. Hickman	Vice President and General Counsel	125,000	24,948
Alfred M. Hunt	Secretary	31,000	13,250
Roy A. Hunt	Chairman of the Executive Committee	90,000	47,250
Frank L. Magee	President	161,000	32,320
I. W. Wilson	Chairman of the Board	190,000	55,377
Directors and Officers as a Group	Officers	1,768,159	506,023

(1) During 1958, the Company had agreements with eighteen officers and, as of December 31, 1958, with sixteen officers providing for the payment to them, or in case of death to designated persons, in equal monthly installments during varying periods of five, eight and ten years after the termination of their employment by death, disability or retirement at or after age 65, of an amount equal to the aggregate additional compensation paid by the Company to them, respectively, after the dates of their agreements. The officers have agreed during such periods to perform such advisory or consulting services as the Company may request and to refrain from entering the employ of, or rendering any service to, any competitor of the Company or any of its wholly owned subsidiaries. Those employees who shall receive additional compensation and the individual amounts thereof are determined each year by the Executive Committee of the Board of Directors (no member thereof participating in a decision on his own compensation), the total amount being within the limits of the lump sum appropriation by the Board of Directors for additional compensation. Aggregate remuneration as above stated includes additional compensation accrued for services rendered in 1958 although such additional compensation was not payable until January 1959. Amounts equal to the additional compensation were accrued by the Company in 1958 for the accounts of the eighteen officers under the deferred compensation agreements as follows: Mr. Anderson—$28,000, Mr. Davies—$26,000, Mr. Hickman—$29,000, Mr. Magee—$35,000, Mr. Wilson—$40,000, and other officers—$221,200. The aggregate amounts accrued to date for the accounts of the eighteen officers under the deferred compensation agreements are: Mr. Anderson—$210,500, Mr. Davies— $196,000, Mr. Hickman—$224,000, Mr. Magee—$247,500, Mr. Wilson—$315,000, and other officers—$878,500.

(2) Except as noted below, the estimated annual retirement benefits to directors and officers are based on the assumptions that the Retirement Plan shall continue in effect unchanged until the normal retirement date of the individual, that he shall continue to work for the Company at his present rate of compensation until retirement, that he shall retire on his normal retirement date, and that he shall not have elected any optional form of annuity. The estimated annual retirement benefits of Mr. Roy A. Hunt and Mr. Wilson and two other officers represent the normal annual pensions which would have been payable to them if they had retired on December 31, 1958. The estimated annual retirement benefits of one director who retired from active service as an officer prior to 1958 and of two officers who retired from active service in 1958 represent the actual pensions payable to them.

No specific amount is paid or set aside by the Company for the account of any individual officer or employee under its Employee Retirement or Group Insurance Plans. Contributions and premiums, respectively, are paid by the Company on a group basis and not on an individual basis.

Alcoa Savings Plan Data

At the 1958 annual meeting of the shareholders, approval was giving to the Alcoa Savings Plan For Salaried Employees under which an eligible employee may save from 2 to 8% of his salary (depending on length of service). The Company makes a contribution equal to one-half of the employee's savings. The employee's savings and the Company contribution are turned over to a Trustee for investment. The employee may direct that all of his savings be invested in U. S. Savings Bonds, or one-half be invested in Savings Bonds and the other one-half in common stock of the Company. The Company contribution is invested in common stock of the Company. While the employee may withdraw either one-half or all of his own savings for any year at any time, the Company contribution for any one year for the employee will be forfeited unless he leaves his savings for that year with the Trustee until the end of the third year following that year. The Trustee may purchase the common stock either on the open market or from the Company at the current market price. The Trustee is to vote all non-forfeitable full shares of common stock of Alcoa [fol. 4534] held by it in a participant's account in accordance with the participant's directions and may in its discretion vote all other shares held by it.

The savings of each person named in the foregoing table of remuneration and of all directors and officers as a group, and the Company contributions made with respect to them during the year 1958 under the Savings Plan (including amounts saved during the preliminary program which began November 1, 1957, and ended during 1958 and the Company contributions with respect to the preliminary program of one-half the savings plus an amount calculated at the rate of 3% per year on the total of such savings and contributions) were as follows:

Name of Individual or Identity of Group	Savings	Company Contributions
M. M. Anderson	$ 7,840	$ 3,952
R. V. Davies	4,860	2,430
Leon E. Hickman	5,880	2,964
Alfred M. Hunt	2,240	1,120
Roy A. Hunt	8,400	4,234
Frank L. Magee	11,200	5,645
I. W. Wilson	14,000	7,056
Directors and Officers as a Group	104,021	52,399

The Company contribution for the account of all directors and officers as a group represents less than 2% of the gross Company contribution to the accounts of all employees participating in the Savings Plan.

Alcoa Employees' Stock Option Plan Data

An employees' stock option plan was adopted by the Company's shareholders in 1952. Among the purposes of the plan is the encouragement of officers and employees mainly responsible for the management, growth and protection of the business of the Company to purchase its common stock and thus to share more directly in the future success of the business. Other considerations include an incentive to the key employees to promote the well-being of the Company and to develop a better appreciation by these employees of the shareholder point of view in matters of corporate management.

Options under the plan have been granted as set forth in the table below. Data as to number of shares and price have been adjusted to reflect the 2 for 1 stock splits in April 1953 and June 1955.

Date Options Granted	Total Number of Shares Covered	Option Price
May 15, 1952	1,057,600	$ 17.68¾
February 26, 1954	174,700	29.37½
July 24, 1956	198,100	117.25
March 7, 1958	193,000	68.50

The 1958 options were issued at 100% of the market price on the date of issuance and the other options were issued at approximately, but not less than, 95% of such market price.

At the time the options were issued in 1958, the Company and optionees cancelled options for a like number of shares granted on July 24, 1956. It was felt that by virtue of the general business recession and the decline in the market

price of the Company's stock the options issued in 1956 were no longer effective in promoting the purposes of the plan.

Directors and officers whose remuneration is reported in the foregoing table of remuneration received options on March 7, 1958, as follows: Mr. Anderson—2,000 shares, Mr. Davies—1,000 shares, Mr. Hickman—2,500 shares, Mr. Alfred M. Hunt—1,000 shares, and Mr. Magee—5,000 shares. Total options granted to all directors and officers as a group on that date amounted to 27,000 shares. These directors and officers surrendered options for a like number of shares that originally had been issued on July 24, 1956. [fol. 4535] As of February 6, 1959, there have been exercised in whole or in part 1,105 options for the purchase of 1,093,410 shares, for which the Company has received $20,716,391. Mr. Alfred M. Hunt exercised options on April 29, 1958, as follows: options issued May 15, 1952, for 600 shares; options issued February 26, 1954, for 1,200 shares. The high and low sales prices of the Company's common stock on the New York Stock Exchange on that date were $65.50 and $64.87½, respectively. Directors and officers as a group have exercised options for the purchase of the number of shares shown in the following tabulation which also shows the range of market prices:

Calendar Period	May 1952 Options Number of Shares Purchased at $17.68¾ Per Share	Feb. 1954 Options Number of Shares Purchased at $29.37½ Per Share	Market Price Range
First Quarter 1958	0	300	$74½-60⅜
Second Quarter 1958	600	1,200	$71⅜-62½
Third Quarter 1958	0	4,000	$90 -69¼
Fourth Quarter 1958	0	0	$96½-82⅝
Jan. 1–Feb. 6, 1959	0	0	$83⅞-80

In consideration for each option granted to him, the optionee under each of the foregoing series of options agreed to remain in the employment of the Company or its subsidiaries for at least two years after the date of the option or until age 65, whichever should be earlier, at the salary rate in effect on said date or such changed rate as might be fixed by the Company or its subsidiaries, except that an optionee who had attained age 65 when granted an option agreed so to remain in employment for the period of his extended service at that time. Subject to the provisions of the plan, options granted in 1952, 1954 and 1956 to persons under age 65 may be exercised during 10 years after the date thereof (but only after two years from such date in the case of 1956 options), but if on the 6th, 7th, 8th or 9th anniversary of the issuance of any option the unexercised portion thereof shall exceed 90%, 80%, 70% or 60%, respectively, of the shares originally covered thereby (as adjusted for stock dividends, stock split-ups and certain other changes in capital structure), the options shall thereupon expire as to such excess. Subject to the provisions of the plan, options granted in 1958 to persons under age 65 are exercisable after July 24, 1958, and within eight years from said date, but if on the 4th, 5th, 6th or 7th anniversary of said date the unexercised portion thereof shall exceed 90%, 80%, 70% or 60%, respectively, of the shares covered thereby (as adjusted for stock dividends, stock split-ups and certain other changes in capital structure), the options shall expire as to such excess. The option granted to one who had attained age 65 is exercisable only within one year from the date thereof. The plan provides that upon an optionee's death, the termination of his employment or his attaining age 65, his option may thereafter be exercised only within limited times and in each case prior to the expiration of the option period.

Alcoa's Stock Ownership

As of February 6, 1959, there were approximately 3,900 shareholders of the Company's $3.75 Cumulative Preferred Stock and approximately 23,800 shareholders of its Common Stock.

The only shareholder who held of record 10% or more of any class of stock of the Company on February 6, 1959 was Mac & Company, P. O. Box 926, Pittsburgh, Pennsylvania, which held 126,413 shares of $3.75 Cumulative Preferred Stock (19.2% of the class) and 1,666,485 shares of Common Stock (8.1% of the class). The Company has been informed by Mellon National Bank and Trust Company that Mac & Company is a nominee of the Bank for the purpose of holding record title to securities and that the shares of Preferred and Common Stock of the Company of record in the name of Mac & Company on February 6, 1959, were held by the Bank in various fiduciary capacities, of which 73,653 shares of Preferred Stock and 40,000 shares of Common Stock were held by the Bank as Trustee under the Employee Retirement Plans of the Company and participating subsidiaries.

The directors and officers of the Company, as a group, owned 2,618,516 shares of Common Stock (12.7% of the class) on February 6, 1959, according to information furnished to the Company by them. Two officers owned .60 shares of Preferred Stock, and a director and officer had a remainder interest in two trusts in which 1,090 shares of Preferred Stock were held.

[fol. 4536] Dissenters' Rights of Appraisal

Under the laws of the State of New York (see Sections 20 and 21 of the New York State Stock Corporation Law) any stockholder not in favor of the Plan outlined above may at any time prior to the vote upon such Plan object to such Plan, in writing filed with the Corporation, and demand payment for his stock. Under the provisions of Sections 20 and 21 of the New York State Stock Corporation Law the Corporation, within ten days after the last day on which a demand for such payment might have been made, would be required to offer to buy the stock from the dissenting stockholder at a price deemed by the Corporation to be the value thereof. If the Corporation fails to make such offer or the stockholder does not accept the Corporation's offer within 20 days, either he or the Corporation may petition the New York State Supreme Court to determine the value of such

stock as of the day before the vote on the proposal to which the stockholder objects, and the Court will thereafter proceed with such a determination. Any stockholder demanding payment for his stock unless he has accepted an Offer of the Corporation to pay for his stock, must within 20 days after the vote upon the Plan, submit his stock certificate or certificates to the Corporation for notation thereon of the fact of such demand.

The above summary of the laws of the State of New York with respect to the rights and remedies of dissenting stockholders does not purport to be complete and is qualified in its entirety by reference to Sections 20 and 21 of the New York State Stock Corporation Law, copies of which Sections are annexed hereto as Exhibit B.

Financial Statements

This Proxy Statement includes the financial statements referred to on page 22.

Other Matters

The management does not know of any other matters which may come before the meeting. However, if any other matters properly come before the meeting, it is the intention of the appointees named in the enclosed form of Proxy to vote the Proxy in accordance with their judgment on such matters.

Solicitation of Proxies

The Corporation will pay the cost of preparing and mailing this proxy statement and the cost of soliciting proxies. In addition to the solicitation of share owners of record by mail, the Corporation will request brokerage houses and other nominees or fiduciaries to forward soliciting material to beneficial owners of stock held of record by such persons, and the Corporation will reimburse such brokerage firms and other nominees and fiduciaries for their expenses incurred in forwarding such soliciting material to the beneficial owners of shares held by them of record. It is also expected that some of the officers, directors and regular employees of Rome Cable Corporation, who will receive no compensa-

tion therefor in addition to their regular compensation, will solicit proxies on behalf of the management by telephone, telegraph and personal interview, the cost of any such solicitation to be borne by Rome Cable Corporation.

The Board of Directors of Rome Cable Corporation Strongly Recommends a Vote in Favor of the Proposed Plan.—Your Cooperation in Giving This Matter Your Immediate Attention and in Returning Your Proxies Promptly Will Be Appreciated.

By order of the Board of Directors, Gerard A. Weiss, Secretary.

Rome, New York

March 3, 1959.

[fol. 4537] Financial Statements

Index to Financial Statements

	Page
Rome Cable Corporation	
Opinion of Independent Public Accountants	23
Summary of Earnings	8
Statements of Financial Condition	24
Analyses of Capital Invested	26
Operating Statements	27
Notes to Financial Statements	28
Aluminum Company of America and Consolidated Subsidiary Companies	
Opinion of Independent Certified Public Accountants	31
Summary of Consolidated Income	9
Consolidated Balance Sheet	32
Statements of Consolidated Retained Earnings and Additional Capital	34
Notes to Consolidated Financial Statements	35

[fol. 4538] Opinion of Independent Public Accountants

Board of Directors
Rome Cable Corporation
Rome, New York

We have examined the financial statements of Rome Cable Corporation for the period of five years ended March 31, 1958. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying statement of financial condition, operating statements and analyses of capital invested present fairly the financial position of Rome Cable Corporation at March 31, 1958, and the results of its operations for the period of three years then ended, in conformity with generally accepted accounting principles applied on a consistent basis.

Further, it is our opinion that the tabulation appearing in the Proxy Statement under the caption "Summary of Earnings" presents fairly in summarized form, and in accordance with generally accepted accounting principles consistently applied, the information therein set forth for the period of five years ended March 31, 1958.

Ernst & Ernst.

New York, New York

February 9, 1959.

[fol. 4539]

Rome Cable Corporation

Statements of Financial Condition

Assets

	December 31, 1958 (Unaudited)	March 31, 1958
Current Assets:		
Cash	$ 2,471,557	$ 4,571,808
Receivables—trade and sundry—less allowances of $100,000	2,929,156	2,691,211
Inventories—In process and finished goods, raw materials, manufacturing supplies, etc.—Note A	7,624,823	6,914,652
Prepaid expenses and sundry supplies	538,217	565,775
Total Current Assets	$13,563,753	$14,743,446
Other Assets:		
Sundry investments	$ 108,000	$ 98,000
Receivables from employees under stock purchase plan (shares of Common Stock held as collateral, December 31—16,455 shares; March 31—18,870 shares)—Note B	158,611	182,632
	$ 266,611	$ 280,632
Plants and Equipment:		
Land	$ 383,073	$ 305,137
Buildings	6,228,362	6,201,103
Machinery and equipment	10,220,617	9,633,023
Total plants and equipment—at cost	$16,832,052	$16,139,263
Less allowances for depreciation and amortization	7,866,591	7,173,697
	$ 8,965,461	$ 8,965,566
	$22,795,825	$23,989,644

See notes to financial statements.

[fol. 4540]

Rome Cable Corporation

Statements of Financial Condition

Liabilities

	December 31, 1958 (Unaudited)	March 31, 1958
Current Liabilities:		
Portion of long-term debt payable within one year	$ 278,000	$ 350,000
Accounts payable and accrued expenses	1,482,678	1,786,775
Dividend payable January 3, 1959	139,401	—
Federal taxes on income—estimated	287,942	905,144
Total Current Liabilities	$ 2,188,021	$ 3,041,919
Long-Term Debt—Note C:		
Promissory note 4¼%, due in semi-annual installments of $125,000 to August 1, 1961, less $250,000 due and payable within one year and included above	$ 500,000	$ 625,000
Promissory notes 4¾%, due in annual installments of $300,000 from August 1, 1962, balance due August 1, 1972, less $28,000 at December 31, 1958 and $100,000 at March 31, 1958 payable within one year and included above	3,872,000	3,900,000
	$ 4,372,000	$ 4,525,000
Reserve:		
For difference between cost and prices charged to customers for returnable reels, spools and cases	$ 114,801	$ 156,115

	December 31, 1958 (Unaudited)	March 31, 1958
Capital Invested:		
Capital Shares:		
Common Stock ($5 per value)—Note D:		
	December 31, 1958	March 31, 1958
Authorized	1,200,000	1,200,000
Outstanding	557,602	557,802
In treasury	34,200	34,000
Issued	591,802	591,802
	$ 2,959,010	$ 2,959,010
Additional capital paid in for stock, plus amounts transferred from earnings retained in the business	3,285,612	3,285,612
	$ 6,244,622	$ 6,244,622
Earnings retained in the business—Notes C and E:		
Unappropriated	10,196,578	10,338,432
Appropriated for contingencies	450,000	450,000
	$16,891,200	$17,033,054
Less cost of Common Stock in treasury	770,197	766,444
	$16,121,003	$16,266,610
	$22,795,825	$23,989,644

See notes to financial statements.

[fol. 4541]

Rome Cable Corporation

Analyses of Capital Invested

	Nine months ended December 31, 1958 (Unaudited)	Year ended March 31, 1958	1957	1956
Capital Shares				
Common Stock—Note D:				
Balance at beginning of period	$ 2,959,010	$ 2,959,010	$ 2,822,185	$ 2,567,500
Add par value of Common Stock issued as stock dividend during the year, 1957—27,365 shares; 1956—50,937 shares			136,825	254,685
	$ 2,959,010	$ 2,959,010	$ 2,959,010	$ 2,822,185
Additional capital paid in for stock, plus amounts transferred from earnings retained in the business:				
Balance at beginning of period	3,285,612	3,285,612	2,642,535	1,674,732
Add excess of ascribed value over par value of shares issued as stock dividend during the year			643,077	967,803
	$ 3,285,612	$ 3,285,612	$ 3,285,612	$ 2,642,535
	$ 6,244,622	$ 6,244,622	$ 6,244,622	$ 5,464,720
Earnings retained in the business—Notes C and E:				
Unappropriated:				
Balance at beginning of period	10,338,432	10,044,503	9,344,130	9,263,156
Add net earnings for period	276,348	1,019,071	2,255,819	2,023,070
	$10,614,780	$11,063,574	$11,599,949	$11,286,226

Rome Cable Corporation

Analyses of Capital Invested—Continued

Deduct dividends paid or payable:				
In cash:				
$ .75 per share	418,202			
$1.30 per share		725,142		
$1 40 per share			750,695	709,071
In Common Stock (1957—5%; 1956—10%), at ascribed value as determined by Board of Directors			779,902	1,222,488
Cash payments in lieu of issuance of fractional shares in connection with the foregoing stock dividend			24,849	10,537
	$ 418,202	$ 725,142	$ 1,555,446	$ 1,942,096
Balance at end of period	$10,196,578	$10,338,432	$10,044,503	$ 9,344,130
Appropriated:				
Balance at beginning and end of period	450,000	450,000	450,000	450,000
	$10,646,578	$10,788,432	$10,494,503	$ 9,794,130
	$16,891,200	$17,033,054	$16,739,125	$15,258,850
Deduct:				
Cost of Common Stock in treasury:				
34,200 shares	770,197			
34,000 shares		766,444	766,444	
36,090 shares				857,021
Total capital invested at end of period	$16,121,003	$16,266,610	$15,972,681	$14,401,829

See notes to financial statements.

[fol. 4542]

Rome Cable Corporation

Operating Statements

	Nine months ended December 31, 1958 (Unaudited)	Year ended March 31, 1958	1957	1956
Net sales	$27,735,618	$40,614,730	$52,790,055	$56,996,682
Cost of products sold	$24,773,604	$34,805,653	$44,560,283	$49,742,051
Distribution, administrative and general expenses	2,240,771	3,510,830	3,413,988	2,930,426
	$27,014,375	$38,316,483	$47,974,271	$52,672,477
Interest expense	$ 721,243	$ 2,298,247	$ 4,815,784	$ 4,324,205
Other charges—credits*	$ 166,198	$ 211,365	$ 157,210	$ 149,424
	6,303*	9,189*	52,755	18,280*
	$ 159,895	$ 202,176	$ 209,965	$ 131,135
	$ 561,348	$ 2,096,071	$ 4,605,819	$ 4,193,070
Provision for federal taxes on income	285,000	1,077,000	2,350,000	2,170,000
Net Earnings	$ 276,348	$ 1,019,071	$ 2,255,819	$ 2,023,070

See notes to financial statements.

[fol. 4543] Rome Cable Corporation

Notes to Financial Statements

Note A—Inventories:

Inventories are stated generally at cost, and include amounts of $6,959,130 and $6,321,765 at December 31, and March 31, 1958 respectively, which were computed by the last-in, first-out method. Total inventory valuation is well below aggregate market prices.

	December 31, 1958	March 31, 1958
Inventories consisted of:		
In process and finished goods	$5,852,160	$5,397,623
Raw materials	1,354,800	1,180,147
Spools, reels, cases, manufacturing supplies	417,923	336,882
	$7,624,823	$6,914,652

Amounts of inventories used in computation of cost of products sold, priced on the aforesaid basis, were as follows:

April 1, 1955	$6,024,630
March 31, 1956	6,979,752
March 31, 1957	7,245,818
March 31, 1958	6,914,652
December 31, 1958	7,624,823

Note B—Receivables From Employees:

Receivables from employees under stock purchase plan include $46,284 at December 31, 1958 and $52,702 at March 31, 1958 due from officers.

Note C—Long-term Debt:

The promissory notes (4¾%) provide for additional payments, due each August 1st, limited to $100,000 for each year, contingent on earnings of the preceding fiscal year, to be applied to the latest maturities of the notes.

So long as the notes are outstanding, the Company is required, among other things, to maintain net working capital (excess of current assets over current liabilities) at stipulated amounts. At December 31 and March 31, 1958, net

working capital exceeded such requirements by more than $4,400,000.

The terms of issuance of the notes place certain restrictions upon the payment of dividends (except stock dividends) and the redemption, retirement, or purchase by the Company of its capital shares. The portion of earnings retained in the business not affected by these restrictions was approximately $2,052,000 at December 31, 1958, and $2,293,000 at March 31, 1958.

Note D—Stock Option Plan:

Reference is made to the caption "Stock Option Plan" in this Proxy Statement concerning stock options.

Note E—Renegotiation:

Renegotiation proceedings for years up to the fiscal year ended March 31, 1956 have been concluded. Settlement for year ended March 31, 1954 resulted in a decrease of $87,390 in net earnings for that year and retro-active adjustment therefor has been made in the financial statements. It is believed that any renegotiation refunds which might be required for subsequent years would not materially affect the financial position of the Company at December 31, 1958, or earnings for the two years and nine months then ended.

Note F—Pension Plans:

There is in effect a non-contributory pension plan covering all employees and also a group retirement insurance plan covering all salaried employees, which is partly contributory by the beneficiaries. The unfunded past service cost of the pension plan was approximately $2,215,000 and $2,160,000 at December 31, 1958 and March 31, 1958, respectively. The Company reduced its contribution for past service cost for the year ended March 31, 1958, and made no provision for past service cost for the nine months ended December 31, 1958. Amounts provided under the plans were as follows:

Period	Amount Provided
Year ended March 31, 1956	$580,882
Year ended March 31, 1957	594,293
Year ended March 31, 1958	493,384
Nine months ended December 31, 1958	278,000

[fol. 4544] Note G—Depreciation and Amortization Policies, etc.:

Depreciation is computed on the sum of the years digits method for certain assets acquired new; subsequent to December 31, 1953. All other assets are depreciated by the straight line method.

Other than costs referred to hereinafter, which had been certified for amortization over five year periods, depreciation has been computed on the basis of the estimated useful life of such assets as follows:

Buildings	5 to 40 years
Machinery and equipment	3 to 18 years
Transportation equipment	5 to 10 years
Office furniture and equipment	2 to 18 years
Fences	15 years

Cost of facilities aggregating $805,837 which had been certified for amortization over periods of five years had been fully amortized at March 31, 1958.

Expenditures for maintenance and repairs were charged to current operating expenses. Cost of renewals and betterments were charged to the pertinent property accounts. At the time properties were replaced, retired or otherwise disposed of, the cost of such properties and the amount of depreciation accumulated thereagainst were deducted respectively from the pertinent asset and related depreciation allowance accounts. Profit or loss resulting from such transaction was included in the income account for the year.

Note H—Supplementary Profit and Loss Information:

	Nine months ended December 31, 1958	Year ended March 31, 1958	1957	1956
Charged directly to profit and loss				
Maintenance and repairs				
Charged to costs	$458,392	$753,126	$930,751	$789,708
Charged to other expenses	2,842	5,092	2,742	3,028
	$461,234	$758,218	$933,493	$792,736
Provision for depreciation and amortization of plants and equipment				
Charged to costs	$680,953	$835,691	$810,163	$830,030
Charged to other expenses	18,032	22,502	16,151	13,526
	$698,985	$858,193	$826,314	$843,556
Taxes, other than taxes on income				
Charged to costs				
On pay rolls	$120,134	$173,550	$181,037	$164,685
Realty and personal property	189,425	239,790	223,273	195,871
Charged to other expenses				
On pay rolls	19,037	30,623	28,149	50,933
Realty and personal property	33,199	31,513	24,353	28,172
Franchise, etc.	20,000	120,092	234,967	213,384
Total taxes	$381,795	$595,568	$691,779	$653,045
Rents and royalties				
Charged to costs	$ 47,011	$ 60,242	$ 74,015	$ 51,326
Charged to other expenses	46,295	76,258	70,101	81,329
	$ 93,306	$136,500	$144,116	$132,655

There were no management or service contract fees.

[fol. 4545] Note I—Proposed Sale of Assets:

Reference is made to the caption "The Proposed Plan and Agreement" in this Proxy Statement for the terms of the proposed Plan and Agreement dated February 17, 1959, between Aluminum Company of America and Rome Cable Corporation.

Note J—Operations for the Nine Months Ended December 31, 1958:

The Company is of the opinion that all adjustments necessary for a fair statement of operating results for this nine months have been included and consisted solely of normal recurring accruals. Interim figures for the nine months are not necessarily indicative of the results for the entire year.

[fol. 4546] Opinion of Independent Certified Public Accountants

To the Shareholders and Board of Directors of Aluminum Company of America:

We have examined the consolidated balance sheet of Aluminum Company of America and consolidated subsidiary companies as of December 31, 1958, and the related summary of consolidated income for the years 1954 through 1958, and statements of consolidated retained earnings and additional capital for the years 1956 through 1958. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the aforementioned financial statements present fairly the consolidated financial position of Aluminum Company of America and consolidated subsidiary companies at December 31, 1958, and the results of their operations for the years 1954 through 1958, in conformity with generally accepted accounting principles, and such principles were applied on a consistent basis except for the change in 1956 with respect to the method of valuing inventories and

the change in 1954 with respect to the method of computing depreciation referred to in Note B of Notes to Summary of Consolidated Income, in which we concur.

Lybrand, Ross Bros. & Montgomery.

Pittsburgh, Pa.
February 3, 1959.

[fol. 4547]

Aluminum Company of America and Consolidated Subsidiary Companies

Consolidated Balance Sheet, December 31, 1958

Assets

Current assets:		
Cash		$ 52,939,341
United States Treasury Bills, at cost		25,025,389
Receivables:		
Customers, including notes of $2,340,001	$ 90,528,405	
Other	4,031,552	
	94,559,957	
Less, allowances for returns, losses, etc.	2,370,000	92,189,957
Inventories (Note 1)		209,865,782
Prepaid insurance and taxes		5,290,195
Total current assets		385,310,664
Indemnity and surety deposits		1,119,680
Receivables and advances—noncurrent		19,024,741
Investments, at cost:		
Subsidiaries not consolidated	3,092,844	
Other	25,933,183	29,026,027

Properties, plants and facilities, at cost:		
Land and land rights, including mines	57,522,324	
Structures	525,236,712	
Machinery, equipment and other facilities	904,918,515	
	1,487,677,551	
Less, accumulated allowances for amortization, depletion and depreciation	669,819,950	
	817,857,601	
Construction work in progress	73,031,662	890,889,263
Patents and other intangible assets, at cost, less amortization of $492,265		1,489,080
Deferred charges:		
Deferred exploration and mining expenses	3,035,348	
Unamortized debt discount and expense (Note 2)	3,894,999	
Other	3,468,718	10,399,065
		$1,337,258,520

The appended notes are an integral part of the financial statements.

[fol. 4548]

Aluminum Company of America and Consolidated Subsidiary Companies

Consolidated Balance Sheet, December 31, 1958

Liabilities

Current liabilities:		
Accounts payable		$ 29,606,824
Dividends on preferred and common stock		7,430,827
Accrued salaries, wages, vacation allowance and other compensation		19,085,140
Provision for taxes, including taxes on income		24,921,608
Other current liabilities		5,444,838
Long-term debt due within one year		5,786,189
Total current liabilities		92,275,426
Long-term debt, less amount due within one year (Note 3)		462,697,480
Reserves, deferred credits and noncurrent liabilities:		
Reserve for future United States income taxes	$ 83,748,249	
Reserve for mold, die and reel repairs and replacements	3,733,711	
Open voyage revenue, net and other deferred credits	3,519,201	
Noncurrent liabilities	4,143,588	95,144,749
		650,117,655
Commitments and contingent liabilities (Note 4)		

Shareholders' Equity

Capital Stock:		
Serial Preferred Stock, par value $100 per share:		
Authorized 1,000,000 shares:		
$3.75 Cumulative Preferred Stock, redeemable at $100 per share:		
Authorized 660,000 shares; issued 659,909 shares	65,990,900	
Common Stock, par value $1.00 per share (Notes 5 and 6):		
Authorized 50,000,000 shares; issued 20,644,966 shares	20,644,966	
Additional capital	35,392,800	
Retained earnings	565,112,199	687,140,865
		$1,337,258,520

The appended notes are an integral part of the financial statements.

[fol. 4549]

Aluminum Company of America and Consolidated Subsidiary Companies

Statements of Consolidated Retained Earnings and Additional Capital For the years 1956 through 1958

	Years		
	1958	1957	1956
Retained Earnings			
Balance, beginning of year	$549,468,997	$501,103,551	$438,599,852
Net income (Note B of Notes to Summary of Consolidated Income)	42,885,230	75,568,461	89,621,033
	592,354,227	576,672,012	528,220,885
Dividends:			
On Preferred Stock—$3.75 per share	2,474,689	2,474,689	2,474,690
On Common Stock—$1.20 per share	24,767,339	24,728,326	24,642,644
	27,242,028	27,203,015	27,117,334
Balance, end of year	$565,112,199	$549,468,997	$501,103,551

	Years		
	1958	1957	1956
Additional Capital			
Balance, beginning of year	$ 34,463,868	$ 33,423,544	$ 30,162,778
Excess of amounts received over the aggregate par value of Common Stock issued under Employees' Stock Option Plan	928,932	1,040,324	3,260,766
Balance, end of year	$ 35,392,800	$ 34,463,868	$ 33,423,544

The appended notes are an integral part of the financial statements.

[fol. 4550] Aluminum Company of America
and Consolidated Subsidiary Companies

Notes to Consolidated Financial Statements

Note Relating to Principles of Consolidation and Equity in Consolidated Subsidiaries:

The consolidated financial statements include all companies which are wholly owned. At December 31, 1958, the excess of the Company's equity in net assets of consolidated subsidiaries, as shown by their accounts, over its investment therein was $68,771,058. In consolidation, undistributed earnings of consolidated subsidiaries since acquisition, amounting to $68,878,351, have been included in consolidated retained earnings and $107,293, representing the excess of cost of investment in one subsidiary over its net assets at date of acquisition, has been included with the book value of land owned by the subsidiary. All intercompany and interdepartmental transactions and profits, material in amount, have been eliminated.

The consolidated balance sheet includes net assets of consolidated subsidiaries in Canada, Venezuela and Surinam, amounting (in United States currency) to $19,104,167. In consolidation, property assets and allowances for depreciation and depletion have been translated into United States currency at the approximate exchange rates in effect at the time such assets were acquired, and other assets and liabilities have been translated at the official or current rates of exchange, except that Canadian dollars have been translated at par.

Note 1. Inventories and Cost of Goods Sold:

Inventories are carried at the lower of cost or market. At December 31, 1956, 1957 and 1958, such costs were determined for substantially all inventories under the last-in first-out method. Prior thereto, the average cost method was used.

At December 31, 1958, inventories are classified, as follows:

Finished goods	$ 52,714,027
Work in process	112,945,245
Bauxite and alumina	17,840,222
Purchased raw materials	15,107,509
Operating supplies	11,258,779
	$209,865,782

The amounts of inventories used in the computation of cost of goods sold, priced as explained above, were as follows: December 31: 1958—$209,865,782; 1957—$231,726,354; 1956—$224,853,985; 1955—$162,259,709; 1954—$162,967,621; and 1953—$167,137,685.

Note 2. Unamortized Debt Discount and Expense:

Deferred debt discount and expense is being amortized over periods from dates of issue of long-term debt to dates of required prepayment or dates of maturity.

Note 3. Debt:

At December 31, 1958, long-term debt comprised:

Sinking Fund Debentures:	
3⅛%, due February 1, 1964	$ 52,500,000
3%, due June 1, 1979	83,400,000
4¼%, due January 1, 1982	125,000,000
3⅞%, due April 1, 1983	125,000,000
Notes payable:	
2.55%, due January 1, 1967	20,000,000
3%, due December 1, 1973	60,000,000
Other	2,583,669
Total long-term debt	468,483,669
Less, amount due within one year included in current liabilities	5,786,189
	$462,697,480

[fol. 4551] The indenture under which the 3⅛% Sinking Fund Debentures, due February 1, 1964, were issued provides for sinking fund payments sufficient to retire $10,000,000 in each of the years 1959 through 1963. Retirements were made in 1958 on these debentures covering the 1959 requirement of $10,000,000. The indenture under which the 3% Sinking Fund Debentures, due June 1, 1979, were issued provides for sinking fund payments sufficient to retire $4,-

150,000 of debentures in each of the years 1959 through 1978. Retirements were made in 1958 and 1957 on these debentures covering the 1959 requirement of $4,150,000. The indenture under which the 4¼% Sinking Fund Debentures, due January 1, 1982, were issued provides for sinking fund payments sufficient to retire $5,200,000 of debentures in each of the years 1959 through 1981. The indenture under which the 3⅞% Sinking Fund Debentures, due April 1, 1983, were issued provides for sinking fund payments sufficient to retire $5,200,000 of debentures in each of the years 1960 through 1982. The 2.55% notes, due January 1, 1967, provide for prepayments in annual installments of $2,500,000. The 3% notes, due December 1, 1973, provide for prepayments in annual installments of $12,000,000 beginning in 1969.

The aggregate amounts of long-term debt (excluding minor amounts) which will become due during the five years ending December 31, 1963 are: 1959—$5,200,000; and 1960, 1961, 1962 and 1963—$27,050,000 each.

Note 4. Commitments and Contingent Liabilities:

Capital expenditures, including renewals and betterments, under the $600,000,000 five year expansion program announced in 1956, aggregated approximately $428,000,000 through 1958. Although all the projects which are included in the expansion program have not yet been authorized, there were, at the end of 1958, unexpended balances of approximately $39,600,000 on authorized but uncompleted projects. It is expected that approximately $65,000,000 will be expended for capital additions and betterments during 1959, which includes preliminary construction expenditures in connection with the $150,000,000 Brokopondo Development in Suriname, S. A. announced in 1957.

Under an agreement made in 1953, and subsequently amended, the Company has contracted to purchase primary aluminum from a Canadian corporation during the years 1959 through 1962 at the current market price in the United States at the time of shipment. Based upon the quoted market price at December 31, 1958, the amount of this commitment was approximately $84,000,000. The Company has the option to postpone delivery of approximately $21,000,000 of

the above shipments for periods up to a maximum of five years by purchasing aluminum certificates which require the payment of one half of the then current market price of the primary aluminum involved. Also, the Company and the Canadian corporation both have the right to cancel approximately $13,000,000 of the shipments.

Under an agreement made in 1955 with a Norwegian corporation, the Company has contracted to advance, over a period of years, approximately $20,000,000 and deliver about 760,000 metric tons of alumina to that corporation, with repayment to be made in primary aluminum. At December 31, 1958, approximately $13,000,000 had been advanced and 50,000 metric tons of alumina delivered under the agreement. The repayment made in primary aluminum on account of the alumina delivered amounted to the equivalent of approximately 40,000 metric tons of alumina at December 31, 1958.

Contingent liabilities of an indeterminate amount exist in suits and claims arising in the ordinary course of business, the disposition of which is not anticipated to materially affect the financial positions as shown by the accompanying consolidated balance sheet.

Note 5. Employees' Stock Option Plan (Amounts and shares shown hereunder are after giving effect to the 2 for 1 stock splits in 1953 and 1955):

At the annual meeting in 1952, the shareholders approved an Employees' Stock Option Plan and authorized the Company to reserve 1,956,292 shares of its authorized but unissued Common Stock for the granting of options to employees. The Plan, which is administered by a committee appointed by the Board of Directors, provides, among other things, that (a) the committee shall select the officers and employees of the Company and its subsidiaries to whom options shall be granted, (b) the number of shares optioned to one individual may not exceed 5 per cent of the total shares authorized to be reserved under the Plan, (c) the option price of each share of stock covered by an option shall be not less than 95 per cent of the fair market value of the stock at the time the option is granted, and (d) the options are non-transferable during the life of the optionee and the

period of time during which each option may be exercised may not exceed ten years from the date of the option.

On May 15, 1952, February 26, 1954, and July 24, 1956, options were granted under the Plan entitling the holders thereof to acquire Common Stock at a price equal to at least 95 per cent of the fair market value on the dates the options were granted. On March 7, 1958, the Company accepted the cancellation of the outstanding options issued on July 24, 1956 for an aggregate of 193,000 shares and issued, on a share for share basis for such surrendered options, new options to purchase 193,000 shares of the Common Stock of the Company at a price equal to one hundred per cent of the fair market value on the date the option was granted. All of the 1956 options, except one covering 150 shares, were either surrendered to the Company upon issuance of the [fol. 4552] 1958 series or were cancelled or expired without being exercised. The options granted in 1952 and 1954 are exercisable throughout the option period while the options granted in 1958 and the remaining 1956 options, may not be exercised until two years after the granting date. Optionees must exercise their options at stated intervals in accordance with the provisions of the Plan or part of the options will expire. Such options covered a total of 1,057,600 shares at a price of $17.6875 per share, 174,700 shares at a price of $29.375 per share, 198,100 shares at a price of $117.25 per share and 193,000 shares at a price of $68.50 per share, respectively. At December 31, 1958, options for 1,082,434 shares had been exercised and options for 204,616 shares had been cancelled, expired or surrendered, leaving unexercised options for 336,350 shares. In addition, 537,508 shares were reserved for issuance under the Plan for which options had not been granted, making a total of 873,858 shares of Common Stock reserved at December 31, 1958.

The option price and fair market value (based upon the higher of (a) the average of the high and low market quotations for that day, or (b) the closing quotation) of the shares subject to unexercised options, at the dates the options were granted, were as follows:

	Per Share	Total
Granted May 15, 1952 (67,375 shares):		
Option price	$ 17.6875	$ 1,191,695
Fair market value	18.59375	1,252,754

Granted February 26, 1954 (79,319 shares):		
Option price	29.375	2,329,906
Fair market value	30.875	2,448,974
Granted July 24, 1956, less surrendered on March 7, 1958 (150 shares):		
Option price	117.25	17,588
Fair market value	123.25	18,488
Granted March 7, 1958 (189,506 shares):		
Option price	68.50	12,981,161
Fair market value	68.50	12,981,161

Options exercised from the inception of the Plan to December 31, 1958, were as follows: 26,236 shares in 1952, 95,310 shares in 1953, 425,576 shares in 1954, 272,141 shares in 1955, 171,411 shares in 1956, 54,222 shares in 1957, and 37,538 shares in 1958. Proceeds from the sale of this stock amounted to $464,049, $1,685,795, $7,627,000, $5,122,360, $3,434,164, $1,094,546 and $966,470, respectively. The fair market value (based upon the average of the high and low market quotations for each month in which options were exercised, multiplied by the number of option shares issued in the respective months of the periods) of these shares at the dates the options were exercised was approximately $557,000 in 1952, $2,475,000 in 1953, $15,909,000 in 1954, $16,622,000 in 1955, $17,903,000 in 1956, $4,795,000 in 1957, and $2,787,000 in 1958.

Under the Company's practice with respect to accounting for options, no charges are reflected in income.

Note 6. Alcoa Savings Plan for Salaried Employees:

The Alcoa Savings Plan for Salaried Employees, begun on a preliminary basis on November 1, 1957, was approved by the shareholders at their annual meeting in 1958. The Plan provides that all full time salaried employees paid from United States payrolls, with one or more years of continuous service, are eligible to become participants, provided they are not covered by a collective bargaining agreement (unless such agreement provides for participation) and provided they are not eligible to receive supplemental unemployment benefits or similar benefits from the Company. Under the trusteed plan, such employees may save, depending upon length of service, from 2 to 8 per cent of their

annual salaries, and the Company contributes one-half of the employees' savings. Each employee may choose whether all of his savings will be invested in U. S. Savings Bonds, or one-half invested in such bonds and the other half in Common Stock of the Company. The Company contribution will be invested in the Company's Common Stock by the trustee who will purchase, from time to time, all shares at the current price in the open market. While the employee may withdraw his own savings at any time, the Company's contribution with respect to the employee's savings during a calendar year will vest only if the employee leaves such savings in the Plan for three years after the end of that calendar year. The contribution by the Company to the Plan for 1958 amounted to approximately $2,400,000.

Note 7. Properties, Plants and Facilities:

Properties, plants and facilities include approximately $200,000,000 for acquisitions during World War II which have been fully amortized. Substantially all of such assets are presently in use.

[fol. 4553] The cost of all other properties, plants and facilities is depreciated in the accounts on either the straight-line or sum-of-the-years-digits methods over their estimated economic useful lives. The lives assigned to the major classifications of depreciable assets are:

	Years
Buildings and other structures, bridges, etc.	25 to 50
Building service systems, electric, steam, water and sewer lines, etc., and yard facilities	17 to 50
Heavy rolling mills, forge and extrusion presses, shears and hammers	25
Other forming machinery and equipment and machine tools	10 to 17
Smelting pots and furnaces	5 to 25
Steam plant and electric power plant equipment and machinery (except hydroelectric)	17 to 25
Hydroelectric dams, reservoirs, spillways, etc.	100
Hydroelectric turbines and generators, etc.	25
High tension transmission lines and appurtenances	20 to 33
Railroad tracks and equipment:	
Within own plants	17 to 33
Outside	According to I. C. C. regulations
Steamships	17 to 25
Office furniture and equipment	5 to 20

For tax purposes, that portion of the cost of facilities constructed under certain expansion programs which is covered by certificates of necessity is being amortized over a period of sixty months. An appropriate reserve has been provided for future income taxes, thereby recognizing the taxes which will be payable as recorded depreciation exceeds the amount deductible for tax purposes. Income taxes are allocated to income of applicable years whenever there is a material difference between the accounting for book and tax purposes of other items.

The policy with respect to depletion of minerals and gas and oil during 1958 is to record depletion at cost over the period during which the quantities of the resources are extracted. The policy with respect to amortization of patents and other intangibles is to provide ratably from income each year an amount sufficient to equal the costs thereof upon expiration of their respective lives.

Maintenance and repairs are charged to income as incurred. The policy with respect to repair and replacement of certain molds and dies during 1958 is to charge such expenditures to costs as incurred. Major renewals and betterments are capitalized. Spare parts for machinery and equipment are capitalized at the date of purchase and depreciated. When installed, the depreciated cost of spare parts is charged to maintenance and repair expense. When fixed assets are retired or otherwise disposed of, the appropriate reserve is charged with the accumulated amount of amortization, depletion or depreciation applicable to such fixed assets. Profits or losses resulting from such dispositions are included in income, except that certain subsidiaries which are under the jurisdiction of the Federal Power Commission record such items in the reserve for depreciation.

Note 8. Retirement Plans:

The various retirement plans for hourly rated and salaried employees provide that the cost of the plans will be borne entirely by the Company and participating subsidiary companies through annual contributions to trust funds. These contributions consist of actuarially determined contributions for current service and (until the estimated cost of benefits for past service shall have been fully funded) of

contributions for past service in such amounts as the Boards of Directors deem advisable. In general, the plans provide for monthly pensions upon retirement at or after age 65 or upon earlier disability, incapacity or special circumstances. The amount of pension depends upon length of service, remuneration and the amount of certain Social Security and other benefits.

The amount included in costs and expenses under the retirement plans for 1958 was $9,200,441, of which $1,175,582 represented payment for employees' past service. At December 31, 1958, the unpaid amount of past service costs, based on an actuarial estimate, was approximately $9,500,000.

[fol. 4554] Note 9. Certain supplementary profit and loss information is set forth below:

	Charged Directly to Profit and Loss			
	To Cost of Goods Sold or Operating Expenses	Other	Charged to Other Accounts	Total
Maintenance and repairs:				
1958	$47,305,030	$ 479,898	$ —	$47,784,928
1957	60,594,028	531,016	—	61,125,044
1956	61,896,679	504,196	—	62,400,875
Depreciation and depletion of fixed and intangible assets:				
1958	64,165,256	1,494,347	395,227(A) 7,482(B)	66,062,312
1957	56,107,178	1,551,328	271,728(A) 11,119(B)	57,941,353
1956	49,378,904	1,391,930	193,956(A)	50,964,790
Taxes, other than income taxes (C):				
1958	14,512,001	2,571,589	5,307(D)	17,088,897
1957	14,813,934	3,121,617	50,489(D)	17,986,040
1956	14,023,365	2,630,307	68,071(D)	16,721,743
Management and service contract fees:				
For entire period	—	—	—	—
Rents (E):				
1958	2,169,252	1,742,360	—	3,911,612
1957	1,694,288	1,589,966	—	3,284,254
1956	1,230,258	1,528,890	—	2,759,148

Note 9—Continued

Royalties:				
1958	1,812,499	84,768	—	1,897,267
1957	2,040,916	78,277	—	2,119,193
1956	2,116,976	120,508	—	2,237,484

Notes:

(A) Depreciation on construction equipment, charged to construction work in progress.
(B) Depletion on timber sold, charged to accounts receivable.
(C) Comprises:

	Years		
	1958	1957	1956
Social security taxes	$ 6,180,262	$ 7,160,262	$ 7,202,982
Real estate and personal property taxes	8,454,666	8,416,073	7,364,084
Franchise and license taxes	1,251,256	1,682,934	1,407,491
Other taxes	1,202,713	726,771	747,186
	$17,088,897	$17,986,040	$16,721,743

(D) Sales taxes and social security taxes, charged to construction work in progress.
(E) Excludes hire of vessels and railroad cars by consolidated subsidiary companies.

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1963

No. 204

UNITED STATES, APPELLANT,

vs.

ALUMINUM COMPANY OF AMERICA, ET AL.

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF NEW YORK

Volume III

INDEX

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
10—New York Stock Exchange Listing Fee Agreement—Form A with Alcoa, dated March 13, 1959	4570	1455
16—Alcoa Annual Report for the year ending December 31, 1958	4572	1457
17—Rome Cable Corporation Annual Report to Stockholders as of March 31, 1953 (excerpts)	4606	1491
22—Rome Cable Corporation 22nd Annual Report to Stockholders as of March 31, 1958	4609	1494
23—(Excerpts) Written answers to questions 6, 11, 18, contained in Antitrust Division letter dated February 2, 1959	4625	1511

Record from the United States District Court for the Northern District of New York—Continued

	Original	Print
Plaintiff's Exhibits—Continued		
27—(Excerpts) Written answers by Rome to questions 3, 13, 14, 15, 16, 17 contained in Antitrust Division letter dated August 18, 1959	4646	1529
28—Memorandum re Arrangement between Rome Cable Corporation and Aluminum Company of America, initialed March 7, 1952	4656	1536
30—Letter from Philip T. Coffin, Alcoa to Glenn Rolston, Rome Cable Corporation, dated November 21, 1955	4658	1538
31—Letter from A. D. R. Fraser, Rome Cable Corporation to Ralph V. Davies, Vice President, Alcoa, dated December 16, 1955	4659	1539
32—The Rome Cable Corporation—Manual of Technical Information, Second Edition (excerpt)—Table showing Properties of Metals at 20 C and statement showing Galvanic Series of Industrial Alloys in Sea Water	4664	1542
33—Written answers by Alcoa to questions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15 contained in Antitrust Division letter dated August 19, 1959	4668	1547
41—Memorandum from Leon E. Hickman to Alcoa Managerial Personnel, dated January 18, 1960 with letter from Leon E. Hickman to Samuel A. Rea, dated January 15, 1960 attached	4691	1567
42—Memorandum from Sam Rea to employees of Rea Magnet Wire Company, Inc., dated January 19, 1960	4695	1571
44—Written answers by Rea and Alcoa to questions: A, B, C, and D contained in Antitrust Division telegram	4696	1572
47—Rome Cable Corporation Report to Stockholders as of March 31, 1937	4700	1574
48—Alcoa Annual Report for the year ending December 31, 1959	4706	1582
49—Alcoa Annual Report for the year ending December 31, 1960	4738	1587
50—Report entitled, "The Electrical Applications of Aluminum in The Building Industry", prepared for The Aluminum Company of America by the firm of Edward E. Ashley, dated July 18, 1957 (excerpts)	4778	1627

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
52—Booklet published by Rome entitled "An Address by A. D. R. Fraser, President, Rome Cable Corporation, to the members of the Rochester Society of Investment Analysts," January 16, 1957	4893	1739
53—Minutes of Meeting of the Executive Committee of Rome Cable Corporation, November 6, 1950	4913	1759
54—Rome memorandum from R. A. Schatzel to A. D. R. Fraser; Subject: "Aluminum", dated March 28, 1951	4915	1761
55—Rome memorandum from R. A. Schatzel to J. R. Woods; Subject: "Consumers Power Power Corp., Self-Supporting SD", dated April 26, 1951	4916	1762
56—Minutes of Meeting of the Board of Directors of Rome Cable Corporation, May 18, 1951	4918	1764
57—Rome memorandum from R. A. Schatzel to A. D. R. Fraser and H. T. Dyett; Subject: "Aluminum", dated July 5, 1951	4926	1773
60—Rome memorandum from R. M. Fraser to C. H. Ellis; Subject: "Aluminum Project", dated October 2, 1951	4930	1776
61—Speech by R. A. Schatzel at Rome Cable Corporation Engineering and Research Conference, October 4, 1951	4932	1779
63—Rome memorandum from G. E. Rolston to F. S. Marks; Subject: "Westinghouse Electric Corporation, Sharon Plant", dated October 17, 1951	4937	1785
67—Minutes of Rome Cable Corporation "Aluminum Meeting", November 29, 1951	4939	1787
68—Minutes of Rome Cable Corporation "Aluminum Meeting", January 4, 1952	4947	1794
69—Minutes of Rome Cable Corporation "Aluminum and General Meeting", January 15, 1952	4950	1796
70—Minutes of Meeting on Aluminum Program for Rome Cable Corporation, January 30, 1952	4955	1801
71—Alcoa memorandum by J. C. Glascock and W. W. Wheater; Subject: "Inspection trip to Rome Cable Company", dated March 3, 1952	4965	1810

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
72—Letter from J. Carlton Ward, Jr., of Rome to H. T. Dyett, dated February 16, 1952 with enclosed four page memorandum regarding visit of Alcoa representatives to Rome, N.Y., dated February 16, 1952	4996	1841
74—Minutes of Rome Cable Corporation "Aluminum Meeting", March 3, 1952	5001	1848
75—Minutes of Rome Cable Corporation "Aluminum Meeting", March 10, 1952	5005	1852
76—Alcoa memorandum from P. T. Coffin to all District Sales Managers, subject: "Covered (Weather-Resistant) Conductors", dated March 14, 1952	5009	1854
77—Rome memorandum from G. E. Rolston to All Salesmen, subject: "Expanded Activity in Aluminum", dated March 14, 1952	5012	1857
78—Alcoa memorandum from Philip T. Coffin to J. W. Hood, subject: "Weather Resistant Covered Aluminum Wire and Cable", dated November 11, 1952	5014	1859
79—Minutes of "Meeting on Aluminum Program for Rome Cable Corporation", dated April 3, 1952	5015	1860
80—Rome memorandum from F. S. Marks to All Salesmen, subject: "Covered Aluminum Orders and Inquiries", dated June 5, 1952	5025	1867
81—Minutes of Meeting of Rome Cable Corporation executives headed "Whither goest thou?", January 24 and 25, 1953	5026	1868
82—Letter from A. D. R. Fraser to R. V. Davies, dated April 7, 1953	5040	1881
83—Rome memorandum by R. A. Schatzel; subject: "1952—Research and Engineering", dated May 4, 1953	5042	1883
84—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting on September 2, 1953	5046	1889
85—A portion of the Minutes of the 1953 Rome Sales Conference referring to a speech by G. E. Rolston entitled, "Our Future in Aluminum"	5056	1899
86—Speech by E. Mark Wolf at the 1953 Rome Sales Conference entitled "Aluminum (Bare) and Magnet Wire Developments"	5058	1901
88—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corp., at their meeting on March 3, 1954	5061	1905

Record from the United States District Court for the Northern District of New York—Continued

	Original	Print
Plaintiff's Exhibits—Continued		
90—Rome memorandum dated June 7, 1954, from R. A. Schatzel to H. T. Dyett, subject: "Engineering—Research and Development"	5073	1917
91—Minutes of meeting of Rome Cable Corporation executives headed "Whither Goest Thou"—continued, July 7, 1954	5076	1920
92—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting on September 8, 1954	5082	1927
93—Rome memorandum by H. T. Dyett; Subject: "Conversation at my home with Ralph Davies, R. Murray Willard ("Jess"), J. H. Dyett and Myself", dated September 13, 1954	5090	1935
95—Rome memorandum from E. Mark Wolf to R. A. Gray, Subject: "R. E. Uptegraff Mfg. Co.", dated March 17, 1955	5092	1937
96—Minutes of meeting of Rome Cable Corporation executives held May 3, 1955, subject: "Aluminum"	5093	1938
97—Rome memorandum from R. A. Schatzel to A. D. R. Fraser, Subject: "1954", dated May 3, 1955	5095	1941
98—Rome memorandum from R. M. Fraser to C. H. Ellis, Subject: "Aluminum", dated August 16, 1955	5097	1943
99—Minutes of meeting of the Executive Committee of Rome Cable Corporation August 17, 1955	5099	1944
102—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting September 7, 1955 with two attached statements by H. T. Dyett dated September 7 and 8, 1955	5102	1949
103—Speech by E. Mark Wolf at Rome Cable Corporation 1955 Sales Conference	5113	1961
104—Speech entitled "Our Industry and Us" by A. D. R. Fraser at Rome Cable Corporation 1955 Sales Conference	5116	1965
105—Rome memorandum dated December 7, 1955 from G. E. Rolston to W. A. Miller	5123	1976
106—Rome memorandum from R. A. Schatzel to A. D. R. Fraser, subject: "1955 Developments", dated December 8, 1955	5125	1978

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
107—Rome memorandum from J. H. Dyett to H. T. Dyett, A. D. R. Fraser, G. E. Rolston and S. O. Williams, Subject: "Alcoa Pig", dated August 18, 1955	5128	1981
108—Unsigned Rome document dated October 5, 1955, bearing handwritten initials of H. T. D., subject: "Notes on Visit of Messrs. Ralph Davies and Phil Coffin to Rome on October 4, 1955"	5129	1982
109—Letter from A. D. R. Fraser to R. V. Davies, dated October 5, 1955 with handwritten notations by P. T. Coffin	5133	1986
110—Letter from R. V. Davies to A. D. R. Fraser, dated October 12, 1955	5136	1989
111—Letter from A. D. R. Fraser to R. V. Davies, dated October 14, 1955	5138	1990
112—Letter from J. H. Dyett to W. S. Stout, Alcoa, dated October 21, 1955	5139	1991
113—Rome memorandum from J. H. Dyett to A. D. R. Fraser, R. A. Schatzel, and S. O. Williams, Subject: "Aluminum", dated October 21, 1955	5140	1992

[fol. 4555] Exhibit A

Plan and Agreement

This Agreement is made by Aluminum Company of America, a Pennsylvania corporation (herein called Alcoa), and Rome Cable Corporation, a New York corporation (herein called Rome).

Alcoa desires to acquire, through a wholly-owned subsidiary of Alcoa (herein called the Subsidiary), and Rome desires to transfer, all of the assets, properties, contract rights, business and good will of Rome in exchange solely for shares of common stock of Alcoa and the assumption by the Subsidiary of all debts, obligations, liabilities and contract duties of Rome.

Rome desires to provide for the winding up and settling of its affairs in voluntary dissolution and for the distribution of the common stock of Alcoa thus to be acquired by Rome to the shareholders of Rome in complete liquidation and cancellation of the common stock of Rome.

To provide for the consummation of the foregoing objectives, Alcoa and Rome agree as follows:

Article I

Representations and Warranties

Section 1.1. *Representations and Warranties of Rome.*

Rome represents and warrants to Alcoa that:

A. Rome is a corporation duly organized and existing and in good standing under the laws of the State of New York and has power and authority (i) to own or lease its properties and to operate them in the places where such properties are now owned, leased or operated and (ii) to carry on its business in the manner in which such business is now conducted. Rome has no subsidiaries.

B. As of December 31, 1958, the authorized capital stock of Rome consisted of 1,200,000 shares of common stock of the par value of $5.00 per share, of which 591,802 shares had been issued, 557,602 shares of which were then outstanding and 34,200 shares of which were then held in

Rome's treasury. As of December 31, 1958, options had been granted to employees of Rome and were outstanding to purchase an aggregate of 34,440 shares at a price of $25.57 per share.

C. Rome has delivered to Alcoa: (i) balance sheets of Rome as of March 31 for each of the years 1956, 1957 and 1958, together with operating statements and analyses of capital invested for the fiscal years ended with such dates, all certified by Ernst & Ernst, independent public accountants, and (ii) a balance sheet of Rome as of December 31, 1958 and an operating statement and analysis of capital invested for the nine-month period ended December 31, 1958, which are unaudited. All such financial statements for the fiscal years ending March 31, 1956, 1957 and 1958 have been prepared in conformity with generally accepted accounting principles applied on a consistent basis throughout the periods covered thereby, and fairly present the financial condition of Rome at the respective dates and the results of operations of Rome for the indicated periods. The balance sheet of Rome as of December 31, 1958 and the operating statement and analysis of capital invested for the nine-month period then ended have been prepared in conformity with the accounting principles regularly employed by Rome in the preparation of its interim statements and are subject to audit and fiscal year-end adjustments.

D. Rome had no liabilities at March 31, 1958 which are not shown or provided for on the balance sheet of Rome as of March 31, 1958 except such as may arise out of contract obligations and other commitments theretofore incurred or made in the ordinary course of business.

E. Rome has not, since March 31, 1958:

(i) entered into any transactions other than in the ordinary course of business;

(ii) paid any dividends or made any other distributions to its shareholders except dividends of 25¢ per share paid on July 1, 1958, October 1, 1958, and January 3, 1959, and of 25¢ per share to be paid on or about March 18, 1959 to shareholders of record on or about February 27, 1959;

[fol. 4556] (iii) issued or sold, or granted any op-

tions to buy, or agreed to issue or sell, or to grant any options to buy, any stocks, bonds or other corporate securities except shares of common stock issued or sold pursuant to stock options outstanding on December 31, 1958;

(iv) incurred or agreed to incur any liability or obligation except current liabilities and obligations entered into in the ordinary course of business;

(v) mortgaged, pledged or subjected to any lien, charge or other encumbrance any of its assets, tangible or intangible;

(vi) sold or transferred any of its tangible assets or canceled any debts or claims except in the ordinary course of business;

(vii) sold, assigned or transferred any patents, trademarks, trade names, copyrights or other intangible assets;

(viii) suffered any extraordinary losses or waived any rights or claims having more than nominal value.

F. Rome has filed all federal, state and local tax returns required to be filed and has paid all taxes shown by such returns to be due and payable. The Internal Revenue Service has audited the federal income and excess profits tax returns filed by Rome for all fiscal years through the fiscal year ending in 1954 and has claimed no deficiencies with respect to such years which have not been paid. No state or local taxing authority has asserted any tax deficiency which has not been paid or for the payment of which adequate provision has not been made.

G. There are no actions, suits or proceedings pending or, to the knowledge of Rome, threatened against or affecting Rome which are material to its business, properties or financial condition. Rome is not in default with respect to any judgment, order, writ, injunction, decree, assessment or other similar command of any court or of any federal, state, municipal or other governmental department, commission, board, bureau, agency or instrumentality.

H. Rome has good and marketable title in fee simple to all real properties and improvements thereon included in its assets as shown in its said balance sheet as of March

31, 1958, and to such real properties and improvements thereon as have been acquired or made since that date, subject only to the lien of current state and local property taxes and assessments, payment whereof is not delinquent, and to minor restrictions, covenants, easements, rights and licenses of record which do not impair the use of such property for the business of Rome. Rome owns outright, free and clear of all liens and encumbrances, all machinery, equipment, inventories and other personal property reflected in its balance sheet as of March 31, 1958, and all machinery, equipment, inventories and other personal property acquired by it since March 31, 1958, except such as it has disposed of since that date in the ordinary course of business.

I. The execution and delivery of this Agreement and the consummation of the transactions contemplated hereby will not result in any breach or violation of, or default under, any agreement or other instrument to which Rome is a party or by which it is bound, except that (i) if the consent of J. P. Morgan & Co. Incorporated, The Connecticut Mutual Life Insurance Company and Massachusetts Mutual Life Insurance Company, or other holder or holders of Rome's promissory notes issued in connection with a borrowing by Rome in 1957 of $5,000,000, shall not be secured, the consummation of the transactions contemplated hereby may constitute a default under said promissory notes, and, (ii) if Rome has any claims, contracts, leases, licenses, rights or obligations which are not by their terms or by law assignable without the consent of any other party thereto, then the consummation of the transactions contemplated hereby may constitute a default thereunder.

J. Rome has not agreed, or become liable, to pay any fee or commission in the nature of a finder's or originator's fee in connection with the subject matter of this Agreement.

K. There have been no changes in the condition of Rome, financial or otherwise, as shown in its said balance sheet as of March 31, 1958, other than changes which occurred in the ordinary course of business, and none of [fol. 4557] such changes (other than as reflected in Rome's balance sheet as of December 31, 1958) had a

material adverse effect on Rome's financial condition, results of its operations or its properties.

Section 1.2. *Representations and Warranties of Alcoa.*

Alcoa represents and warrants to Rome that:

A. Alcoa is a corporation duly organized and existing and in good standing under the laws of the Commonwealth of Pennsylvania.

B. As of February 6, 1959, the authorized capital stock of Alcoa consisted of: (i) 1,000,000 shares of serial preferred stock of the par value of $100.00 per share, of which 660,000 shares of a series designated "$3.75 Cumulative Preferred Stock" had been authorized, 659,909 shares of which had been issued and were then outstanding; and (ii) 50,000,000 shares of common stock of the par value of $1.00 per share of which 20,655,992 shares had been issued and were then outstanding. As of February 6, 1959 options had been granted to employees of Alcoa and were outstanding to purchase the following numbers of shares of common stock at the following prices: 60,628 shares at $17.6875 per share, 77,095 shares at $29.3750 per share, 150 shares at $117.25 per share, and 187,151 shares at $68.50 per share.

C. Alcoa has delivered to Rome a consolidated balance sheet of Alcoa as of December 31, 1958, together with a statement of consolidated income and retained earnings and a statement of consolidated additional capital for the year ended December 31, 1958, all certified by Lybrand, Ross Bros. & Montgomery, independent public accountants. Such statements have been prepared in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year, and fairly present the financial condition of Alcoa as of December 31, 1958 and the results of operations of Alcoa for the year ended December 31, 1958.

D. There have been no changes in the condition of Alcoa, financial or otherwise, as shown in its said balance sheet as of December 31, 1958, other than (i) changes which occurred in the ordinary course of business and (ii) changes which occurred outside the ordinary course of business but did not have a material adverse effect on

Alcoa's financial condition, results of its operations or its properties.

Article II

Covenants

Section 2.1. *Negative Covenants of Rome.*

From and after the date of this Agreement and until the Closing Date, Rome shall not:

A. Grant any general increases in rates of pay to its hourly paid employees except increases resulting from existing contracts with labor unions, or grant any material increase in the salaries of any other employees or make any material increase in other benefits to which employees may be entitled.

B. Amend its Certificate of Incorporation or its by-laws except to change its name.

Section 2.2. *Affirmative Covenants of Rome.*

A. Forthwith upon the execution and delivery of this Agreement, Rome shall:

(i) Deliver to Alcoa a true and complete list of all real properties owned by or leased to Rome as of the date of this Agreement, and supplement the same with a list or lists of real properties thereafter acquired or leased, including in such list or lists all plants, structures and other improvements on such real properties, together with a statement as of March 31, 1958 (or as of any later date of acquisition) of the gross book value, book reserve for depreciation, net book value, basis of valuation, and depreciation and amortization policy with respect thereto.

(ii) Deliver to Alcoa a true and complete list and brief description of all patents, patent applications, trademark registrations and copyrights owned by Rome or in which it has any rights as of the date of this Agreement, to- [fol. 4558] gether with a brief description of the nature of such rights, and supplement the same with a list or lists of such property or rights thereafter acquired, provided that Alcoa shall accord confidential treatment to the content of patent applications so revealed.

(iii) Deliver to Alcoa a true and complete list, and make available for inspection by Alcoa a true copy, of the following described contracts and other instruments to which Rome is or shall be a party or by which it is or shall be bound:

(a) All employment contracts and collective bargaining or other labor agreements;

(b) All pension, retirement, stock option, profit-sharing, group insurance or other incentive or welfare contracts and all trust agreements relating thereto;

(c) All contracts for the purchase of any materials, supplies or equipment or for the sale of Rome's products which extend beyond December 31, 1959;

(d) All leases of any property, real or personal, with respect to which Rome is either lessor or lessee;

(e) All notes and agreements relating to any indebtedness of Rome which matures after March 31, 1959;

(f) All other contracts not made in the ordinary course of business.

(iv) Deliver to Alcoa a true and complete list and brief description of all policies of fire, liability and other forms of insurance held by Rome, and maintain and keep such insurance in full force and effect.

(v) Call a special meeting of its shareholders to be held on March 25, 1959 (or other date acceptable to Alcoa), for the purpose of considering and approving this Agreement and authorizing the consummation of the transactions contemplated hereby.

B. From and after the date of this Agreement and until the Closing Date, Rome shall:

(i) Carry on its business in substantially the same manner as heretofore and not make any purchase or sale or introduce any method of management or operation in respect of its business or properties except in a manner consistent with its prior practices.

(ii) Use its best efforts to maintain and preserve its business organization intact, to retain its present employees and to maintain its relationships with its customers and others.

(iii) Permit Alcoa and its authorized representatives to have full access to all properties, records and documents of Rome and furnish to Alcoa such financial and other information with respect to the business and properties of Rome as Alcoa may from time to time reasonably request; provided, however, that any furnishing by Rome of such information to Alcoa or any making by Alcoa of such investigation shall not affect the right of Alcoa to rely upon the representations and warranties of Rome, and provided further that Alcoa shall use its best efforts to keep all such information confidential but shall be under no liability for any disclosure which may occur in spite of such best efforts.

C. At or after the Closing Date, Rome shall:

(i) Take such action as shall be necessary to effect the termination of Rome's profit-sharing plan for employees and the distribution of assets held in trust thereunder.

(ii) Take such action with respect to all pension, retirement, stock option, group insurance or other incentive or welfare plans of Rome as Alcoa shall reasonably direct.

Section 2.3. *Covenants of Alcoa.*

From and after the date of this Agreement and until the Closing Date, Alcoa:

A. Shall not subdivide or otherwise reclassify its capital stock.

B. Shall not issue any additional capital stock except such as may be issued pursuant to the exercise of stock options outstanding on February 6, 1959 and except such as may be issued under the Alcoa Savings Plan for Salaried Employees.

[fol. 4559] C. Shall take such corporate action as shall be necessary to carry out the transactions contemplated hereby and shall cause the Subsidiary to be incorporated and to be registered to do business in states where such registration shall be deemed necessary.

Article III

Conditions

Section 3.1. *Conditions of Alcoa's Obligations.*

The obligations of Alcoa under this Agreement are subject to the satisfaction of the following conditions:

A. All representations and warranties of Rome contained in this Agreement shall be true and correct on and as of the Closing Date, with the same force and effect as though such representations and warranties had been made on and as of the Closing Date, except as to transactions contemplated herein and changes which occurred in the ordinary course of business after the date hereof and did not have a material adverse effect on the operation, properties or financial condition of Rome.

B. Rome shall have delivered to Alcoa a certificate, dated as of the Closing Date and signed by the President or a Vice President and by the Comptroller or Assistant Comptroller of Rome, stated to be to the best of their knowledge and belief, to the effect stated in clause A of this Section 3.1.

C. Rome shall have fully complied with all covenants stated in Sections 2.1 and 2.2 hereof.

D. Rome shall have used its best efforts, (i) to have secured the consent of J. P. Morgan & Co. Incorporated, The Connecticut Mutual Life Insurance Company and Massachusetts Mutual Life Insurance Company, or other holder or holders of Rome's promissory notes issued in connection with a borrowing by Rome in 1957 of $5,000,000, to the transactions contemplated by this Agreement, and (ii) to provide for Alcoa or the subsidiary the benefits of such claims, contracts, licenses, leases or rights as may be non-assignable, including enforcement, not at the cost of Rome, of any and all rights of Rome against the other party thereto.

E. The holders of at least two-thirds of the issued and outstanding shares of common stock of Rome entitled to vote thereon shall have voted in favor of this Agreement and of the consummation of the transactions contemplated herein.

F. Alcoa shall have received from Messrs. Ferris, Hughes, Dorrance and Groben, or other counsel for Rome satisfactory to Alcoa, an opinion, in form and substance satisfactory to Alcoa and dated the Closing Date, to the effect that:

(i) Rome is a corporation duly organized and existing and in good standing under the laws of the State of New York and has power and authority (a) to own or lease its properties and to operate them in the places where such properties are then owned, leased or operated and (b) to carry on its business in the manner in which such business is then conducted;

(ii) Rome has full power and authority to convey, assign, transfer and deliver the assets of Rome as herein provided;

(iii) All corporate and other proceedings required to be taken by or on the part of Rome to authorize it to carry out this Agreement and to convey, assign, transfer and deliver the assets of Rome as herein provided have been duly and properly taken;

(iv) The title of Rome in and to its real properties is a good and marketable title in fee simple, free and clear of all mortgages, liens, charges or encumbrances of any nature except the lien of current state and local property taxes and assessments, payment whereof is not delinquent, and except as to minor restrictions, covenants, easements, rights and licenses of record which do not impair the use of such property for the business of Rome, and that Rome has good title to the property and assets of Rome other than real property;

(v) The instruments of transfer and conveyance tendered to the Subsidiary are sufficient to vest in the Subsidiary such title to all of the assets of Rome as a going concern as was vested in Rome immediately prior to the delivery thereof;

and to such other effect as Alcoa may reasonably require. [fol. 4560] G. Alcoa shall have received a letter from Ernst & Ernst, dated the Closing Date, stating in effect that on the basis of a limited review (but not an audit or "examination" as used in accountants' certificates) of the financial statements of Rome for the period subsequent to

March 31, 1958, consultations with officers of Rome responsible for financial and accounting matters and other specified procedures and inquiries they have no reason to believe that:

(i) The statement of financial condition of Rome as of March 31, 1956, 1957 and 1958 and the operating statement and analysis of capital invested for the fiscal years ended with such dates (on which they have previously reported) do not now fairly present the financial condition of Rome at the respective dates, and the results of operations of Rome for the indicated periods and were not prepared in accordance with generally accepted accounting principles applied on a consistent basis.

(ii) There has been any material change in the accounting principles followed by Rome since March 31, 1958, and

(iii) Except as set forth or contemplated in this Agreement, during the period from March 31, 1958 to a date not more than five days prior to the Closing Date there was any change in the issued capital stock or funded debt of Rome other than payment in accordance with the terms thereof, or any material change in the financial position other than in the ordinary course of business or that Rome entered into any material financial transactions not in the ordinary course of business.

Section 3.2. *Conditions of Rome's Obligations.*

The obligations of Rome under this Agreement are subject to the satisfaction of the following conditions:

A. All representations and warranties of Alcoa contained in this Agreement shall be true and correct on and as of the Closing Date with the same force and effect as though such representations and warranties had been made on and as of the Closing Date, except as to transactions contemplated herein and (i) changes which occurred in the ordinary course of business after the date hereof and (ii) changes which occurred outside the ordinary course of business after the date hereof but did not have a material adverse effect on the operations, properties or financial condition of Alcoa.

B. Alcoa shall have delivered to Rome a certificate, dated as of the Closing Date and signed by the President or a Vice President and the Controller or Assistant Controller of Alcoa, stated to be to the best of their knowledge and belief, to the effect stated in clause A of this Section 3.2.

C. Alcoa shall have fully complied with all covenants stated in Section 2.3 hereof.

D. Rome shall have received from the Internal Revenue Service a ruling, in form and substance satisfactory to Rome, with respect to the federal income tax consequences of the transactions contemplated hereby.

E. The holders of at least two-thirds of the issued and outstanding shares of common stock of Rome entitled to vote thereon shall have voted in favor of this Agreement and of the transactions contemplated herein.

F. There shall not have been objection to the transfer of Rome's assets and demand for payment of the value of their shares of Rome common stock as provided in Sections 20 and 21 of the New York Stock Corporation Law by the holders of more than 10% of the issued and outstanding shares of common stock of Rome.

G. Rome shall have received from the General Counsel of Alcoa an opinion, in form and substance satisfactory to Rome and dated the Closing Date, to the effect that:

(i) Alcoa is a corporation duly organized and existing and in good standing under the laws of the Commonwealth of Pennsylvania;

(ii) All corporate and other proceedings required to be taken by or on the part of Alcoa to authorize it to carry out this Agreement and to issue and deliver the shares of common stock of Alcoa, deliverable pursuant hereto, have been duly and properly taken;

(iii) Said shares of common stock of Alcoa will, on delivery thereof to Rome, in accordance with the terms hereof, be duly and validly issued, fully paid and nonassessable, that registration of the said shares under [fol. 4561] the Securities Act of 1933 is not required (or if required has been duly accomplished), and that the said shares have been duly listed on the New York Stock Exchange.

Article IV

Consummation of Transactions

Section 4.1. *Transfer of Rome's Assets.*

On the Closing Date Rome shall convey, assign, transfer and deliver to the Subsidiary all assets, properties, contract rights, business and good will of Rome of every kind and description and wherever located as the same shall exist on the Closing Date (herein sometimes collectively called assets of Rome) except such amounts of cash or other assets as may be retained pursuant to Section 4.6 hereof and except the minute books and stock books of Rome and any records required by law to be retained by Rome, provided that within a reasonable time after the dissolution of Rome, Rome shall, unless otherwise required by law, deliver to Alcoa or to the Subsidiary, as Alcoa shall direct, the minute books, stock books and all other records of Rome. The transfer shall be effected by such instruments as Alcoa shall reasonably request. Rome shall from time to time as the same is received by it after the Closing Date, pay over to the Subsidiary all cash received by Rome from the exercise by its employees of options to purchase common stock of Rome.

Section 4.2. *Assumption of Rome's Liabilities.*

On the Closing Date Alcoa shall cause the Subsidiary to assume and agree to pay, perform and discharge all debts, obligations, liabilities and contract duties of Rome as the same shall exist on the Closing Date, except expenses for the payment of which Rome shall retain cash or other assets as provided in Section 4.6 hereof. The Subsidiary shall execute such instruments as Rome shall reasonably request. Notwithstanding any other provision of this Agreement and except as otherwise specifically provided in this Article IV, neither Alcoa nor the Subsidiary shall assume any obligation of Rome with respect to options granted by Rome to its employees to purchase common stock of Rome.

Section 4.3. *Transfer of Alcoa Stock.*

On the Closing Date Alcoa shall cause the Subsidiary to transfer to Rome such number of shares of common stock of Alcoa, not to exceed 355,226 shares, as shall be equal to

6/10 (rounded off to the next higher full share) of the aggregate number of shares of common stock of Rome which are issued and outstanding on the Closing Date (exclusive of any shares held in the treasury of Rome) and with respect to which any unexercised stock option granted by Rome to its employees prior to December 31, 1958 shall be outstanding. Alcoa shall take all such action as it may and as shall be required to cause the said shares of common stock of Alcoa to be listed on the New York Stock Exchange on the Closing Date.

Section 4.4. *Dissolution of Rome.*

On or as promptly as practicable after the Closing Date Rome shall take such steps as may be required under the laws of New York to dissolve and terminate its corporate existence and shall distribute to its shareholders, against surrender of and in exchange for their respective certificates for shares of common stock of Rome, certificates for shares of common stock of Alcoa at the rate of 6/10 of one share of common stock of Alcoa for each issued and outstanding share of common stock of Rome. Such distribution shall be effected by depositing with Guaranty Trust Company of New York (herein called the Trust Company), as depository for the shareholders of Rome, all the shares of common stock of Alcoa received hereunder, and the Trust Company, upon receipt of certificates for shares of common stock of Rome, shall deliver to or upon the order of the respective owners of such Rome shares, certificates for the number of whole shares of common stock of Alcoa to which such owners are entitled, together with any dividends which the Trust Company as such depository shall have received subsequent to the Closing Date with respect to such shares so held by it. Certificates for fractional shares of common stock of Alcoa shall not be issued in connection with such exchange. In lieu thereof Rome and Alcoa shall take appropriate action to permit, for a period of 120 days after the Closing Date (the date of expiration of said period being herein call the Expiration Date), the purchase and sale of fractional interests in shares of common stock of Alcoa by Rome shareholders [fol. 4562] who, except for the preceding sentence, would have been entitled to certificates for fractional shares of common stock of Alcoa. At such time or times after the

Expiration Date as the Trust Company shall reasonably determine, the Trust Company, acting as agent for each shareholder of Rome who is, according to the stock transfer books and records of Rome as of the close of business on the Expiration Date, entitled to a fractional interest in any share of Alcoa common stock, shall sell the share or shares representing the aggregate of such fractional interests and shall remit to each such shareholder his proportionate interest in the net proceeds of such sale against surrender by such shareholder of his certificate or certificates representing shares of common stock of Rome.

Section 4.5. *Re-Transfer of Alcoa Shares in Certain Cases.*

If any shareholder of Rome shall have objected to the transfer of Rome's assets and shall have demanded the payment of the value of his shares of Rome common stock pursuant to the applicable provisions of the laws of New York, the shares of common stock of Alcoa to which such shareholder of Rome would otherwise have been entitled shall not be distributed to such shareholder of Rome. After such shareholder of Rome shall have received payment of the value of his shares of Rome common stock and shall have transferred such shares to Rome, Alcoa or the Subsidiary, as Alcoa shall direct, shall be entitled to the shares of common stock of Alcoa, including a fractional interest in any share, to which such shareholder would otherwise have been entitled. From time to time thereafter, upon surrender of Rome certificates, and as requested by Alcoa, the Trust Company shall deliver to Alcoa or the Subsidiary the certificate or certificates for such shares of Alcoa common stock and shall also pay Alcoa or the Subsidiary any dividends which the Trust Company shall have received with respect to such shares. If any employee of Rome holding an option to purchase common stock of Rome granted by Rome prior to December 31, 1958 shall fail to exercise the same in full within three months after the Closing Date, the shares of common stock of Alcoa to which such employee would have been entitled upon exchange for shares of common stock of Rome which he would have acquired had he exercised the said option in full shall not be delivered to him, and from time to time thereafter, as requested by Alcoa, the Trust Company shall deliver to Alcoa or the Subsidiary the cer-

tificate or certificates for such shares of Alcoa common stock and shall also pay Alcoa or the Subsidiary any dividends which the Trust Company shall have received with respect to such shares. Whenever, after December 31, 1962, Alcoa shall so request the Trust Company shall deliver and pay to Alcoa or to the Subsidiary certificates for any and all shares of common stock of Alcoa not theretofore transferred to shareholders of Rome in exchange for certificates for common stock of Rome, and the net proceeds of the sale of shares in which there are fractional interests, together with all dividend monies received by the Trust Company with respect to such shares. Thereafter the holders of such shares of common stock of Rome shall, if and to the extent that they shall have any rights thereto, look only to Alcoa or the Subsidiary, as the case may be, for delivery of certificates for such full shares of Alcoa common stock, payment of their proportionate interests in such net proceeds of the sale of shares in which there were fractional interests and payment of such dividend monies allocable thereto upon surrender of their shares of Rome common stock for exchange.

Section 4.6. *Retention of Cash or other Assets by Rome.*

Rome shall retain in a separate fund cash or other assets or both in such amount as Rome shall reasonably deem sufficient to enable Rome to pay all expenses incurred or to be incurred by Rome in carrying out this Agreement and not paid by Rome prior to the Closing Date. Such expenses shall include but not be limited to payments to shareholders of Rome who object to the transfer of the assets of Rome and demand payment for their shares of Rome stock and any expenses incurred in connection with any proceedings to fix the value of Rome stock for such purpose. Any balance remaining in such fund after all such expenses shall be paid or adequately provided for shall be paid over and transferred to the Subsidiary.

Section 4.7. *Alternate Provision Concerning Rome Stock Options.*

A. The provisions of paragraph B of this Section 4.7 may, by mutual agreement of Alcoa and Rome, be applied in lieu of the provisions elsewhere made in this Article IV (except

in Section 4.2) with respect to options granted by Rome to its employees to purchase common stock of Rome. In the event that the provisions of paragraph B of this Section 4.7 are applied, shares of common stock of Rome with respect to which any unexercised stock option shall be outstanding on the Closing Date shall not be included in the aggregate [fol. 4563] number of shares of common stock of Rome referred to in Section 4.3 for the purpose of determining the number of shares of common stock of Alcoa to be delivered under the provisions of Section 4.3.

B. Alcoa shall assume each option granted by Rome to its employees prior to December 31, 1958 to purchase common stock of Rome which has not been fully exercised on or prior to the Closing Date, to the end that by exercise of each such option the optionee may, for the price of $25.57 and under the terms of said option, purchase 6/10ths of one share of Alcoa common stock for each share of common stock of Rome with respect to which such option might have been but was not exercised as of the Closing Date, provided that the number of shares of Alcoa common stock that may be purchased under any such option shall not include any fractional share but shall be rounded off to the next lower full share.

Section 4.8. *Further Assurances.*

At any time and from time to time after the Closing Date, upon the request of Alcoa, Rome will do, execute, acknowledge and deliver or will cause to be done, executed, acknowledged and delivered, all such further acts, deeds, assignments, transfers, conveyances, powers of attorney and assurances as may be required for the better assigning, transferring, granting, conveying, assuring and confirming to the Subsidiary and its successors and assigns, or for aiding and assisting in collecting and reducing to possession, the assets of Rome to be assigned to the Subsidiary as herein provided.

Article V

Miscellaneous

Section 5.1. *Closing Date.*

The Closing Date shall be March 31, 1959, provided that either Alcoa or Rome may, at any time and from time to

time, by written notice to the other, postpone the closing to a date not later than the close of business on April 30, 1959. Subject to the provisions of Section 5.8 hereof, Alcoa and Rome, by mutual consent, may postpone the closing date beyond April 30, 1959.

Section 5.2. *Place of Closing.*

The consummation of the transactions contemplated by this Agreement shall take place at the office of Rome in Rome, New York, or at such other place as Rome and Alcoa shall mutually determine.

Section 5.3. *Bulk Sales Laws.*

Alcoa hereby waives and will cause the Subsidiary to waive compliance by Rome with the provisions of any applicable bulk sales law.

Section 5.4. *Election of Alcoa with respect to Subsidiary.*

The right is reserved to Alcoa to effect the acquisition of assets of Rome by the Subsidiary and the assumption of liabilities of Rome by the Subsidiary by the direct acquisition of the assets of Rome by Alcoa from Rome in exchange for shares of common stock of Alcoa and the assumption of liabilities of Rome by Alcoa, and the subsequent transfer of all or less than all of said assets by Alcoa to the Subsidiary in exchange for capital stock of the Subsidiary and the assumption by the Subsidiary of all or less than all of said liabilities.

Section 5.5 *Name of the Subsidiary.*

Rome consents to the use of the name "Rome Cable Corporation" by the Subsidiary or to the use of the word "Rome" in any other manner in the corporate name of the Subsidiary. Rome shall cooperate fully with Alcoa and the Subsidiary in connection with the incorporation of the Subsidiary and the registration thereof to do business in states where such registration is deemed necessary.

[fol. 4564] Section 5.6. *Notices.*

All notices or other communications required or permitted to be given hereunder shall be in writing and shall be sufficiently given to Alcoa if delivered personally to its President or if sent by registered or certified mail, addressed to:

Aluminum Company of America
1501 Alcoa Building
Pittsburgh 19, Pennsylvania
Attention of F. L. Magee, President

and to Rome if delivered personally to its President or if sent by registered or certified mail, addressed to:

Rome Cable Corporation
Rome, New York
Attention of A. D. Ross Fraser, President.

The designation of the person to be so notified or the address of such person may be changed from time to time by similar written notice.

Section 5.7. *Parties in Interest.*

This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns but shall not be assignable by either party without the written consent of the other party. Nothing in this Agreement, express or implied, is intended or shall be construed to confer upon any person other than the parties hereto any right, remedy or claim under or by reason of this Agreement.

Section 5.8. *Integration, Modification and Termination.*

This Agreement is the entire agreement between the parties hereto with respect to the subject matter hereof. Alcoa and Rome, by the mutual consent of their respective Boards of Directors or Executive Committees, or officers authorized by such boards or committees, may amend or modify this Agreement by a written instrument executed by Alcoa and Rome, provided, however, that no such amendment or modification shall change the number of shares of common stock of Alcoa to be delivered to Rome hereunder or make any material change in the provisions of this Agreement relating to the transfer of Rome's assets to and the assumption of its liabilities by the Subsidiary and the distribution to Rome's shareholders of such shares of common stock of Alcoa against surrender by such shareholders for cancellation of their certificates for outstanding shares of common stock of Rome, or alter the right of the share-

holders of Rome to terminate this Agreement as hereinafter provided in this Section. Notwithstanding any other provision hereof, this Agreement may be terminated at any time by mutual consent of the Boards of Directors or the Executive Committees of Alcoa and Rome. If, by mutual consent of Alcoa and Rome, the period within which the closing may be held is extended beyond April 30, 1959, the shareholders of Rome may direct the termination of this Agreement by affirmative vote of holders of record of a majority of the outstanding shares of the corporation represented and voting at any annual meeting of shareholders of Rome held after December 31, 1959, if the closing shall not have been held prior to the date of such annual meeting. In the event of any such direction by the shareholders of Rome, this Agreement shall thereupon be terminated. In the event of such termination in either such manner neither party shall have any liability of any kind to the other party or to any shareholder of such other party with respect to any matter arising out of this Agreement.

Section 5.9. *Interpretation.*

This Agreement shall be construed in accordance with the laws of the Commonwealth of Pennsylvania. The titles of the articles and sections have been inserted as a matter of convenience of reference only and shall not control or affect the meaning or construction of this Agreement.

[fol. 4565] Section 5.10. *Counterparts.*

A separate counterpart of this Agreement may be executed by each of the parties and both such counterparts taken together shall constitute a single instrument.

The parties have executed this Agreement this 17th day of February, 1959.

Aluminum Company of America, By I. W. Wilson, Chairman of the Board.

Attest:

Alfred M. Hunt, Secretary.

Rome Cable Corporation, By A. D. R. Fraser, President.

Attest:

Gerard A. Weiss, Secretary.

[fol. 4566] Exhibit B.

Stock Corporation Law of the State of New York

Section 20

Voluntary Sale

§ 20. Voluntary sale, lease or exchange of property, rights, privileges and franchises and rights of objecting stockholders.

A stock corporation, except as otherwise provided by law or by its certificate of incorporation or other certificate filed pursuant to law, may voluntarily sell, lease or exchange its property, rights, privileges and franchises, or any interest therein or any part thereof; provided, however, that if such sale, lease or exchange is not made in the regular course of business of the corporation and involves all or substantially all of its property, rights, privileges and franchises, or an integral part thereof essential to the conduct of the business of the corporation, such sale, lease or exchange shall not be made without the consent of either the holders of record of all of its outstanding shares entitled to vote thereon given in writing without a meeting or the holders of record of two-thirds of its outstanding shares entitled to vote thereon obtained at a meeting of the stockholders called pursuant to section forty-five. Franchises within the state may be sold only to a domestic corporation.

If the sale, lease or exchange may not be made without the consent of stockholders and such consent is obtained at a stockholders' meeting, any stockholder entitled to vote thereon and not voting in favor of such proposed sale, lease or exchange may at any time prior to the vote thereon—or if notice of the meeting was not mailed to him at least twenty days prior to the taking of such vote, then within twenty days after the mailing of such notice—object to such sale, lease or exchange and demand payment for his stock, and thereupon such stockholder or the corporation shall have the right, subject to the conditions and provisions of section twenty-one, to have such stock appraised and paid for as provided in said section. Such objection and demand must be in writing and filed with the corporation,

The provisions of this section shall not apply to a railroad corporation.

Section 21

Appraisal of Stock of Objecting Stockholder

§ 21. *Determination of value of stock of objecting stockholder.* 1. In the event that the stockholders of a corporation have taken action pursuant to sections fourteen, twenty, eighty-five, eighty-six or ninety-one or pursuant to article four and if any stockholder has objected to such action and demanded payment for his stock as provided in section fourteen, section twenty, subdivision seven of section eighty-five, section eighty-seven, section ninety-one or subdivision eleven of section thirty-eight, as the case may be, the corporation, within ten days after the last day on which a demand for payment might have been made, shall mail by registered mail to such objecting stockholder or deliver personally to him a written offer to pay for such stock in cash at a price deemed by the corporation to be the value thereof; and an offer so made to any such objecting stockholder shall also be made on the same terms and conditions and at the same price per share to all such objecting holders of shares of the same class of stock. If mailed, such offer shall be directed to such stockholder at his address as it appears on the stock-book unless he shall have filed with the secretary of the corporation a written request that notices intended for him be mailed to some other address, in which case it shall be mailed to the address designated in such notice. Such offer shall be accompanied by a balance sheet of the corporation as of a date not more than six months prior to the making of such offer and a profit and loss statement for the twelve months' period ended on the date of such balance sheet; provided, that if it is impracticable to furnish a balance sheet as of a date within such six months' period, a balance sheet as of such earlier date as shall be practicable, but not earlier than the end of the corporation's preceding fiscal year, shall be furnished, in which event the profit and loss statement shall be for the twelve months' period ended on the date of such balance sheet.

[fol. 4567] 2. The corporation may apply to the purchase of stock pursuant to an offer made as provided in subdivi-

sion one hereof, such of its assets as are lawfully available for the purchase of shares of its stock, and an amount of its capital not exceeding the capital represented by the shares so purchased; provided, that the effect of any such purchase and application of capital thereto shall not be to reduce the actual value of the assets of the corporation to an amount less than the total amount of its debts and liabilities, plus the amount of its capital reduced by the amount of capital so applied. The use of capital to such extent for such purpose shall not be deemed to be the declaration or payment of a dividend or a distribution of assets within the meaning of section fifty-eight of the stock corporation law, or constitute a violation of section six hundred sixty-four of the penal law. The shares of stock so purchased may be held or disposed of by the corporation; provided, that the corporation, by resolution of its board of directors, may retire any shares so purchased, and shall retire any thereof purchased through the application of capital, by filing a certificate entitled "Certificate of reduction of capital of (name of corporation) pursuant to section twenty-one of the stock corporation law". Such certificate shall contain the statements prescribed in section thirty-six for certificates under subdivision two and subdivision four of section thirty-five to effect a reduction of capital and the elimination of previously authorized shares, and the reduction of capital stock in conformity therewith. Such certificate shall be subscribed and acknowledged by the president or a vice-president and the secretary or an assistant secretary who shall make and annex an affidavit that they have been authorized to execute and file such certificate by resolution of the board of directors, adopted at a directors' meeting duly called and held on a date specified in such affidavit. There shall be annexed to such certificate an affidavit of the president or a vice-president and also an affidavit of the treasurer or a majority of the directors stating that the actual value of the assets of the corporation is not less than the total amount of the debts and liabilities of the corporation plus the proposed amount of its capital. Such certificate shall be filed as provided in section thirty-eight in respect of certificates under section thirty-six. Upon the filing of such certificate the shares so purchased shall be eliminated from the authorized capital stock or number of

shares of the corporation, and the capital of the corporation shall be reduced by an amount equal to the amount of capital represented by the shares so retired. The capital of the corporation represented by any shares of stock purchased or otherwise acquired by it pursuant to any provision of this section shall be determined as provided in subdivision two of section twenty-nine.

3. If the corporation shall fail to make an offer within the time specified in subdivision one hereof, or if the objecting stockholder shall fail to accept an offer from the corporation within twenty days after the mailing or delivery thereof, either such stockholder or the corporation may petition the supreme court, at any special term thereof held in the judicial district in which the principal office of the corporation is situated, to determine the value of such stock. Such petition shall be made on five days' notice and shall be made returnable in such court on the fiftieth day after the last day on which the demand of the objecting stockholder for payment might have been made, or, if the rules or practice of such court do not permit such petition to be made returnable on such fiftieth day, then it shall be made returnable on the first succeeding day permitted by such rules or practice. If more than one such proceeding shall have been instituted, the court, in its discretion, may, or on motion of the corporation shall, enter an order directing the consolidation of all proceedings and making such directions with respect to the conduct of the consolidated proceeding as it shall deem proper. Two or more objecting stockholders may join or be joined in any such proceeding.

4. The court shall determine which of the objecting stockholders have complied with the provisions of section fourteen, section twenty, subdivision eleven of section thirty-eight, subdivision seven of section eighty-five, section eighty-seven or subdivision seven of section ninety-one, whichever shall be applicable, and thereby become entitled to have the value of their stock determined. If the court shall find that any of the objecting stockholders are so entitled, it shall proceed to determine the value of their stock, or shall appoint an appraiser to determine such value, and may make such directions in regard to the proceeding as it shall deem proper. If the court shall determine such value without appointing an appraiser, judgment shall be entered against

the corporation and in favor of each objecting stockholder party to the proceeding for the value of his stock so determined. If an appraiser shall be appointed, he shall be duly sworn honestly and faithfully to discharge his duties and thereupon shall proceed to determine the value of such stock, considering all relevant legal evidence which may be produced, and shall cause a stenographic transcript of the testimony to be taken. For all the purposes of this section, such value shall be determined as of the close of business on the day before the taking of the stockholders' vote on the action [fol. 4568] to which objection was made, excluding any appreciation or depreciation directly or indirectly consequent upon such action or the proposal thereof. The appraiser may require any person to attend before him as a witness, and shall have the same powers with respect to all proceedings before him as are conferred upon a person authorized by law to hear, try or determine a matter in relation to which proof may be taken. The appraiser's report shall state his conclusion as to the value of the stock and his reasons therefor, and he shall file such report, together with the transcript of testimony and all exhibits which shall have been offered, with the court within sixty days after his appointment, or within such later period as the court may direct, and shall serve one copy of the report by mail on each party to the proceeding. The court shall consider the report in the light of all the relevant legal evidence and, on motion of any party to the proceeding, shall enter an order confirming, modifying or rejecting the same and, if confirming or modifying, directing the time within which payment shall be made. If the appraiser's determination of value be confirmed or modified by such order, judgment shall be entered thereon against the corporation and in favor of each objecting stockholder party to the proceeding for the value of his stock so determined. If the appraiser's determination of value be rejected, the court in its discretion (a) may determine the value of the stock of the objecting stockholders in the light of all the relevant legal evidence, in which event judgment shall be entered on such determination as in the case of judgment entered upon an order confirming an appraiser's determination of value, or (b) may remit the proceeding to the appraiser, making such directions with respect to further proceedings as may

be deemed proper. Any judgment for the value of stock entered under this subdivision shall include interest from the date of the stockholders' vote on the action to which objection was made; provided, that if, taking into consideration the price which the corporation may have offered to pay for such stock, the financial statements furnished to the stockholder, and such other circumstances as the court may deem relevant, the court shall find that the action of the stockholder in failing to accept such offer was arbitrary and vexatious or not in good faith, no interest shall be allowed. The payment of any such judgment shall not be deemed to be the declaration or payment of a dividend or a distribution of assets within the meaning of section fifty-eight of the stock corporation law, nor constitute a violation of section six hundred sixty-four of the penal law.

5. The costs and expenses of the proceeding shall be determined by the court and shall be assessed against the corporation; provided, that all or any part of such costs and expenses may be apportioned and assessed as the court may deem equitable against any or all of the objecting stockholder parties to the proceeding to whom the corporation shall have made an offer to pay for the stock if, taking into consideration the value of the stock as determined in the proceeding, the financial statements furnished to such stockholders, and such other circumstances as the court may deem relevant, the court shall find that the action of such stockholders in failing to accept such offer was arbitrary and vexatious or not in good faith. Such expenses shall include reasonable compensation to and the reasonable expenses of the appraiser but shall exclude the fees and expenses of counsel and of experts retained by any party; provided, that if the value of the stock as determined in the proceeding shall materially exceed whatever amount the corporation may have offered to pay therefor, or if no offer shall have been made, the court, in its discretion, may award to any stockholder party to the proceeding such sum as the court may determine to be reasonable compensation to any expert or experts retained by such stockholder in the proceeding if the court shall find the retaining of such expert or experts to have been reasonably necessary.

6. Any stockholder demanding payment for his stock shall have no right to receive any dividends or distributions

payable to holders of such stock of record after the close of business on the day next preceding the date of the stockholders' vote in favor of the action to which such objection was made, and upon such vote shall cease to have any other rights of a stockholder of the corporation with respect to such stock, except the right to receive payment for the value thereof as in this section provided; and no such demand may be withdrawn unless the corporation shall consent thereto. If, however, such demand shall have been withdrawn upon such consent, or if no petition for the appointment of an appraiser to determine the value of the stock of such stockholder shall have been made within the time herein provided, or if a court of competent jurisdiction shall determine that such stockholder is not entitled to the relief by this section provided, or if the action to the taking of which objection was made shall be abandoned or rescinded, the status of such stockholder as a stockholder in the corporation thereupon shall be restored; without prejudice, however, to any corporate proceedings which may have been taken during the interim; provided, that such stockholder shall thereupon be entitled to receive any dividends, distributions or other rights to which he would have been or would have become entitled had he not demanded payment for his stock.

[fol. 4569] 7. The corporation shall not be required to make payment for the stock of any objecting stockholder as in this section provided unless, simultaneously, the certificate or certificates representing such stock shall be surrendered to it, duly indorsed in blank and in proper form for transfer, accompanied by evidence of payment of all requisite stock transfer taxes; and any judgment (red pursuant to this section shall so provide. Upon receipt of such payment, the objecting stockholder shall cease to have any interest in the corporation or its assets by reason of his ownership of the stock so paid for, and such stock may be held or disposed of by the corporation; provided, that if payment for the stock of an objecting stockholder shall have been demanded in consequence of action taken on a merger or consolidation pursuant to sections eighty-five, eighty-six or ninety-one, the shares or other securities of the resulting or surviving corporation into which the shares of the objecting stockholder would have been converted had

no objection been made shall, unless the certificate of merger or consolidation shall otherwise provide, be deemed to have been duly issued in accordance with the terms of such certificate and reacquired by the resulting or surviving corporation, and may be held or disposed of by it free of any preemptive rights of stockholders. The corporation, by resolution of its board of directors, may retire any shares of stock acquired by it upon the payment of a judgment for the value thereof, by filing a certificate as provided in subdivision two hereof for the retirement of shares purchased pursuant to an offer; except, that the affidavits of the president or a vice-president and of the treasurer or a majority of the board of directors, specified in the said subdivision two, relative to the actual value of the assets of the corporation, shall not be required. Upon the filing of such certificate the shares so acquired shall be eliminated from the authorized capital stock or number of shares of the corporation, and the capital of the corporation shall be reduced by an amount equal to the amount of capital represented by the shares so retired.

8. Within twenty days after the last day on which a demand for payment might have been made, each stockholder demanding payment, unless the offer of the corporation to pay therefor shall have been accepted, shall submit his stock certificate or certificates to the corporation for notation thereon of the fact of such demand; and any stockholder who shall fail so to do shall not be entitled to the relief by this section provided unless a court of competent jurisdiction, for good and sufficient cause shown, shall otherwise direct. Upon any subsequent transfers of such stock on the books of the corporation prior to payment by the corporation of the value thereof, as herein provided, the new certificate or certificates issued therefor shall bear a similar notation, together with the name of the original objecting holder of such stock, and, until such payment shall have been made, no transferee of any such stock shall acquire any rights of any character whatsoever by reason thereof except the rights of the original objecting stockholder.

9. In any case where the action with respect to which objection was made shall have been taken with, or authorized by, the consent of stockholders without a meeting, the

actual date upon which the written consent to such action is first obtained from the requisite number of stockholders, or, in case such action shall have been taken pursuant to section eighty-five of the stock corporation law, the date of filing the certificate of ownership as in such section provided, shall for all purposes be deemed to be the date of the stockholders' vote referred to in subdivisions four and six of this section.

[fol. 4570] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 10

New York Stock Exchange

Listing Fee Agreement—Form A.

Agreement made this 13th day of March 1959 by Aluminum Company of America, a corporation duly organized and existing under the laws of the Commonwealth of Pennsylvania (hereinafter called the Company), with the New York Stock Exchange (hereinafter called the Exchange),

Witnesseth:

Whereas, the Company has filed its application for listing upon the Exchange of 355,226 shares of Common Stock; and

Whereas, it is a requirement of the Exchange that, as a condition precedent to the consideration of such application an initial listing fee must accompany the application and, in addition, there must be filed with the Exchange an agreement to pay an annual fee for the continuance of such shares upon the list of the Exchange;

Now, Therefore, in consideration of the Exchange receiving and considering the Company's application for the listing of the above mentioned shares of stock, the Company hereby covenants and agrees as follows:

1. Provided any of the above mentioned 355,226 shares are outstanding and listed on the Exchange when any annual payment is due as hereinafter set forth, the Company will pay to the Exchange each year for a period of fifteen years a continuing fee, with respect to such shares, or any

part thereof, to be calculated as to each payment as provided in the Schedule of Listing Fees hereto annexed and made a part hereof. The first payment is to be made within thirty days after the first anniversary of the date of the original admission of any shares of the issue to dealings on the Exchange (whether or not shares covered by the above mentioned application) and the annual payments thereafter are to be made each within thirty days after the succeeding anniversaries of such admission.

2. Any payments heretofore or hereafter made by the Company to the Exchange in connection with the above mentioned application are hereby declared to be subject [fol. 4571] to the provisions of Schedule hereto annexed and made a part hereof, as the same may be amplified or modified by the foregoing terms of this agreement.

In Witness Whereof, the Company has caused these presents to be executed by its proper officers thereunto duly authorized and its corporate seal to be hereunto affixed, as of the day and year first above written:

Aluminum Company of America, by /s/ Leon E. Hickman, Vice President & General Counsel.

[Seal.]

Attest:

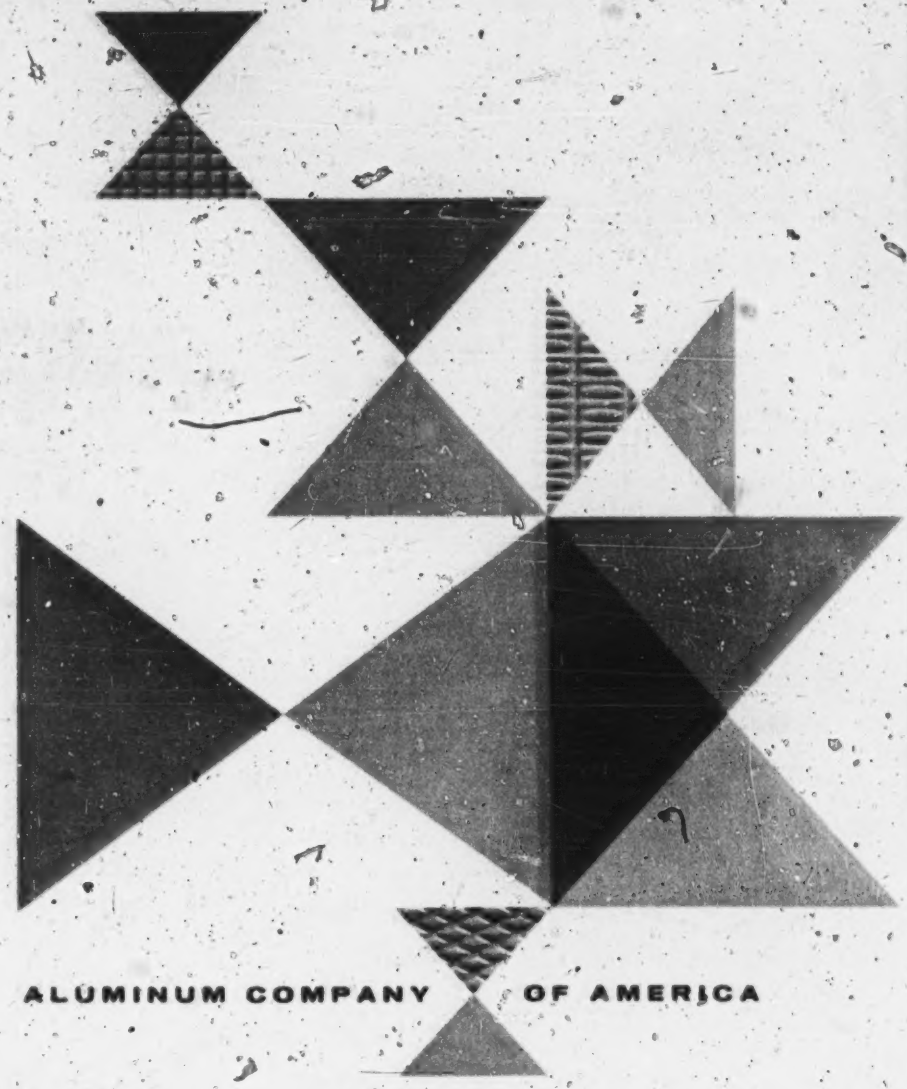
/s/ Alfred M. Hunt, Secretary.

[fol. 4572] In United States District Court

Plaintiff's Exhibit 46

1457

ALCOA ANNUAL REPORT 1958



ALUMINUM COMPANY OF AMERICA

[fol. 4573]

ALUMINUM COMPANY OF AMERICA

Wholly Owned Subsidiaries

ALCOA EXPLORATION COMPANY
Conducts bauxite mining operations in the Dominican Republic.

ALCOA GENERATING CORPORATION
Owns and will operate the power plant now under construction which, when completed, will furnish power to the Warrick works near Evansville, Indiana.

ALCOA INTERNATIONAL, INC.
Sells aluminum products in foreign markets, holds stock of a partially owned related company, and owns ships used for transporting bauxite from Suriname to Trinidad and United States ports.

ALCOA MINERALS INC.
In the process of exploring for bauxite in areas held under concession from the Republic of Panama.

ALCOA OF COSTA RICA, INC.
In the process of exploring for bauxite in Costa Rica.

ALCOA PROPERTIES, INC.
Owns coal properties in Indiana and Kentucky, to supply fuel for power generation at the Warrick works, near Evansville, Indiana, and at a possible future smelter near Sturgis, Kentucky.

ALCOA SECURITIES CORPORATION
Holds stock of certain partially owned affiliated companies, and other securities.

ALCOA SERVICE CORPORATION
Renders building services, and owns certain sales office buildings and other real estate holdings.

ALCOA STEAMSHIP COMPANY, INC.
Owns, charters and operates ships transporting bauxite from Suriname, Trinidad and the Dominican Republic to the United States, and offers commercial service between United States East and Gulf Coast ports and the Caribbean.

ALTON AND SOUTHERN RAILROAD
Owns and operates a belt line and terminal railroad in the vicinity of the East St. Louis, Illinois, works.

ALUMINIO ALCOA (VENEZUELA) S. A.
Holds capital stock of partially owned affiliated companies in Venezuela.

BAUXITE & NORTHERN RAILWAY COMPANY
Owns and operates a railroad in the vicinity of the Bauxite, Arkansas, works.

CEDAR CREEK COMPANY
Operates a railroad switching service at the Bridgeport, Connecticut, works.

CEDARS RAPIDS TRANSMISSION COMPANY, LIMITED
Owns and operates electric transmission lines in Canada, transmitting electric energy for use at the Massena, New York, works.

COLUMBIA RIVER ORCHARDS COMPANY
Operates fruit orchards owned by Aluminum Company of America in the vicinity of the Wenatchee, Washington, works.

LAVACA PIPE LINE COMPANY
Owns and operates gas pipelines to transport natural gas to the Point Comfort, Texas, works.

THE MASSENA TERMINAL RAILROAD COMPANY
Owns and operates a railroad in the vicinity of the Massena, New York, works.

NANTAHALA POWER AND LIGHT COMPANY
Owns and operates hydroelectric power plants and an electric utility system in western North Carolina.

PLEASANT HILLS WATER COMPANY
Supplies water for public and private use in the town of Riverdale, Iowa, near the Davenport, Iowa, works.

POINT COMFORT & NORTHERN RAILWAY COMPANY
Owns and operates a railroad in the vicinity of the Point Comfort, Texas, works.

POINT COMFORT WATER COMPANY
Owns the supply of fresh water for the refining plant at the Point Comfort, Texas, works.

ROCKDALE, SANDOW & SOUTHERN RAILROAD COMPANY
Owns and operates a railroad in the vicinity of the Rockdale, Texas, works.

THE ST. LAWRENCE RIVER POWER COMPANY
Owns and operates electric transmission lines and a water distribution system at the Massena, New York, works.

SURINAME ALUMINUM COMPANY
Conducts bauxite mining operations on lands held under concession from the Suriname government; and is in the process of carrying out the power and smelting undertakings designated in the Brokopondo Agreement.

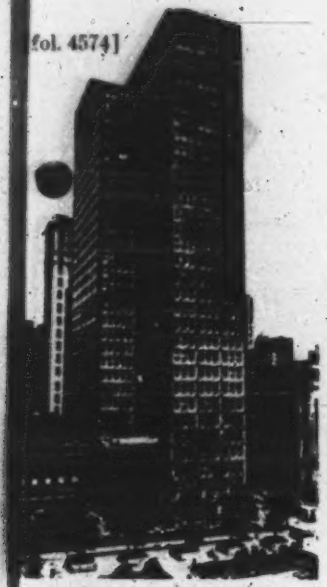
SURINAME TRANSPORT COMPANY, N. V.
Owns floating equipment used for mine dredging and ship towing in Suriname.

TAPOCO, INC.
Owns and operates (a) the Tallassee Project, a federally licensed hydroelectric development consisting of four power plants in North Carolina and Tennessee, to furnish power to the Alcoa, Tennessee, works, and (b) water distribution systems to supply water for that works and surrounding communities.

WEAR-EVER ALUMINUM, INC.
Sells Wear-Ever aluminum cooking utensils, Kensington giftware, Cutco cutlery, Westmorland sterling and Alcoa Wrap.

WEAR-EVER INTERNATIONAL, INC.
Sells Wear-Ever aluminum cooking utensils and Cutco cutlery in Latin America.

YADKIN, INC.
Owns and operates the Yadkin Project, a federally licensed hydroelectric development consisting of four power plants (three in operation and one to be constructed) in North Carolina, to furnish power to the Badin, North Carolina, works.



1958 ANNUAL REPORT

Directors and Officers as of December 31, 1958

Board of Directors

M. M. Anderson

Ralph V. Davies

Leon E. Hickman

Alfred M. Hunt

Roy A. Hunt

Frank L. Magee

Richard K. Mellon

George J. Stanley

I. W. Wilson

George W. Wyckoff

Honorary Chairman

Arthur V. Davis

ANNUAL MEETING

The annual meeting of shareholders of Aluminum Company of America will be held on Thursday, April 16, 1959, at 10:00 a.m., E.S.T., in the Pittsburgh Room, Penn-Sheraton Hotel, Pittsburgh, Pa.

Officers

I. W. Wilson	*Chairman of the Board*
Roy A. Hunt	*Chairman of the Executive Committee*
Frank L. Magee	*President*
N. R. Althauser	*Vice President and Controller*
M. M. Anderson	*Vice President in Charge of Personnel and Industrial Relations*
Frederick J. Closz	*Vice President in Charge of Sales Development and Commercial Research Divisions*
Ralph V. Davies	*Vice President in Charge of Sales*
H. C. Erskine	*Vice President in Charge of Smelting and Fabricating Operations*
*Lewis P. Favorite	*Vice President in Charge of Product Sales and Distribution*
B. J. Fletcher	*Vice President, General Manager of Engineering*
J. P. Haight	*Vice President in Charge of Engineering and Purchasing*
Arthur P. Hall	*Vice President in Charge of Public Relations and Advertising*
Leon E. Hickman	*Vice President and General Counsel*
R. O. Keefer	*Vice President, General Purchasing Agent*
Lawrence Litchfield, Jr.	*Vice President in Charge of Raw Materials and Refining Divisions*
Robert B. McKee	*Vice President in Charge of Sales Offices and Direct Selling*
Edward B. Wilber	*Vice President and Treasurer*
*D. Wilmot	*Vice President in Charge of Product Sales and Distribution*
Alfred M. Hunt	*Secretary*

*Effective February 1, 1959, Mr. Favorite was elected vice president, succeeding Mr. Wilmot, who retired.

Assistant Officers

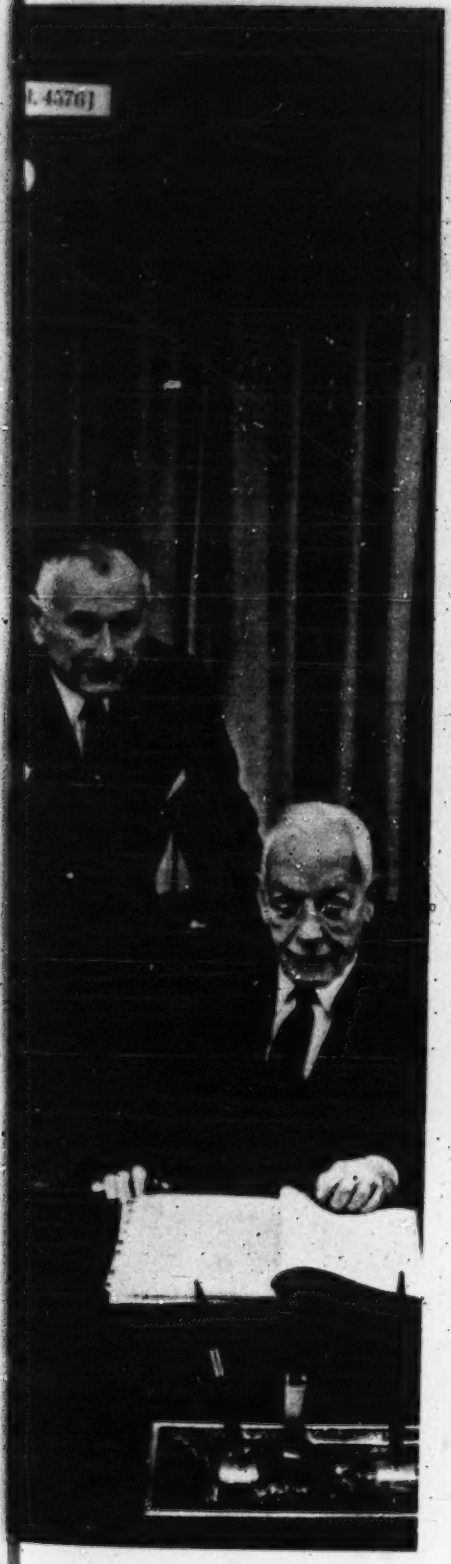
C. C. Conner	*Assistant Secretary*
R. E. Coulter	*Assistant Treasurer*
Harry Flynn	*Assistant General Counsel*
S. T. Gustina	*Assistant Controller*
C. W. Head	*Assistant Treasurer*
Matt. W. Stanley	*Assistant Treasurer*
W. K. Unverzagt	*Assistant General Counsel*

[fol. 4575]

1460

FINANCIAL HIGHLIGHTS

	1958	
Gross Revenues	$758,143,787	$875,461,218
Net Income	42,885,230	75,568,461
Per Share of Common Stock	1.96	3.55
Taxes	44,212,978	85,026,664
Per Share of Common Stock	2.14	4.03
Dividends Declared		
Preferred Stock	2,474,689	2,474,689
Per Share	3.75	3.75
Common Stock	24,767,339	24,728,326
Per Share	1.20	1.20
Total Dividends	27,242,028	27,203,015
Earnings Reinvested in the Business	15,643,202	48,365,446
Capital Expenditures	81,599,867	207,500,256
Net Working Capital	293,035,238	187,788,303
Ratio of Current Assets to Current Liabilities	4.18 to 1	1.98 to 1
Common Stock Equity	621,149,965	604,540,293
Equity Per Share of Common Stock	30.09	29.34



To the Shareholders of ALCOA

Alcoa's sales and earnings dropped substantially in 1958, reflecting generally reduced activity in the national economy. Although an upward trend in aluminum consumption was noticeable over the course of the year, the company's smelters and fabricating facilities operated well below capacity.

In the aluminum industry throughout the world, surplus productive capacity has been a significant problem. Intense competition, particularly in the area of prices, prevailed throughout the year. Late in March, when the price of aluminum dropped on the world market, your company met this situation by reducing the price of primary aluminum ingot from 26 cents to 24 cents per pound, effective April 1. By August 1, conditions were such that part of this reduction could be restored, and Alcoa led U. S. producers with an increase of seven-tenths of a cent per pound. This price increment, however, only partially offset wage increases under existing labor agreements and other rising costs.

Although the existence of surplus productive capacity throughout our industry caused many problems during this period, it serves as an essential element of future growth. To stimulate the expansion of aluminum markets, the company placed added emphasis on its research and development program in 1958. At the same time, an aggressive sales and advertising campaign was conducted to promote new uses and to increase the sale of aluminum for its many present applications. The success of these efforts is indicated by an increase in the use of aluminum per unit of output of many durable goods products in a year when production of such products was sharply curtailed.

A number of market developments of 1958 point toward great opportunities for the growth of aluminum usage in the years ahead. One outstanding example is the building and construction industry, where developments in the field of residential construction are especially promising. Significant progress has also been made in automobile, highway, packaging and electrical applications.

Throughout the company's operations, major emphasis has been placed on cost reduction and increased production efficiency. As a result, important savings have been realized in man power and operating expenses. These improvements were made possible only by a united effort on the part of all Alcoa employees.

On March 25, 1959, the shareholders of Rome Cable Corporation will vote on a proposal made by Alcoa to acquire the assets of Rome in exchange for 355,226 shares of common stock of Alcoa and the assumption by Alcoa of the obligations of Rome. The proposal has been approved by the Board of Directors of Rome. If the sale is approved by its shareholders, the assets of Rome will be transferred to Alcoa as of March 31, 1959. Rome Cable Corporation is a successful and respected wire and cable company (largely copper) and its consolidation with Alcoa will make available to Alcoa facilities and personnel needed to expand our aluminum conductor markets as well as greatly extending the line of products offered to the trade through a single organization.

In submitting this report, the directors and officers take this opportunity to gratefully acknowledge the many contributions made by the men and women of Alcoa who have worked together so effectively during this difficult period. Their loyalty and cooperation in carrying on the affairs of this enterprise are a firm basis for Alcoa's future success.

J. W. WILSON, *Chairman of the Board*
FRANK L. MAGEE, *President*

1501 Alcoa Building
Pittsburgh 19, Pennsylvania
March 1, 1959

Pittsburgh's John J. Kane Hospital, completed in 1956, incorporates nearly two million pounds of Alcoa aluminum in functional and decorative applications.

MARKETS

Demand for aluminum remained at reduced levels during 1958, reflecting the continued effect of the general business recession. In an effort to offset this market condition, the company placed heavy emphasis on an increasingly aggressive sales effort coupled with an intensified research and development program.

BUILDING AND CONSTRUCTION. One of the largest markets for aluminum again was the building and construction industry. Aluminum-faced buildings of the monumental type increased in number during 1958. Two outstanding examples where Alcoa aluminum was specified were the 47-story Time-Rockefeller Building and the 60-story Chase Manhattan Building, both in New York City.

A promising architectural development of the year was the trend toward aluminum in residential construction, which was keynoted by the announcement of a complete line of manufactured aluminum dwellings by National Homes Corporation. The new houses were inspired by Alcoa's widely publicized Care-Free Home described in last year's report and were designed through cooperative research and engineering by Alcoa and National Homes Corporation. Aluminum was also prominently featured in the 1958 research homes sponsored by the National Association of Home Builders.

TRANSPORTATION INDUSTRY. Another leading market for aluminum was transportation, with automotive applications remaining the largest single segment. Aluminum applications in 1958 model passenger automobiles increased more than 16 per cent over 1957 models and reached an average of 37.52 pounds per car for the year.

It now appears that the automotive industry is on the threshold of a development that should have an important effect on the use of aluminum. An all-aluminum engine is reported to be imminent, and is expected to appear first on some 1959 models.

While aircraft production continues to consume large quantities of aluminum, missiles have also become a promising new field of application. Typical aluminum missile parts now in use or under consideration are skins, fuel bodies, structural and mechanical parts, launching devices and ground handling equipment.

STRUCTURAL APPLICATIONS. Important progress was made in structural applications for aluminum during 1958. In September, the first welded aluminum girder type highway bridge was dedicated at Des Moines, Iowa, a result of a project jointly sponsored by the State of Iowa, Aluminum Company of America

The Chateau model of National Homes Corporation's new Viking line employs 4,000 pounds of aluminum. The Viking line was inspired by Alcoa's Care-Free Home.

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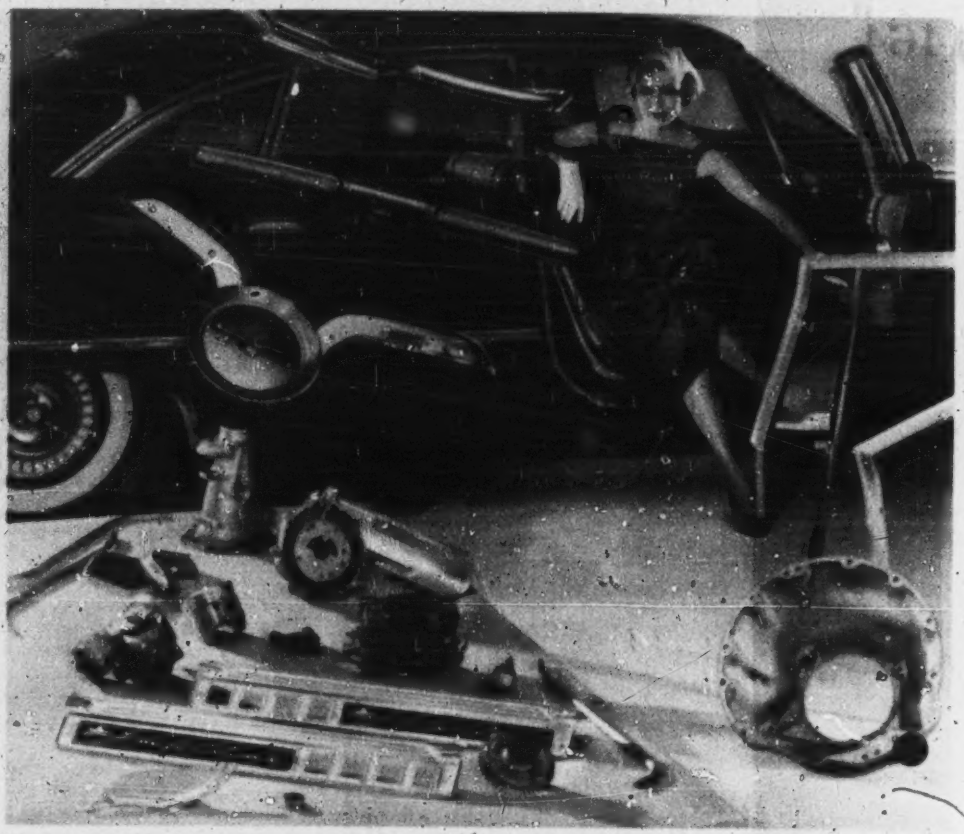
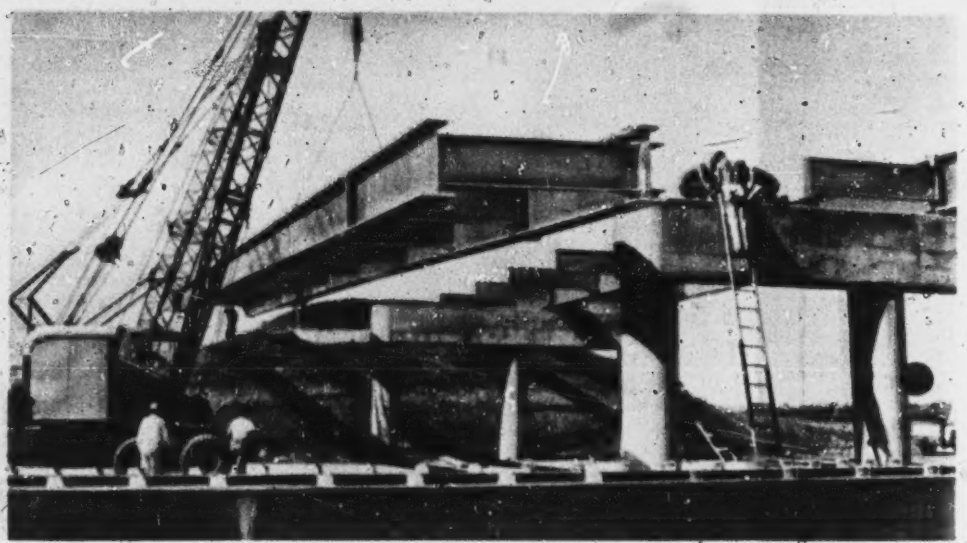


Nearly 100 pounds of aluminum are used in this 1958 Chrysler. Average for all 1958 passenger automobiles was 27.72 pounds per car.

This aluminum highway bridge, constructed in the State of Iowa during 1958, represents a vast new market for aluminum.



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and two other major aluminum producers. Another aluminum bridge which Alcoa helped to sponsor was designed and built by Fairchild Engine and Airplane Corporation, and was tested by Lehigh University's Department of Civil Engineering. The Fairchild bridge incorporates proven aircraft principles, can be mass-produced in sections and is quickly and easily transported and assembled. Since the nation's highway construction program will include some 60 to 70 thousand bridges, these developments may help to create a large new market for aluminum.

Another significant development took place in the electric utility field, when Public Service Electric and Gas Company, Newark, N. J., announced that it intended to use 60 aluminum towers on an 11-mile power transmission line. This structural application of aluminum in the electrical industry is the latest in a series introduced under the leadership of Alcoa. It further extends the use of the metal in a field that has long been an important market. Aluminum is a leading material for use in overhead transmission, primary and secondary distribution, busway systems, and light and heavy industrial bus runs. It is also used in electrical substations, utility pole crossarms and the upper "hot" part of transmission towers.

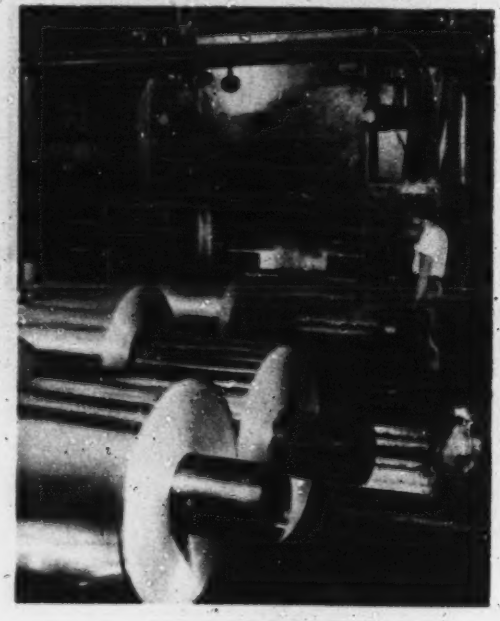
ELECTRICAL EQUIPMENT. Progress in the electrical equipment industry was less spectacular, but equally promising. New developments in coil winding now make it possible for electrical manufacturers to realize substantial savings by using aluminum sheet and foil as strip windings in a wide range of applications from large transformers to miniature radio cells. Cast aluminum rotors and stators were employed in most of the 50 million fractional horsepower motors produced in this country during 1958.

HIGHWAY APPLICATIONS. During 1958, the use of aluminum in bridge railings, signs, fences, gates and lighting equipment continued to be an important field of application. This use of aluminum is also expected to grow as the nation's highway construction program continues.

CONTAINERS AND PACKAGING. As in past years, aluminum had a significant part in the expanding market for containers and packaging. Foil containers are becoming increasingly popular, and the use of aluminum for this application continued to grow.

Aluminum's role in the jet age is illustrated by the fact that nearly 50 tons of the light metal are used in the new Boeing 707 Stratoliner.

A modern foil mill at Davenport, Iowa, works—part of Alcoa's new facilities built to meet the increasing demand for foil in home and industry.



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RESEARCH AND DEVELOPMENT

Throughout 1958, Alcoa continued to maintain its industry-wide leadership in research and development. To strengthen this position still further, the company reorganized and extended its network of technical committees and, at the same time, placed them under more unified direction. These steps are expected to improve the effectiveness of the company's research and development program, and to provide even greater opportunity for outstanding accomplishment.

PROGRESS ON NEW RESEARCH CENTER. Alcoa is continuing with its plans, first reported in 1957, to provide for present and future expansion of its research and development facilities. The location to be developed is a 2,300-acre site at Merwin, Pa., a short distance from the present headquarters of Alcoa Research Laboratories at New Kensington, Pa. Survey work has begun, and preliminary building plans are being developed.

FACILITIES ADDED. In order to take advantage of the market possibilities offered by electrical equipment, the company purchased facilities of the Transformer Division of Automation Instruments, Denver, Colo., and installed them at Alcoa Research Laboratories. These facilities will be used to develop insulating coatings and winding techniques for the production of coils from aluminum strip and foil.

NEW DEVELOPMENTS. Several new products and processes introduced in 1958 offer considerable promise. One development of special significance is a new high-strength, high-modulus alloy for aircraft, containing lithium as a principal alloying constituent. Known as Alloy X-2020, this new product will main-

This huge ingot, weighing 21,000 pounds, was cast at Lafayette, Ind., works for fabrication into missile components by an Alcoa customer.

[fol. 4582]

tain high strength up to 400° F, thus extending by more than 100° F the usefulness of aluminum in the construction of supersonic aircraft.

Another noteworthy development of the year was a new line of aluminum architectural products for roofing, siding, fence panels and garage doors. Finished in a variety of baked alkyd enamel colors, the new product is sold under the trade name, Alumalure, and is available in either flat or coiled sheet.

After several years of development work, Alcoa is now offering a complete line of aluminum rain-carrying equipment (gutters, downspouts and related equipment) for residential use. These architectural accessories have been designed for ease of installation, serviceability and unusual aesthetic appeal.

A complete new line of aluminum rain-carrying equipment for residential use was announced by Alcoa in 1958.

Alcoa's development of high-strength alloys and materials for high temperature ceramics has greatly broadened the market possibilities for the company's products in the field of missiles and rockets.

ADVERTISING AND SALES PROMOTION HIGHLIGHTS

Alcoa again conducted an aggressive, imaginative advertising and sales promotion campaign throughout the year. The company's FORECAST program of stimulating new uses for aluminum was continued with the announcement of five new design creations.

In response to the urgent need for 500,000 new classrooms in America's school system, Alcoa financed the preparation of an unusual book entitled *SCHOOLHOUSE: What to Do When Your Neighborhood Needs a School.* Now available in bookstores throughout the country, the publication was sponsored by Alcoa as a public service. Public response to the new book has been enthusiastic.

Alcoa's residential housing program for 1958 involved the largest amount of national and local publicity ever devoted to this activity. Part of this program was a follow-up of the 1957 Care-free Home campaign and was concentrated on new residential developments announced during 1958 (see page 5).

During 1958, the company continued its unusual program of promoting Alcoa Wrap household foil by including samples in metropolitan newspapers. In this manner, some 3,000 miles of foil were distributed to nearly 9 million families during 1958. Sales of Alcoa Wrap increased significantly in every area where the program was used.

Supporting all of Alcoa's promotional programs, the *Alcoa Theatre* continued to give top entertainment to a nationwide audience through its half-hour TV dramatic series. Planned for wide audience appeal, each *Alcoa Theatre* production used three minutes for its commercial messages. Subjects for these messages were selected from the company's customer support, Alcoa Wrap and institutional programs.

Camera crew films scene from Alcoa's latest movie entitled "A Product of the Imagination." Film tells story of aluminum's development and many uses.

Company executives examine plans for Alcoa Market-Maker Promotion, designed to create new uses for aluminum by intensive advertising in seven major markets.

[fol. 4584]

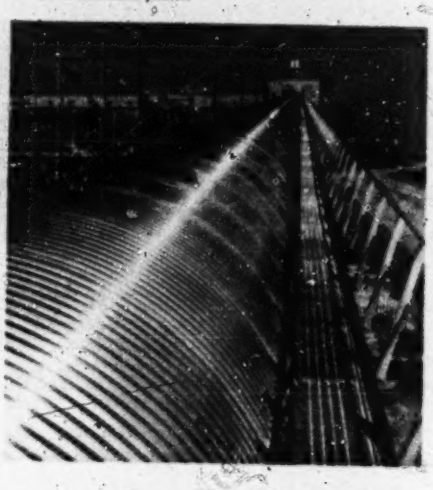
FACILITIES

While the company's sales and research divisions were carrying out a vigorous campaign to promote the sale and broaden the use of aluminum, Alcoa's manufacturing locations worked effectively to cut production costs, prolong the life of existing equipment and generally increase the production efficiency of all facilities.

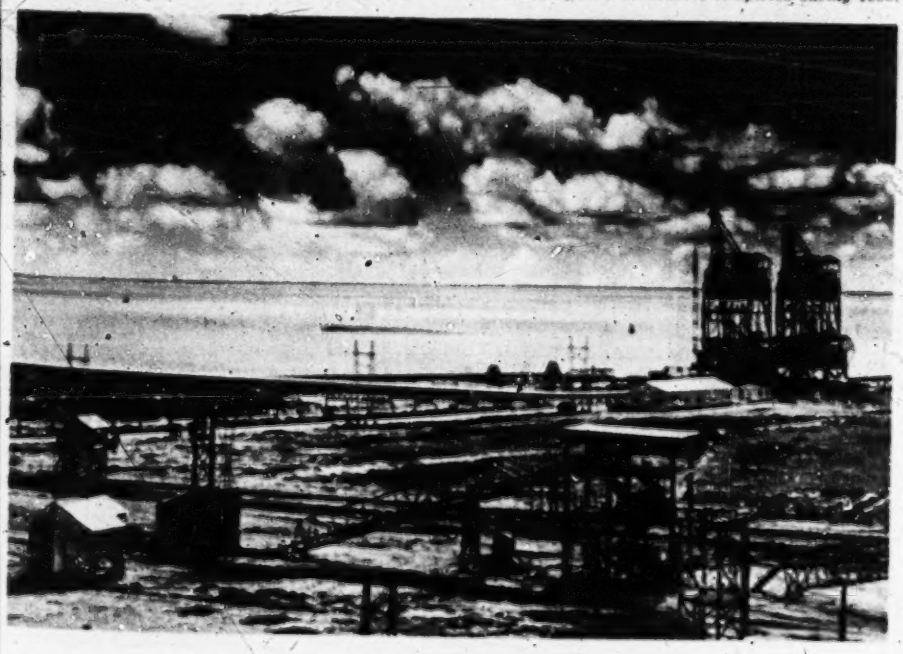
Significant savings in man power and operating expenses were achieved as a result of careful auditing of production activities, planned simplification of paperwork, establishment of data processing equipment and rearrangement of work patterns for increased efficiency. Close control was exercised over the replacement of equipment, and increased emphasis was placed on prolonging the operational life of existing equipment.

Production facilities generally operated at substantially reduced volume throughout 1958. Total production of primary aluminum was 520,000 tons compared with 712,000 tons in 1957.

New bauxite conveyor system transports ore from dock to storage area at recently completed Point Comfort alumina plant.



Dock and related facilities at Alcoa's Point Comfort, Tex., alumina plant, which were completed during 1958.



View of new alumina plant which is being constructed at Point Comfort, Tex

Raw materials—refining

Significant progress was made during 1958 in increasing the company's available supply of raw materials. The acquisition of new or extended bauxite concessions in a number of foreign locations is described under "Foreign Activities."

In addition, Alcoa has continued to provide for new sources of electric energy by continued exploration for natural gas and oil deposits, and by acquiring extensive new reserves of coal. In southern Indiana, Alcoa completed purchase of coal reserves and land properties for use at Warrick works power plant, and provided facilities for mining, processing and transporting the coal, through contractual arrangements with Peabody Coal Company.

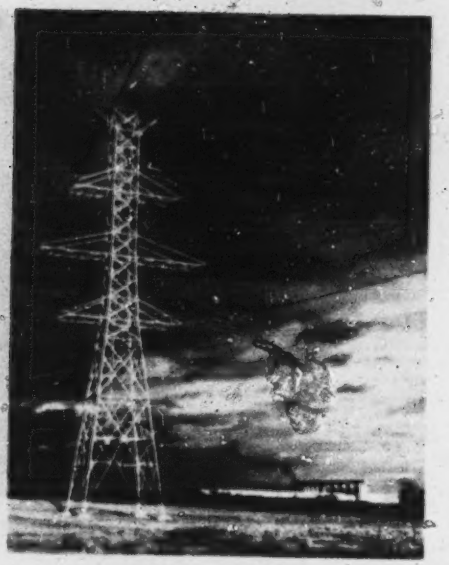
To provide facilities capable of refining Caribbean bauxite and to increase the supply of alumina for Alcoa smelters in the Gulf Coast area, the company continued construction of a new alumina plant at Point Comfort, Tex. Shipment of ore to this plant will be facilitated by a 36-foot deep channel from the Gulf of Mexico to Matagorda Bay. The channel was authorized by Congress in 1958, and is to be constructed by the U.S. Corps of Engineers, subject to appropriation of the necessary funds.

[fol. 4586]

Smelting

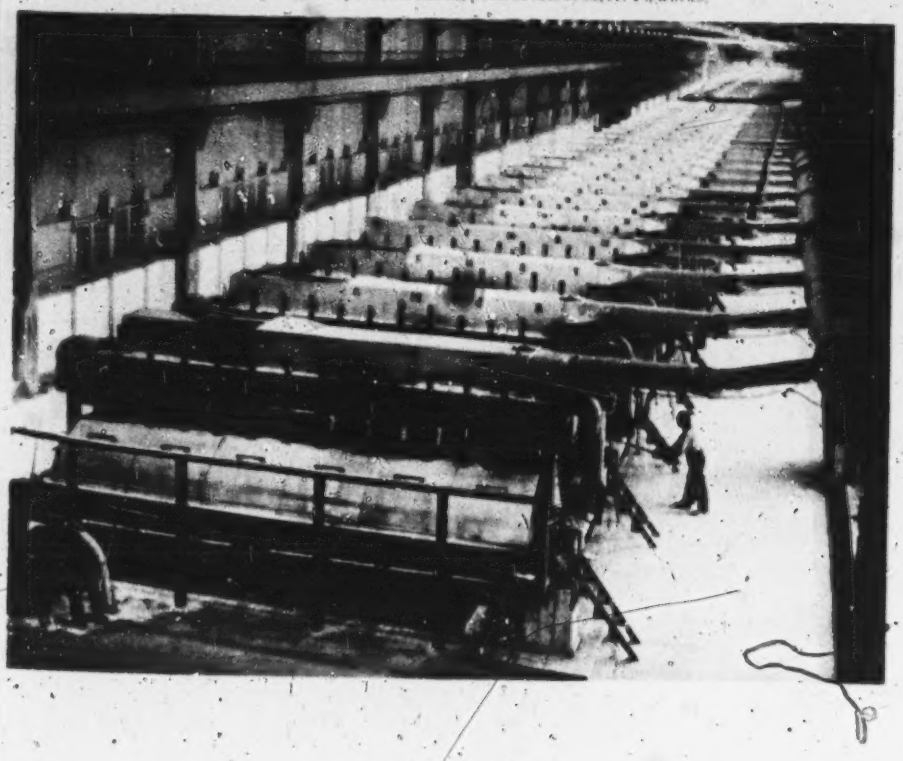
Alcoa's smelting activities during 1958 were conducted with constant emphasis on modernization of equipment and improvement in production practices at all operating locations. Because of the company's confidence that the demand for aluminum would continue to grow in years to come, none of the smelting division's expansion plans were canceled. Instead, construction programs were slowed down and completion dates were extended.

A concerted effort to ensure a long-range power supply at all Alcoa smelters was continued, and considerable progress was made. The company was



A vast network of power lines transmits electricity from the St. Lawrence Project to Alcoa's Massena, N. Y., works.

This new potline was one of two placed in operation during 1958 at Massena, N. Y., works.



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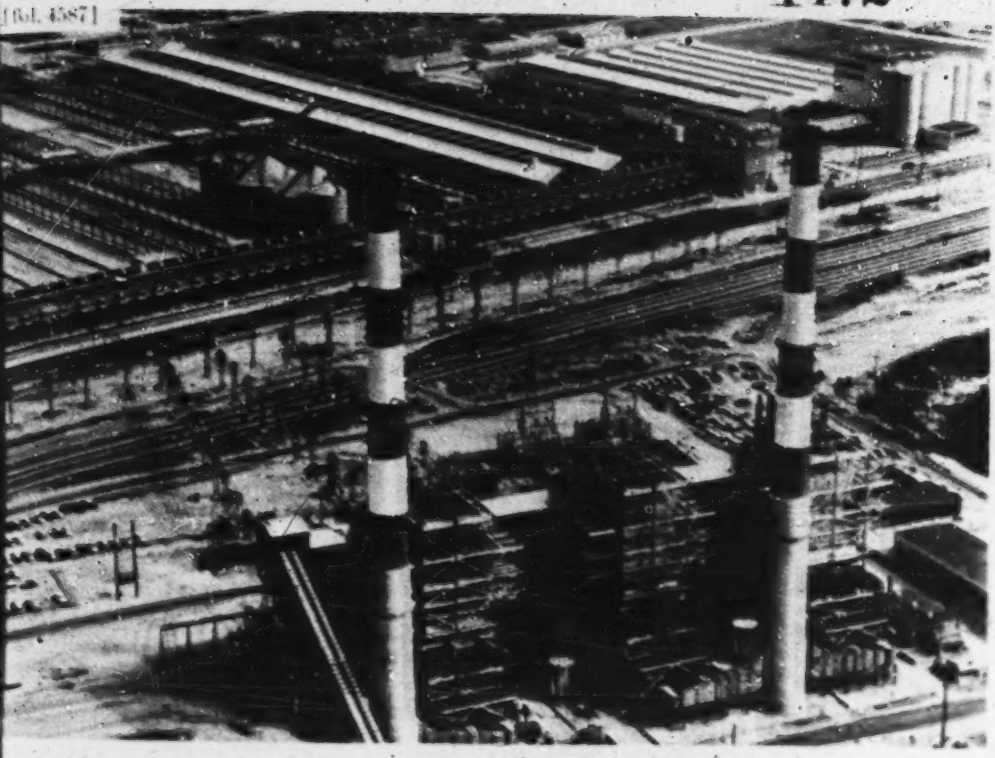


Construction was essentially completed on the power plant and one potline at Warrick's works near Evansville, Ind.

granted a 50-year license by the Federal Power Commission on a new dam at Tuckertown, N. C., and three existing dams on the Yadkin River — all to be known as the Yadkin Project. This hydroelectric development will serve as the power source for operations at the Badin, N. C., works.

At Massena, N. Y., two of three new potlines were completed and placed in operation during the year. With the production of aluminum from these new potlines, Alcoa became the largest industrial user of power from the St. Lawrence Project of the Power Authority of the State of New York. These facilities were built to replace potlines using power from Alcoa's own generating station which will become permanently inoperable with the completion of the St. Lawrence Seaway and Power Project.

A new potline at the Point Comfort, Tex., smelter, was essentially completed. When placed in production, the new line will increase the production capacity of the Point Comfort smelter to 140,000 tons per year.

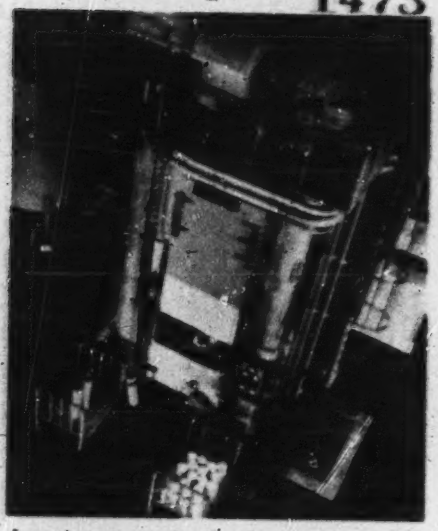
At Warrick works, construction was continued on the new smelter, although at a reduced rate. The Warrick works power station is scheduled for completion early in 1960.

[fol. 4588]

Fabricating

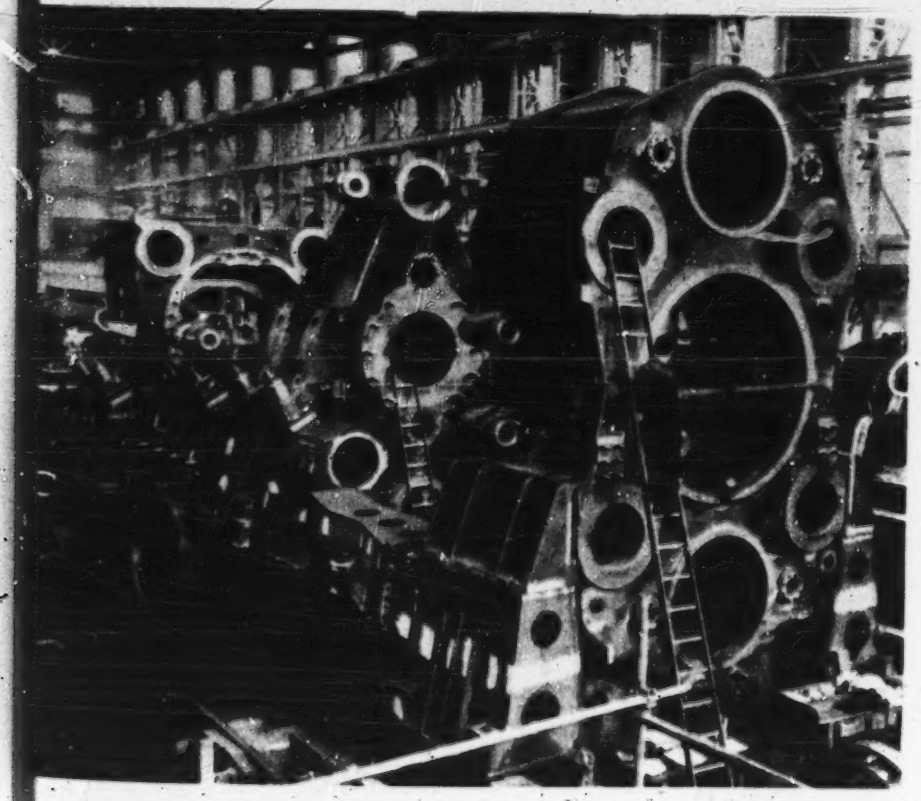
In response to the growing demand for foil packaging materials, the company installed an additional foil laminator at the Davenport, Iowa, works. This equipment laminates foil to paper for use in the packaging and building industries.

A 2,500-ton vertical impact extrusion press was installed and began production at Cressona, Pa. This new press produces one-piece, seamless semi-hollow or solid shapes having forged bases and one or more extruded walls. Products of this type are used widely



Large impact extrusions for aircraft, automotive and electrical industries are fabricated on this new press at Cressona, Pa., works.

New Alcoa-owned 14,000-ton extrusion press for Lafayette, Ind., works is assembled in manufacturer's plant. New press is twin to Air Force press at Lafayette.



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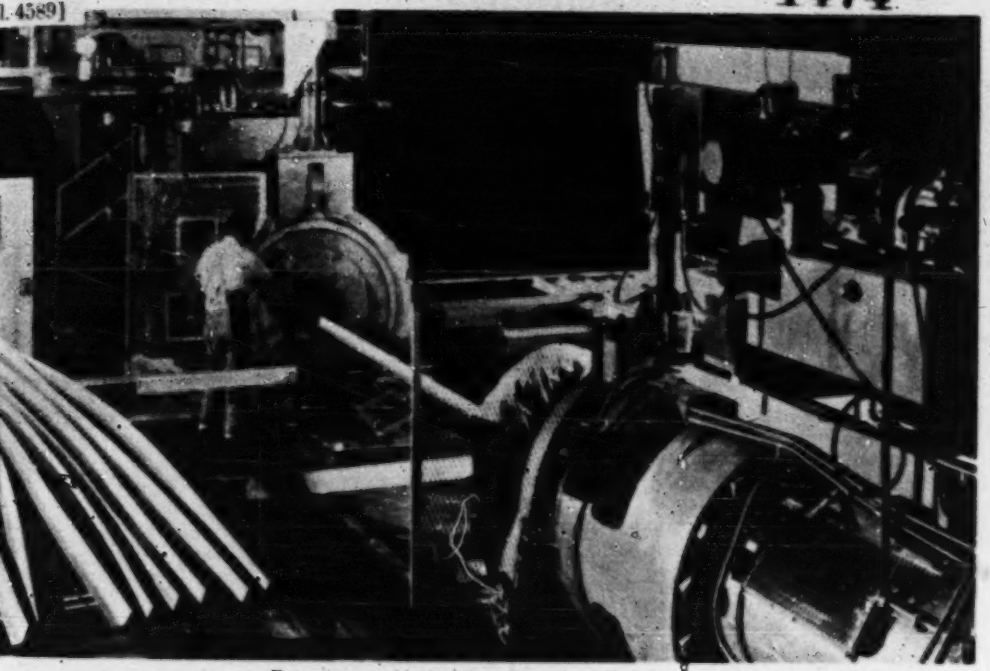


Extrusions produced at Vernon works in Los Angeles, Calif., are straightened on new 750,000-lb stretcher. Stretching relieves stresses which develop during fabrication.

by the aircraft, appliance and electronics industries.

The first shipment of parts for a 14,000-ton Alcoa-owned extrusion press was received at the Lafayette, Ind., works. This press is to be a companion to the Air Force-owned press already in operation there, and is being built to meet an increasing demand for large, high-strength aluminum alloy extrusions, primarily in the aircraft and missiles fields. Construction of auxiliary equipment continued in 1958, and the press foundation has been completed.

At Richmond, Ind., facilities were installed for making a new screw-on cap for baby food jars developed by Alcoa to meet an urgent market need. This development, which also involved the fabrication of filling and capping equipment for use in customers' plants, is expected to offer wide market possibilities.

FOREIGN ACTIVITIES

In 1958, Alcoa broadened the scope of its foreign activities and made a number of organizational changes designed to take advantage of the promising opportunities offered by foreign markets.

NEW ORGANIZATIONAL PROVISIONS. To promote and supervise the development of these activities, a new international division of Alcoa was established and the operations of Alcoa International, Inc., a subsidiary of Alcoa, were expanded. These organizations are designed to develop foreign markets by the direct sale of Alcoa products, by the licensing of foreign companies to manufacture aluminum products with Alcoa technical advice, or by investment in overseas manufacturing facilities.

EXPLORATION AND MINING ACTIVITIES. In a series of steps taken to prepare for the anticipated growth of markets, the company has entered into agreements with foreign governments assuring bauxite mining concessions in a number of foreign locations. Exploration activities are now being carried on.

Through an agreement with the Government of [illegible] name signed in 1958, Suriname Aluminum Company (Suralco), a wholly owned subsidiary, extended its rights for additional bauxite concessions in that country and initiated a program to build a hydroelectric development and smelting facilities there. This agreement also provides for the eventual construction of a bauxite refining plant in Suriname. Preliminary engineering investigations on the over all project, known as the Brokopondo Development, are under way. A description of the Brokopondo Agreement was given in the 1957 Annual Report.

During the year, Alcoa contracted for the sale of [illegible],000,000 tons of Suriname bauxite and its shipment by Alcoa Steamship Company, Inc., to government stockpiles in the United States.

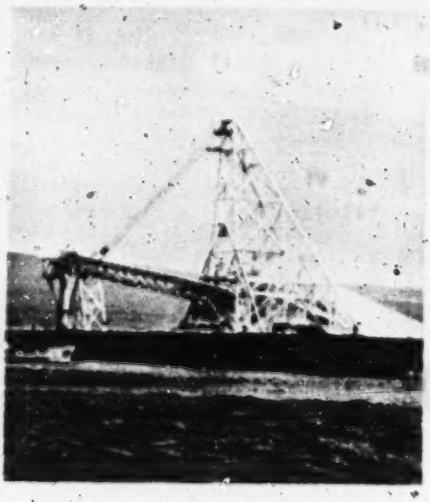
Other Alcoa explorations and mining prospects are being carried out in Costa Rica, Panama and the Dominican Republic. In Costa Rica, exploratory drilling operations resulted in the development of substantial new reserves of bauxite, while the results of exploration in Panama have proved promising enough to warrant the negotiation of a government contract establishing Alcoa's mining rights in that country. Construction of mining and dock facilities at Cabo Rojo, Dominican Republic, were completed during the year, and mining operations were begun.

MARKETING ACTIVITIES. Alcomex, S. A., a subsidiary company manufacturing and selling extruded and tubular products in Mexico, continued to increase its marketing activities and to improve its operating and manufacturing efficiency during the year 1958.

Alcoa has negotiated with the Furukawa Electric Company of Japan to establish a jointly owned fabricating company to be known as Furukawa Aluminum Company (Furalco) to make aluminum sheet, extrusions and castings. The arrangement provides for Alcoa's obtaining one-third of the new company's capital stock and providing technical advice on a royalty basis. Approval of the proposal by the Japanese government is required before the negotiations can be concluded.

In November, the directors of The British Aluminium Company Limited, offered to sell 5[illegible] million shares of authorized, but as yet unissued, common stock of their company to Alcoa in order to obtain capital funds for future expansion and market development as well as the technical and marketing assistance of Alcoa. This offer was accepted by your management, subject to approval of the British Treasury. Before the purchase was completed, however, control of British Aluminium changed hands, and Alcoa thereupon withdrew, believing this course of action to be in the best interests of its shareholders.

Dock facilities at Cabo Rojo, Dominican Republic, which will be used for shipment of Dominican bauxite to the United States.



N. R. Althauser

F. J. Close

B. J. Fletcher

R. O. Keefer

ORGANIZATIONAL CHANGES

At a meeting of the board of directors of Aluminum Company of America held April 17, 1958, four new vice presidents were elected. They are N. R. Althauser, controller; F. J. Close, in charge of sales development and commercial research divisions; B. J. Fletcher, general manager of engineering; R. O. Keefer, general purchasing agent.

Upon the retirement of D. Wilmot, vice president in charge of product sales and distribution, on February 1, 1959, Lewis P. Favorite was elected as his successor. Mr. Favorite had been manager of product sales.

John S. Harrison, formerly assistant to the vice president in charge of personnel and industrial relations, was named general manager, personnel, on January 3, 1958.

The name of The Aluminum Cooking Utensil Company, Inc., a wholly owned subsidiary of Alcoa, was changed to Wear-Ever Aluminum, Inc., on January 22, 1958. Robert L. Becker, president of this Alcoa subsidiary, was also elected president of Wear-Ever International, Inc., effective December 31, 1958, succeeding Errett M. Grable, who retired.

L. B. Kuhns, formerly assistant chief engineer of Alcoa, became chief engineer on February 1, 1958.

John L. Fleming, formerly assistant director of public relations, was named general manager of public relations on February 1, 1958.

Harry L. Smith, Jr., vice president in charge of sales development and commercial research divisions, retired June 30, 1958.

In a reorganization of Alcoa's foreign operations, John M. Mitchell, formerly president of Esko-Alcoa Containers Inc., was elected president of Alcoa International, Inc., and became general manager of the new international division of Aluminum Company of America on July 1, 1958.

Smelting operations at Badin, N. C., were transferred to Alcoa from Carolina Aluminum Company, a wholly owned subsidiary, effective July 1, 1958. Power generating and transmission facilities serving the Badin smelter are retained in Carolina Aluminum Company, renamed Yadkin, Inc.

The board of directors of Alton and Southern Railroad, a wholly owned subsidiary of Alcoa, elected James Davies to the position of chairman of the board, effective August 1, 1958. He was succeeded as president by Robert K. Heineman, formerly Alcoa's director of industrial relations, and vice president of the subsidiary since January 1, 1958.

Upon the retirement of Herman E. Bakken, vice president and general manager of the refining division on October 1, 1958, the refining division was placed under the supervision of Lawrence Litchfield, Jr., formerly vice president and general manager of the mining division, whose new title is vice president in charge of raw materials and refining divisions. At the same time, J. R. Fox was named general manager of the refining division and G. W. Streepey was made general manager of the raw materials division.

In a move to reorganize and broaden the scope of the company's research and development programs, Alcoa's internal network of technical advisory committees was combined under more unified direction. T. W. Bossert, former chief metallurgist for Alcoa, became the new, full-time chairman of the company's expanded research and development committee on November 12, 1958. As committee chairman, Mr. Bossert succeeds G. D. Welty, manager of engineering sales for Alcoa, who retired November 1, 1958. Concurrent with the new appointment, J. H. Alden was named the first full-time secretary of the committee and J. W. Hood was appointed to the position of chief metallurgist of the company.

PERSONNEL AND INDUSTRIAL RELATIONS

For all Alcoa personnel, 1958 was a year of intense effort to meet the problems resulting from reduced business activity and increased competition. Efforts to improve costs and organizational effectiveness received a cooperative and constructive response at all levels.

Conferences on creative thinking techniques, designed to sharpen problem-solving skills and generate new ideas, were started at several additional works during 1958 and are producing financial savings. Other management development efforts emphasized job improvement through coaching and regular performance reviews. Education and training programs stressed cost improvement and the need for more attention to employee communication.

The relatively few people added to the company during the year were carefully selected and placed. Recruitment of college graduates was concentrated primarily on research and sales personnel.

Alcoa's interest in safety and insistence on safe practices again were recognized by the National Safety Council, which presented awards to several of our plants for reduced injury rates during 1958.

The Alcoa Savings Plan For Salaried Employees has provided an incentive and an effective way for such employees to acquire a stock interest in the company as well as a convenient method to save. Under its provisions, salaried employees are permitted to invest up to a maximum of 8 per cent of their salary in the savings plan. Participants may invest either 100 per cent in U. S. Savings Bonds or 50 per cent in such bonds and 50 per cent in Alcoa common stock. The company contributes an amount equal to 50 per cent of the participant's savings, which is invested in Alcoa common stock. The plan was approved at the shareholders annual meeting on April 17, 1958. As of December 31, 1958, approximately 83 per cent of the eligible employees were participating.

Alcoa's three-year agreements with its major unions which were entered into in 1956 provided for additional wage and fringe benefit improvements in 1958. These labor agreements expire on July 31, 1959. There were no major strikes or work stoppages during the year, and our employee and union relations showed the results of effective communication and improved understanding of employees' interests and management objectives and responsibilities.

HONORS

An award for chemical engineering achievement was presented in January to Alcoa by *Chemical Engineering* magazine, for meritorious contributions to the extractive metallurgy of the Atomic Age.

Broadcasting industry's top honor for public service in the highway safety field — the Alfred P. Sloan Award — was presented to Alcoa on May 6 in recognition of the *Alcoa Hour* television program, "No License to Kill."

R. O. Keefer, vice president and general purchasing agent, was awarded the J. Shipman Gold Medal on May 13 by the National Association of Purchasing Agents for his achievements in standardization.

Howard J. Rowe, chief metallurgist of Alcoa's fabricating division, was awarded the William H. McFadden Gold Medal of the American Foundrymen's Society on May 19 for his "outstanding contributions to the society and the light metals branch of the casting industry."

I. W. Wilson, chairman of the board of Alcoa, was awarded an honorary degree of Doctor of Commercial Science from Duquesne University on June 1. He was re-elected to the board of trustees of the National Industrial Conference Board in April, and was awarded an honorary degree of Doctor of Laws from Washington and Jefferson College on June 7.

Leon E. Hickman, vice president and general counsel of Alcoa, was awarded an honorary Doctor of Laws degree from Western Maryland College on June 2. He was elected president of the Association of General Counsel on October 21 and named chairman of the American Bar Association's Committee on Corporate Law Departments in the Association's Section on Corporation, Banking and Business Law.

Ralph B. Derr, chief chemical engineer of Alcoa's refining division, was awarded an honorary degree of Doctor of Science by Bucknell University on June 9.

Arthur V. Davis, honorary chairman of Alcoa, received an honorary degree of Doctor of Laws from Carnegie Institute of Technology on June 10.

H. C. Erskine, vice president in charge of smelting and fabricating operations, received a Distinguished Alumnus Award from Pennsylvania State University on June 14.

Edgar H. Dix, Jr., retired assistant director of research for Alcoa, was awarded the Distinguished Public Service Award on November 6 for his outstanding contributions to the Navy in the fields of scientific research and development. Mr. Dix was awarded an honorary degree of Doctor of Science from Carnegie Institute of Technology on June 10.

Frank L. Magee, president of Alcoa, received an honorary degree of Doctor of Laws from Maryville College on September 16.

FINANCIAL REVIEW OF 1958

Revenues and Net Income

Gross revenues for the year 1958 amounted to $758,143,787 compared with 1957 gross revenues of $875,461,218. Net income for 1958 amounted to $42,885,230 in comparison with the 1957 net income of $75,568,461. The decrease in both gross revenues and net income was due to the substantially lower rate of activity in the aluminum industry generally, which became noticeable during the latter part of 1957 and continued through 1958. Accordingly, Alcoa limited its 1958 production of primary aluminum to 520,000 tons as compared with 712,000 tons produced in 1957.

Early in the year a price decline in the world aluminum market adversely affected prices in the domestic industry. Consequently, the price of aluminum pig was reduced by two cents per pound on April 1, 1958, which was immediately followed by a decrease in prices of mill and other fabricated products. On August 1, 1958, when certain contractual wage increases became effective, the price of pig was increased $0.007 per pound and was followed by various upward adjustments in prices of certain mill and fabricated products. These adjustments, however, were insufficient to offset the effect of wage increases and other rising costs resulting from a lower sales volume and decreased operating rates.

Dividends

Regular quarterly dividends on the common stock in a total amount of $24,756,077.10 were paid during 1958 as follows:

Dividend Number	Record Date	Payment Date	Amount Per Share
74	2/14/58	3/10/58	$0.30
75	5/20/58	6/10/58	0.30
76	8/20/58	9/10/58	0.30
77	11/21/58	12/10/58	0.30

Preferred stock quarterly dividends paid during the year were $0.9375 each and aggregated $2,474,688.94 or $3.75 per share.

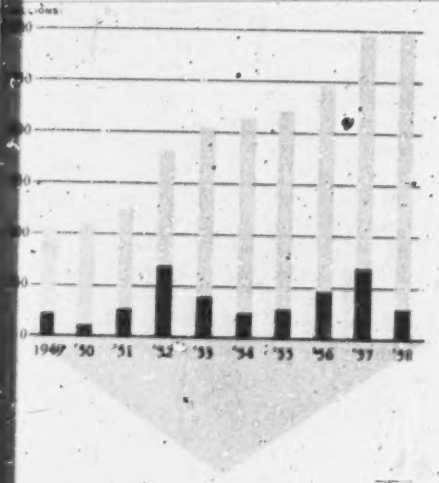
Capital Expenditures

The $600,000,000 capital expenditure program, initiated and carried forward in 1956 and 1957, continued throughout 1958 at reduced construction rates, and completion dates for certain components of the program were extended from those originally planned. Consequently, the 1958 capital expenditures were limited to $81,599,867. This amount, when added to capital expenditures in 1956 and 1957, totals $428,410,941 expended for capital additions and betterments of the previously announced $600,000,000 program. Although the program was extended, no part has been canceled, and the rate of completions of the various components was rescheduled to coincide with the anticipated future demand for the use of the facilities. Not all of the capital expenditures included in the expansion program are authorized, and there remain unexpended balances of presently authorized projects of $39,600,000.

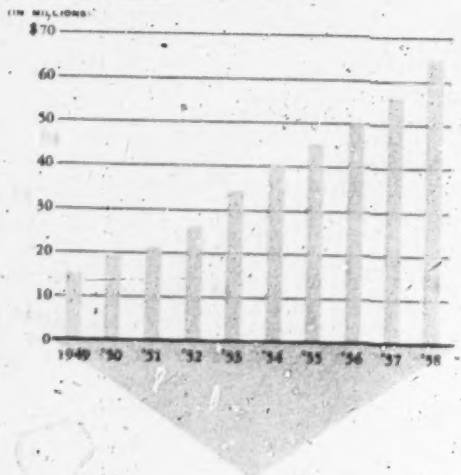
It is anticipated that capital expenditures in 1959 will approximate $65,000,000, which will include preliminary construction expenditures in connection with the previously announced $150,000,000 Brokopondo Development in Suriname, S. A.

CAPITAL EXPENDITURES

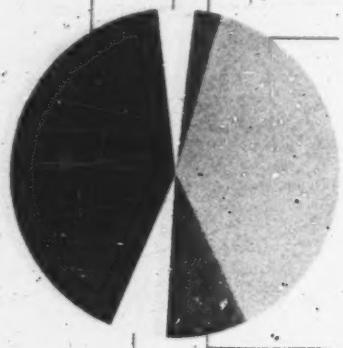
PROPERTIES, PLANTS AND EQUIPMENT



DEPRECIATION AND DEPLETION



DISTRIBUTION OF REVENUE DOLLAR



$313,601,940 Cost of Materials, Services, etc.

27,242,028 Dividends

15,643,202 Earnings Reinvested in the Business

291,784,036 Wages, Salaries and Employee Benefits

65,659,603 Depreciation and Depletion

44,212,978 Taxes — Although taxes are only 5.84% of money taken in, they represent 50.76% of earnings before taxes.

Gross Revenues $758,143,787

Long-Term Debt

During the first quarter of 1958, the company increased its short-term borrowings under the Bank Credit Agreement of August 1, 1957, from $55,000,000 on December 31, 1957, to a total of $80,000,000. This agreement provided for short-term borrowings up to a maximum of $125,000,000, which could be converted on or before August 20, 1958, into term notes ranging in maturities from one to three years. The company decided early in 1958 to refinance the term loan agreement by means of a public issue of debentures. Accordingly, $125,000,000 of 25-year sinking fund debentures, due April 1, 1983, carrying an interest coupon of 3⅞%, were sold as of April 1, 1958, at a price of 99.60. The net proceeds were used to retire the $80,000,000 outstanding short-term bank notes, and the balance was added to working capital to be used for capital expenditures and other corporate purposes.

During 1958, the company acquired and submitted to the trustee for cancellation $10,000,000 principal amount of its 3⅛% debentures due February 1, 1964, in satisfaction of the mandatory sinking fund requirement in that amount due January 31, 1959. The company also acquired and submitted to the trustee for cancellation $3,650,000 principal amount of its 3% debentures due June 1, 1979, which, together with previous acquisitions, satisfied the mandatory sinking fund payment due May 31, 1959, in the amount of $4,150,000.

The annual installment of $2,500,000 due January 1, 1959, on the 2.55% note was paid December 31, 1958. The following table details the mandatory debt retirement schedule of outstanding long-term debt as of December 31, 1958:

(In Thousands of Dollars per Year)

	Debentures				Notes		
	3⅛% Due 1964	3% 1979	4¼% 1982	3⅞% 1983	2.55% 1967	3% 1975	Annual Total
1959	None	None	$ 5,200	.....	None	.....	$ 5,200
1960	$10,000	$ 4,150	5,200	$ 5,200	$ 2,500	.....	27,050
1961	10,000	4,150	5,200	5,200	2,500	.....	27,050
1962	10,000	4,150	5,200	5,200	2,500	.....	27,050
1963	10,000	4,150	5,200	5,200	2,500	.....	27,050
1964	12,500	4,150	5,200	5,200	2,500	.....	29,550
1965	.....	4,150	5,200	5,200	2,500	.....	17,050
1966	.....	4,150	5,200	5,200	2,500	.....	17,050
1967	.....	4,150	5,200	5,200	2,500	.....	17,050
1968	.....	4,150	5,200	5,200	.....	.....	14,550
1969/1973	.....	4,150	5,200	5,200	.....	$12,000	26,550
1974/1978	.....	4,150	5,200	5,200	.....	.....	14,550
1979	.....	4,550	5,200	5,200	.....	.....	14,950
1980/1981	.....	.....	5,200	5,200	.....	.....	10,400
1982	.....	.....	5,400	5,200	.....	.....	10,600
1983	.....	.....	.....	5,400	.....	.....	5,400
Total Long-Term Debt	$52,500	$83,400	$125,000	$125,000	$20,000	$60,000	$465,900

Employees' Stock Option Plan

At the annual meeting on April 17, 1952, the shareholders authorized the company to reserve 1,956,292 shares (adjusted to give effect to the stock split-ups in 1953 and 1955) of its authorized but unissued common stock for the granting of options to employees. The purpose of the plan was to provide an incentive to key employees to become shareholders, thereby attaining a proprietary interest in the future development of the company. These options permit

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to purchase common stock from the com-
prices no lower than 95 per cent of the fair
lue at the dates the options are granted.
s on a total of 193,000 shares were issued to
on March 7, 1958, at 100 per cent of the
ween the high and low sales prices on the
k Stock Exchange on that date. These em-
ad received options on the same number of
July 24, 1956, at 95 per cent of the market
that date. However, the business decline and
g drop in stock prices defeated the purpose
56 options, and all but one option, covering
150 shares, were either surrendered to the company upon issuance of the 1958 series or were canceled or expired without being exercised.

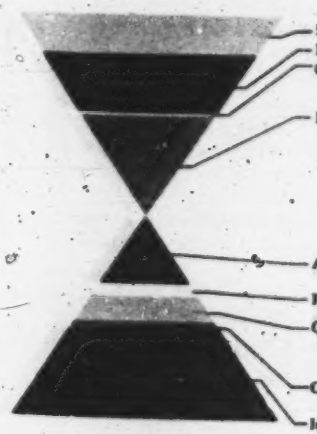
On January 1, 1958, there were 536,308 shares of the company's common stock reserved for future options; and on December 31, 1958, the shares so reserved totaled 537,508, the increase representing 1,200 shares on which outstanding options were canceled or expired during the year and thereby made available for future options.

The following table details pertinent information with respect to options outstanding in 1958:

	Options Granted			
	5/13/52	2/26/54	7/24/56	3/7/58
Option price	$17.6875	$29.375	$117.25	$68.50
Shares subject to unexercised options at January 1, 1958	89,052	92,186	193,850	None
Shares under options issued March 7, 1958	None	None	None	193,000
Shares purchased during 1958	21,677	12,867	None	2,994
Shares canceled or expired during 1958	None	None	700	500
Shares surrendered	None	None	193,000	None
Shares subject to unexercised options at December 31, 1958	67,375	79,319	150	189,506

Sources and Application of Funds

Cash flow during 1958, as briefed in the table below, resulted in a material increase in working capital from $187,788,303 on December 31, 1957 to $293,035,238 at the end of 1958.



Net income		$ 42,885,230
Depreciation and depletion		65,659,603
Other		1,841,410
Total from operations		$110,386,243
Proceeds from sale of:		
3⅛% Sinking Fund Debentures, net	$123,046,628	
Common stock	966,470	124,013,098
		$234,399,341
Additions to properties, plants and facilities, less net retirements of $7,789,425	$ 73,810,442	
Payments on long-term debt	16,464,600	
Cash dividends:		
Preferred stock	$ 2,474,680	
Common stock	24,767,339	27,242,028
Other—principally increase in receivables and advances—noncurrent	11,635,336	129,152,406
Increase in working capital		$105,246,935

ALUMINUM COMPANY OF AMERICA
and consolidated subsidiaries

CONSOLIDATED BALANCE SHEETS *December 31, 1958 and 1957*

ASSETS

	December 31 1958	December 31 1957
Current Assets:		
Cash	$ 52,939,341	$ 39,963,229
United States Treasury Bills, at cost	25,025,389	—
Accounts and notes receivable:		
Customers, less allowances: 1958, $2,370,000; 1957, $2,357,000	88,158,405	99,935,757
Other	4,031,552	4,086,596
Inventories (Note A)	209,865,782	231,726,354
Prepaid insurance and taxes	5,290,195	4,066,725
Total Current Assets	**385,310,664**	**379,778,661**
Investments, at cost:		
Subsidiaries not consolidated	3,092,844	3,974,205
Other	25,933,183	26,203,231
Total Investments	**29,026,027**	**30,177,436**
Other Assets and Deferred Charges:		
Indemnity and surety deposits	1,119,680	1,063,229
Receivables and advances—noncurrent	19,024,741	11,444,633
Deferred exploration and mining expenses	3,035,348	3,222,952
Other deferred charges	7,363,717	5,654,228
Total Other Assets and Deferred Charges	**30,543,486**	**21,385,042**
Properties, Plants and Facilities, at cost:		
Land and land rights, including mines	57,522,324	54,357,986
Structures, machinery, equipment and other facilities	1,430,155,227	1,264,265,792
	1,487,677,551	1,318,618,778
Less, accumulated allowances for amortization, depletion and depreciation	669,819,950	615,332,051
	817,857,601	703,286,727
Construction work in progress	73,031,662	179,422,993
Patents and other intangible assets, less amortization	1,489,080	1,517,784
Total Properties, Plants and Facilities	**892,378,343**	**884,227,504**
	$1,337,258,520	**$1,315,568,643**

The appended notes are an integral part of the financial statements.

[fol. 4598]

LIABILITIES

	December 31 1958	December 31 1957
Current Liabilities:		
Notes payable to banks	$ —	$ 57,144,772
Accounts payable	29,606,824	44,609,844
Dividends on preferred and common stock	7,430,827	7,419,565
Accrued salaries, wages, vacation allowance and other compensation	19,085,140	21,531,558
Provision for taxes, including taxes on income	24,921,608	54,269,383
Other current liabilities	5,444,838	6,777,064
Long-term debt due within one year	5,786,189	238,172
Total Current Liabilities	**92,275,426**	**191,990,358**
Long-Term Debt, less amount due within one year (Note B)	**462,697,480**	**358,919,526**
Deferred Credits, Reserves and Noncurrent Liabilities	**11,396,500**	**9,172,951**
Reserve for Future United States Taxes on Income	**83,748,249**	**84,954,615**
	650,117,655	**645,037,450**

SHAREHOLDERS' EQUITY

Capital Stock:		
Serial Preferred Stock, par value $100 per share:		
Authorized 1,000,000 shares;		
$3.75 Cumulative Preferred Stock, redeemable at $100 per share;		
Authorized 660,000 shares; issued 659,909 shares	65,990,900	65,990,900
Common Stock, par value $1.00 per share:		
Authorized 50,000,000 shares;		
Issued: 1958, 20,644,966 shares; 1957, 20,607,428 shares	20,644,966	20,607,428
Additional Capital	35,392,800	34,463,868
Retained Earnings	565,112,199	549,468,997
Total Shareholders' Equity	687,140,865	670,531,193
	$1,337,258,520	**$1,315,568,643**

[fol. 4599]

ALUMINUM COMPANY OF AMERICA
and consolidated subsidiaries

STATEMENT OF *Consolidated Income and Retained Earnings*

For the years ended December 31, 1958 and 1957

	▼	▲
Net sales and operating revenues	$ 753,140,254	$ 869,378,093
Income from securities and investments	1,660,425	1,988,103
Other income, including adjustments applicable to prior years	3,343,108	4,095,022
Gross revenues	758,143,787	875,461,218
Cost of goods sold and operating expenses	495,397,744	551,095,531
Selling, general administrative and other expenses	92,340,999	93,468,310
Provision for depreciation and depletion	65,659,603	57,658,306
Interest expense	17,647,233	14,643,746
Taxes, not including social security and United States and foreign taxes on income	12,712,978	14,026,664
Total costs and expenses	683,758,557	730,892,757
Income before United States and foreign taxes on income	74,385,230	144,568,461
Provision for United States and foreign taxes on income	31,500,000	69,000,000
Net income for the year	42,885,230	75,568,461
Retained earnings, beginning of year	549,468,997	501,103,551
	592,354,227	576,672,012
Dividends declared:		
On preferred stock—$3.75 per share	2,474,689	2,474,689
On common stock —$1.20 per share	24,767,339	24,728,326
	27,242,028	27,203,015
Retained earnings, end of year	$ 565,112,199	$ 549,468,997

STATEMENT OF *Consolidated Additional Capital*

For the years ended December 31, 1958 and 1957

	▼	▲
Additional capital, beginning of year	$ 34,463,868	$ 33,423,544
Excess of amounts received over the aggregate par value of common stock issued under Employees' Stock Option Plan	928,932	1,040,324
Additional capital, end of year	$ 35,392,800	$ 34,463,868

The appended notes are an integral part of the financial statements.

Notes *to consolidated financial statements*

NOTE A. Inventories are carried at the lower of cost or market, with cost being determined for substantially all inventories under the last-in first-out method. A classification of the inventories follows:

	December 31 1958	1957
Finished goods	$ 52,714,027	$ 54,547,769
Work in process	112,945,245	126,482,204
Bauxite and alumina	17,840,222	19,779,645
Purchased raw materials	15,107,509	15,589,256
Operating supplies	11,258,779	15,327,480
	$209,865,782	$231,726,354

NOTE B. Long-term debt comprises:

	December 31 1958	1957
Sinking fund debentures:		
3½%, due February 1, 1964	$ 52,500,000	$ 62,500,000
3%, due June 1, 1979	83,400,000	87,050,000
4½%, due January 1, 1982	125,000,000	125,000,000
5⅛%, due April 1, 1983	125,000,000	—
Notes payable:		
2.55%, due January 1, 1967	20,000,000	22,500,000
3%, due December 1, 1973	60,000,000	60,000,000
Other	2,583,669	2,107,698
Total long-term debt	468,483,669	359,157,698
Less, amount due within one year included in current liabilities	5,786,189	238,172
	$462,697,480	$358,919,526

NOTE C. Under an agreement made in 1953, and subsequently amended, the company has contracted to purchase primary aluminum from a Canadian corporation during the years 1959 through 1962 at the current market price in the United States at the time of shipment. Based upon the quoted market price at December 31, 1958, the amount of this commitment was approximately $84 million. The company has the option to postpone delivery of approximately $21 million of the above shipments for periods up to a maximum of five years by purchasing aluminum certificates which require the payment of one-half of the then current market price of the primary aluminum involved. Also, the company and the Canadian corporation both have the right to cancel approximately $13 million of the shipments.

Under an agreement made in 1955 with a Norwegian corporation, the company has contracted to advance, over a period of years, approximately $20 million and deliver about 760,000 metric tons of alumina to that corporation, with repayment to be made in primary aluminum. At December 31, 1958, approximately $13 million had been advanced and 50,000 metric tons of alumina delivered under the agreement. The repayment made in primary aluminum on account of the alumina delivered amounted to the equivalent of approximately 40,000 metric tons of alumina at December 31, 1958.

NOTE D. The various retirement plans for hourly rated and salaried employees provide that the cost of the plans will be borne entirely by the company and participating subsidiary companies through annual contributions to trust funds. These consist of actuarially determined contributions for current service and (until the estimated cost of benefits for past service shall have been fully funded) of contributions for past service in such amounts as the boards of directors deem advisable. In general, the plans provide for monthly pensions upon retirement at or after age 65 or upon earlier disability, incapacity or special circumstances. The amount of pension depends upon length of service, remuneration and the amount of certain social security and other benefits.

Amounts included in costs and expenses under the retirement plans amounted to approximately $9.2 million for 1958 and approximately $12 million for 1957. Of these amounts, approximately $1.2 million represented payments for employees' past service. At December 31, 1958, the unfunded amount of past service costs, based upon an actuarial estimate, was approximately $9.5 million.

The Alcoa Savings Plan for Salaried Employees, begun on a preliminary basis on November 1, 1957, was approved by the shareholders at their annual meeting in 1958. Under the trusteed plan, eligible salaried employees may save, depending upon length of service, from two to eight per cent of their salaries, and the company contributes one-half of the employees' savings. Each employee may choose whether all of his savings will be invested in U. S. Savings Bonds or one-half in such bonds and the other half in the company's common stock, but the company contribution must be invested in the company's common stock. The company contribution to the plan amounted to approximately $2.4 million for 1958 and approximately $400,000 for the period from November 1, 1957 to December 31, 1957.

NOTE E. Reference is made to the sections of this Annual Report titled "To the Shareholders of Alcoa" and "Financial Review of 1958" for information with respect to the proposed acquisition of the net assets of Rome Cable Corporation, capital expenditures and commitments related thereto, long-term debt and the employees' stock option plan.

ALUMINUM COMPANY OF AMERICA
and consolidated subsidiaries

TEN-YEAR SUMMARY

Year Ended December 31,	1958	1957	1956	1955	1954
Earnings					
Gross Revenues	$758,143,787	$875,461,218	$869,783,315	$848,745,207	$713,004,925
Cost of Materials, Services, etc.	313,601,940	332,229,358	307,704,742	320,561,827	279,403,298
Wages, Salaries and Employee Benefits	291,784,036	326,978,229	323,902,506	294,726,544	264,236,167
Depreciation and Depletion	65,659,603	57,658,506	50,770,834	45,114,035	40,653,031
Taxes	44,212,978	83,026,664	97,786,200	100,741,993	66,837,274
Net Income	42,883,230	75,568,461	89,621,033	87,600,808	61,875,155
Preferred Stock Dividends	2,474,689	2,474,689	2,474,690	2,474,691	2,474,692
Common Stock Dividends	24,767,339	24,728,326	24,642,644	21,376,494	16,058,638
Financial Position					
Net Working Capital	293,035,238	187,788,303	189,630,821	224,558,265	182,698,781
Properties, Plants and Facilities, Net	892,378,343	884,227,504	744,655,958	664,993,115	640,865,349
Investments and Other Assets, Net	48,173,013	42,389,527	31,898,547	25,199,889	32,829,608
Long Term Debt	462,607,480	358,919,526	273,281,901	308,372,943	336,350,713
Future Income Taxes	83,748,249	84,954,613	71,832,224	51,242,931	33,769,919
Shareholders' Equity	687,140,865	670,551,193	621,071,201	555,135,395	486,273,106
Other Data					
*Per Share of Common Stock					
Net Income	1.96	3.55	4.24	4.18	2.95
Dividends Declared	1.20	1.20	1.20	1.05	.80
Taxes	2.14	4.03	4.76	4.94	3.32
Equity	30.09	29.34	27.01	24.60	20.90
Number of Shareholders					
Preferred Stock	3,911	4,010	4,093	4,228	4,282
Common Stock	23,715	23,295	20,499	16,029	11,625
Capital Expenditures	81,399,867	207,300,256	139,310,818	79,521,316	67,151,034
Number of Employees (average for year)	44,281	54,640	58,486	56,774	54,652

*Per share amounts have been adjusted where applicable to give effect to stock split-ups in 1953 and 1955, and are based on the number of shares outstanding at the end of the year.

[fol. 4602]

1,073,898	$584,005,750	$539,615,017	$481,167,050	$346,588,954
8,885,592	218,860,571	193,770,755	193,137,582	145,321,368
1,637,895	230,218,277	199,107,427	170,861,943	143,121,905
4,047,688	26,087,475	21,657,123	19,492,910	15,719,607
6,007,508	61,477,139	85,227,418	50,818,024	21,533,211
0,495,215	47,362,488	39,852,294	46,856,597	20,892,863
2,474,694	2,474,694	2,474,694	2,474,694	2,474,694
5,720,917	14,682,042	13,449,516	9,781,466	9,781,466
9,730,069	98,635,365	68,397,626	126,417,275	97,103,960
1,102,391	545,337,283	379,597,615	325,920,249	316,608,574
5,407,289	78,033,939	36,790,518	34,971,904	12,933,740
1,704,024	323,940,671	123,570,223	146,301,717	140,239,000
7,231,644	4,747,035	566,456	—	—
1,304,281	391,318,881	360,649,080	341,007,741	306,407,274
2.95	2.29	1.91	2.27	.94
.80	.75	.69	.50	.50
3.86	3.14	4.36	2.60	1.10
18.76	16.61	15.06	14.06	12.29
4,478	4,553	4,628	4,788	4,831
10,784	9,901	9,558	9,286	9,036
407,886	198,338,289	79,710,625	34,690,610	68,624,738
58,376	52,120	49,320	46,044	40,331

COMMON STOCK of Aluminum Company of America is listed on the New York Stock Exchange.

PREFERRED STOCK of Aluminum Company of America is admitted to trading on the American Stock Exchange.

AUDITORS' REPORT

TO THE SHAREHOLDERS AND
BOARD OF DIRECTORS,
ALUMINUM COMPANY OF AMERICA:

We have examined the consolidated balance sheet of Aluminum Company of America and consolidated subsidiary companies as of December 31, 1958, and the related statements of consolidated income and retained earnings and additional capital for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying consolidated financial statements present fairly the financial position of Aluminum Company of America and consolidated subsidiary companies at December 31, 1958, and the results of their operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

LYBRAND, ROSS BROS. & MONTGOMERY

Pittsburgh, Pa.
February 3, 1959

REGISTRARS

COMMON STOCK
Pittsburgh: Fidelity Trust Company
New York: Guaranty Trust Company of New York
PREFERRED STOCK
Pittsburgh: Fidelity Trust Company
New York: Bankers Trust Company

STOCK TRANSFER AGENTS

COMMON STOCK
Pittsburgh: Mellon National Bank & Trust Company
New York: Bankers Trust Company
PREFERRED STOCK
Pittsburgh: Mellon National Bank & Trust Company
New York: First National City Trust Company

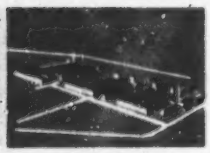
Aluminum Company of America is incorporated in the Commonwealth of Pennsylvania

[fol. 4693]

ALCOA

PLANTS AND PRODUCTS

ALCOA, TENN.—pig and ingot; sheet, plate, foil, powder and paste, welded tube, rail-carrying equipment



BADIN, N. C.—pig and ingot

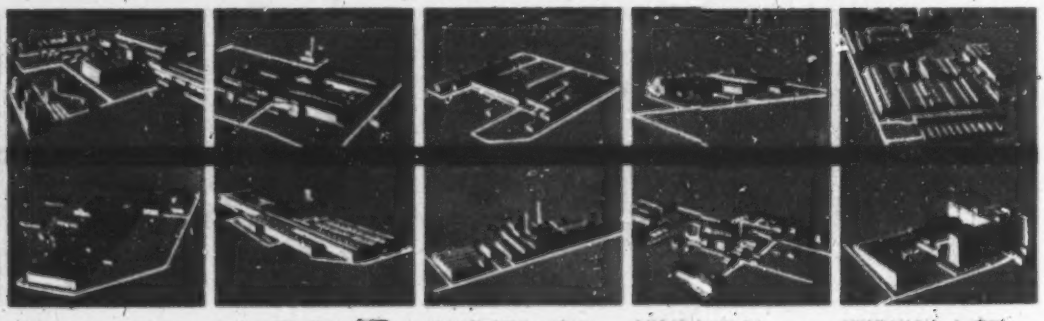
BAUXITE, ARK.—alumina, alumina chemicals

BRIDGEPORT, CONN.—castings (sand, permanent mold, plaster process), ingot

CHICAGO, ILL.—die castings

CHILLICOTHE, OHIO—cooking utensils

CLEVELAND, OHIO—castings (sand, permanent mold, plaster process), forgings, ingot



CRANDALL, PA.—extrusions, impact extrusions, ingot

DAVENPORT, IOWA—sheet, foil

DETROIT, MICH.—castings (permanent mold, plaster process), ingot

EAST ST. LOUIS, ILL.—chemicals: fluorides, gallium, calcium chloride, cement, desiccants

EDGEWATER, N. J.—sheet, foil, impact extrusions

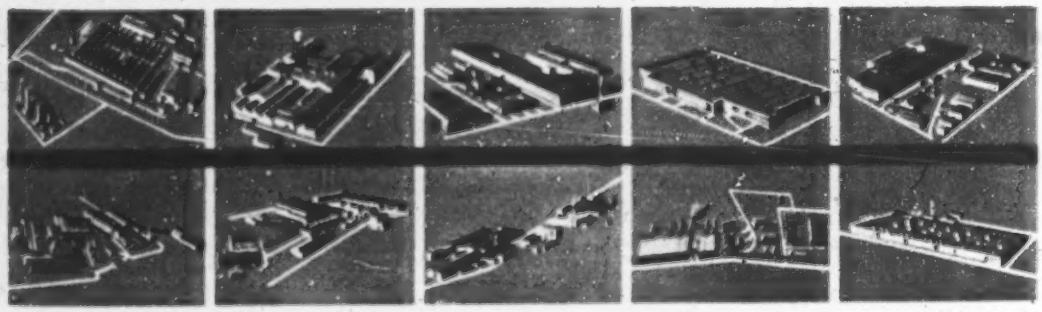
EVANSVILLE, IND.—(Warrick works under construction), pig and ingot

GARWOOD, N. J.—die castings

LAFAYETTE, IND.—tube, extrusions, ingot

LANCASTER, PA.—rivets, nails, fasteners, screw machine products

LOS ANGELES, CALIF.—(Vernon works) castings (sand, permanent mold, plaster process), forgings, rivets, nails, extrusions, tube, ingot



MASSENA, N. Y.—pig and ingot, wire, rod, bar, cable, cable accessories, structural shapes

MOBILE, ALA.—alumina, alumina chemicals

NEW KENSINGTON, PA.—tube extrusions, foil, powder and paste, cooking utensils, rubbing products, ingot, fittings

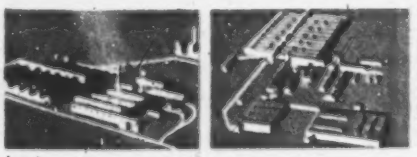
POINT COMFORT, TEX.—pig and ingot, alumina

RICHMOND, IND.—bottle and jar closures, collapsible tubes

ROCKDALE, TEX.—pig and ingot

VANCOUVER, WASH.—pig and ingot, foil, wire, cable, cable accessories, extrusions

WENATCHEE, WASH.—pig and ingot



ALCOA ALUMINUM

[fol. 4604]

ALUMINUM COMPANY OF AMERICA

MINING LOCATIONS

Bauxite, Arkansas
Cabo Rojo, Dominican Republic
David, Republic of Panama
Evansville, Indiana
Houston, Texas
Moengo, Suriname
Paranam, Suriname
Point Comfort, Texas
Port of Spain, Trinidad, B.W.I.
(Bauxite Transfer Station)
Rockdale, Texas
Rosiclare, Illinois
San José, Costa Rica
St. Martinville, Louisiana

RESEARCH LABORATORIES

Chicago, Illinois
Cleveland, Ohio
East St. Louis, Illinois
Massena, New York
New Kensington, Pennsylvania

DISTRICT SALES OFFICES

Atlanta, Georgia
Boston, Massachusetts
Buffalo, New York
Chicago, Illinois
Cincinnati, Ohio
Cleveland, Ohio
Dallas, Texas
Detroit, Michigan
Hartford, Connecticut
Kansas City, Missouri
Los Angeles, California
Milwaukee, Wisconsin
Minneapolis, Minnesota
Newark, New Jersey
New York, New York
Philadelphia, Pennsylvania
Pittsburgh, Pennsylvania
St. Louis, Missouri
San Francisco, California
Seattle, Washington
Toledo, Ohio
Washington, D.C.

BRANCH SALES OFFICES

Akron, Ohio
Albany, New York
Allentown, Pennsylvania
Baltimore, Maryland
Birmingham, Alabama
Bridgeport, Connecticut
Charlotte, North Carolina
Chattanooga, Tennessee
Columbus, Ohio
Davenport, Iowa
Dayton, Ohio
Denver, Colorado
Evansville, Indiana
Fort Wayne, Indiana
Garden City, New York
Grand Rapids, Michigan
Houston, Texas
Indianapolis, Indiana
Jackson, Michigan
Louisville, Kentucky
Memphis, Tennessee
Miami, Florida
New Orleans, Louisiana
Oklahoma City, Oklahoma
Omaha, Nebraska
Peoria, Illinois
Pontiac, Michigan
Portland, Oregon
Providence, Rhode Island
Richmond, Virginia
Rochester, New York
San Diego, California
South Bend, Indiana
Spokane, Washington
Springfield, Massachusetts
Syracuse, New York
Tampa, Florida
Wichita, Kansas
Wilmington, Delaware
Worcester, Massachusetts
York, Pennsylvania
Youngstown, Ohio

RESIDENT SALES OFFICES

Aberdeen, South Dakota
Boise, Idaho
Des Moines, Iowa
Lafayette, Indiana
Little Rock, Arkansas
Nashville, Tennessee
Phoenix, Arizona

DISTRIBUTORS

Adam Metal Supply, Inc.
Long Island City, New York

Adam Metal Supply of New Jersey, Inc.
Elizabeth, New Jersey

Aluminum Products Hawaii, Ltd.
Honolulu, Hawaii

Brace-Mueller-Huntley, Incorporated
Buffalo, New York
Rochester, New York
Syracuse, New York

A. M. Castle & Co.
Nottingham Steel & Aluminum Div.
Cleveland, Ohio

Central Steel and Wire Company
Chicago, Illinois
Cincinnati, Ohio
Detroit, Michigan
Milwaukee, Wisconsin

The Corey Steel Company
Chicago, Illinois

Ducommun Metals & Supply Co.
Berkeley, California
Los Angeles, California
Phoenix, Arizona
San Diego, California

Eastern Metal Mill Products Company
Roxbury, Massachusetts

Eastern Metals Warehouse, Inc.
Albany, New York

Edgcomb Steel Company
Charlotte, North Carolina
Greensboro, North Carolina
Philadelphia, Pennsylvania
York, Pennsylvania

Edgcomb Steel of New England, Inc.
Nashua, New Hampshire
Slatersville, Rhode Island

Edgcomb Steel of New England, Incorporated
Milford, Connecticut

Henry B. Last
New York, New York

Hinkle Supply Company, Inc.
Birmingham, Alabama

Jones & Laughlin Steel Corporation
Kenilworth, New Jersey

Manhattan Brass & Copper Company
New York, New York

Marsh Steel Corporation
Denver, Colorado
North Kansas City, Missouri
Wichita, Kansas

Metal Goods Corporation
Dallas, Texas
Denver, Colorado
Houston, Texas
Memphis, Tennessee
New Orleans, Louisiana
North Kansas City, Missouri
St. Louis, Missouri
Tulsa, Oklahoma
Wichita, Kansas

Metal Supply Company
Philadelphia, Pennsylvania

Metal Supply, Inc.
Rochester, New York

Miller Steel Company, Inc.
Hillside, New Jersey

Ohio Metal & Manufacturing Company
Dayton, Ohio

Pacific Metal Company
Boise, Idaho
Portland, Oregon
Seattle, Washington

Pacific Metals Company, Ltd.
Los Angeles, California
Salt Lake City, Utah
San Francisco, California

Sachs Metal Supply Company
Rochester, New York

Steel Sales Co. of Indiana Inc.
Indianapolis, Indiana

Steel Sales Co. of Michigan
Detroit, Michigan

Steel Sales Co. of Minnesota
Minneapolis, Minnesota

Steel Sales Co. of Missouri, Inc.
St. Louis, Missouri

Steel Sales Co. of Wisconsin
Milwaukee, Wisconsin

Steel Sales Corporation
Chicago, Illinois

Strahs Aluminum Company, Inc.
New York, New York

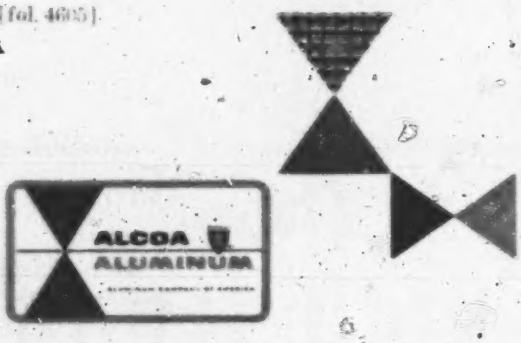
The J. M. Tull Metal & Supply Co. Inc.
Atlanta, Georgia
Birmingham, Alabama
Greenville, South Carolina
Jacksonville, Florida
Miami, Florida
Tampa, Florida

Whitehead Metals, Inc.
Baltimore, Maryland
Buffalo, New York
Cambridge, Massachusetts
Harrison, New Jersey
New York, New York
Philadelphia, Pennsylvania
Syracuse, New York
Windsor, Connecticut

Williams and Company, Incorporated
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
Louisville, Kentucky
Pittsburgh, Pennsylvania
Toledo, Ohio

Form 66-11240

[Vol. 4695]



LUMINUM COMPANY OF AMERICA, 1230 ALCOA BUILDING, PITTSBURGH 19, PENNSYLVANIA

[fol. 4606] In United States District Court

Plaintiff's Exhibit 17

Annual Report

as of March 31, 1953

Rome Cable Corporation

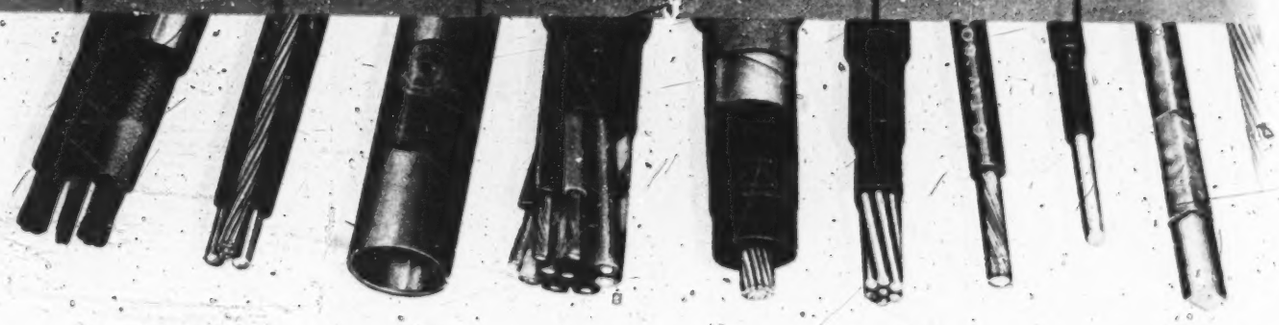
[fol. 4607]

Seventeen Years of Progress

[fol. 4608]

Year	Net Sales	Inventories	Net Working Capital	Net Investment in Plant	Total Capital Invested	Book Value Per Share of Common Stock*	Total Taxes	Net Earnings
1937	$1,798,000	$563,000	$821,000	$892,000	$1,762,000	$3.52	$16,000	$2,000
1938	4,957,000	643,000	812,000	947,000	1,833,000	3.66	65,000	71,000
1939	5,371,000	872,000	1,061,000	971,000	2,083,000	4.16	97,000	245,000
1940	6,081,000	988,000	1,141,000	1,084,000	2,306,000	4.61	123,000	298,000
1941	9,465,000	1,452,000	2,021,000	1,144,000	2,636,000	5.27	331,000	432,000
1942	11,632,000	1,146,000	2,314,000	1,159,000	3,124,000	6.24	1,051,000	592,000
1943	12,712,000	1,523,000	2,228,000	1,301,000	3,359,000	6.71	874,000	368,000
1944	16,910,000	1,566,000	2,404,000	1,288,000	3,698,000	7.39	1,619,000	467,000
1945	22,798,000	1,675,000	2,397,000	1,519,000	4,055,000	8.11	1,692,000	487,000
1946	16,975,000	2,645,000	3,420,000	1,720,000	4,338,000	8.67	760,000	399,000
1947	18,436,000	3,296,000	4,720,000	2,957,000	7,150,000	14.29	1,102,000	1,359,000
1948	25,203,000	3,658,000	3,947,000	4,168,000	7,933,000	15.86	929,000	1,132,000
1949	26,089,000	3,678,000	5,637,000	4,415,000	8,549,000	17.09	961,000	1,116,000
1950	19,603,000	4,007,000	6,206,000	5,254,000	8,761,000	17.51	426,000	302,000
1951	35,143,000	3,611,000	5,895,000	6,302,000	10,295,000	20.58	2,575,000	1,922,000
1952	42,658,000	4,938,000	5,561,000	8,027,000	11,439,000	22.87	5,268,000	1,753,000
1953	54,633,000	5,236,000	6,382,000	8,034,000	12,630,000	25.25	6,021,000	2,008,000
TOTALS	$350,464,000						$23,908,000	$13,573,000

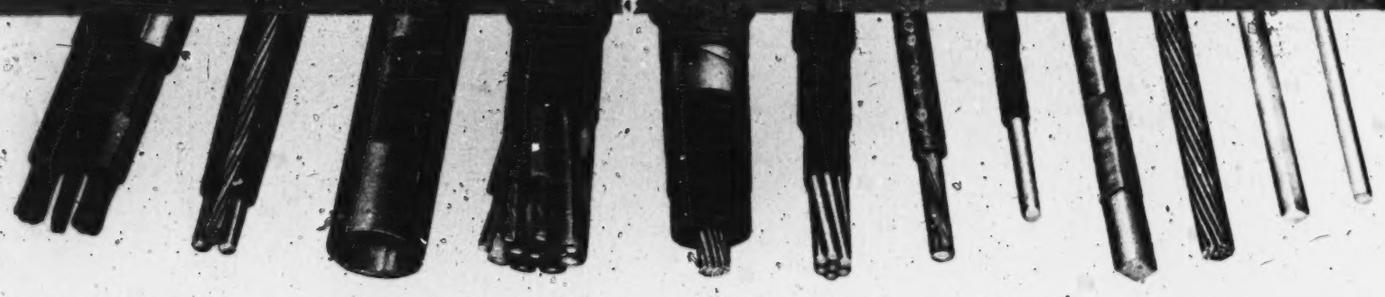
* Based on 500,373 shares outstanding on March 31, 1953.

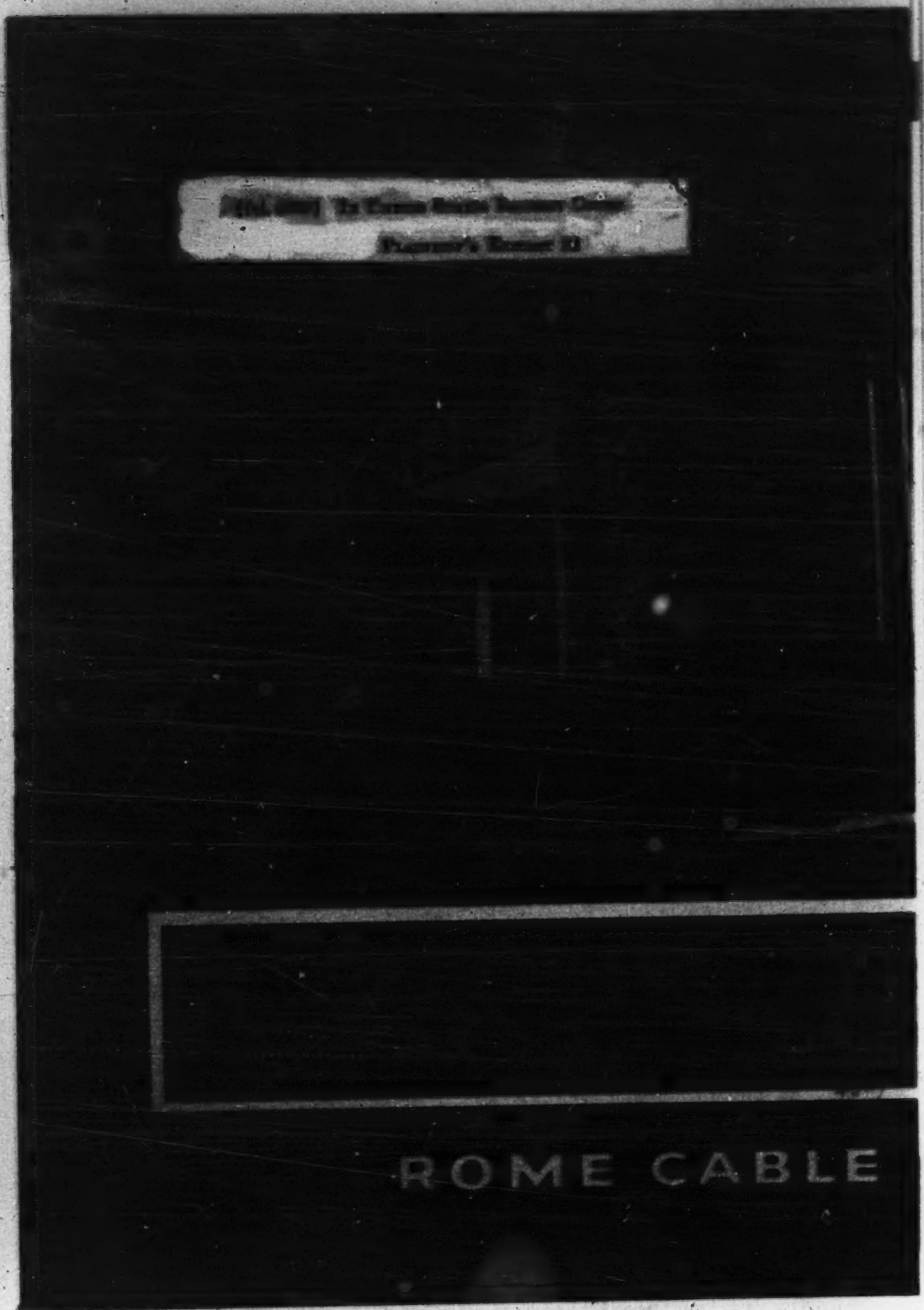


[fol. 4608]

n Years of Progress

Net Sales	Income	Net Working Capital	Net Investment in Plant	Total Capital Invested	Book Value Per Share of Common Stock*	Total Taxes	Net Earnings	Net Earnings Per Share of Common Stock*	Cash Dividends Paid	Salaries, Wages and Other Compensation
1,798,000	$563,000	$821,000	$892,000	$1,762,000	$3.52	$16,000	$2,000	—	—	$257,000
4,957,000	643,000	812,000	947,000	1,833,000	3.66	63,000	71,000	$.14	—	577,000
5,371,000	872,000	1,061,000	955,000	2,083,000	4.16	97,000	245,000	.49	—	664,000
6,081,000	988,000	1,141,000	1,084,000	2,306,000	4.61	123,000	298,000	.59	$76,000	837,000
9,465,000	1,452,000	2,021,000	1,144,000	2,636,000	5.27	331,000	432,000	.86	95,000	1,184,000
1,632,000	1,146,000	2,314,000	1,159,000	3,124,000	6.24	1,051,000	592,000	1.18	114,000	1,745,000
2,712,000	1,523,000	2,228,000	1,301,000	3,359,000	6.71	874,000	368,000	.73	114,000	2,195,000
6,910,000	1,566,000	2,404,000	1,288,000	3,698,000	7.39	1,619,000	467,000	.93	114,000	3,363,000
2,798,000	1,875,000	2,397,000	1,519,000	4,055,000	8.11	1,692,000	487,000	.97	161,000	4,073,000
6,975,000	2,645,000	3,420,000	1,720,000	4,338,000	8.67	760,000	399,000	.80	114,000	3,530,000
8,436,000	3,296,000	4,720,000	2,957,000	7,150,000	14.29	1,102,000	1,359,000	2.72	320,000	4,244,000
5,203,000	3,658,000	3,947,000	4,168,000	7,933,000	15.86	929,000	1,152,000	2.30	361,000	4,981,000
6,089,000	3,678,000	5,637,000	4,415,000	8,549,000	17.09	961,000	1,116,000	2.23	357,000	4,822,000
9,603,000	4,007,000	6,206,000	3,254,000	8,761,000	17.51	426,000	302,000	.60	291,000	3,989,000
5,143,000	3,611,000	5,895,000	6,302,000	10,295,000	20.58	2,575,000	1,922,000	3.84	430,000	5,874,000
2,658,000	4,938,000	5,561,000	8,027,000	11,439,000	22.87	5,268,000	1,753,000	3.50	539,000	7,308,000
4,633,000	5,236,000	6,382,000	8,034,000	12,630,000	25.25	6,021,000	2,008,000	4.01	647,000	8,598,000




ROME CABLE

Total Amount

IN THOUSANDS OF DOLLARS	Year Ended March 31, 1958	FIVE YEAR AVERAGES Years Ended March 31 1957	1952	1947
Net Sales	$40,615	$49,544	$29,739	$17,566
Net Earnings	1,019	1,771	1,249	616
Cash Dividends Paid	725	710	396	165
For Use in the Business, to Provide Improvements	294	1,061	853	451
Depreciation and Amortization	858	758	336	187
Added to Plant and Equipment	1,935	807	1,378	557
Net Working Capital	11,789	8,629	5,449	3,034
Share Owners' Equity	16,354	14,154	9,395	4,520
Expenditures for Employee Compensation, Pensions and Insurance	9,452	8,773	5,395	3,481

Per Share of Common Stock*

Net Earnings	$ 1.82	$ 3.17	$ 2.23	$ 1.10
Cash Dividends	1.30	1.27	.70	.29
For Use in the Business, to Provide Improvements	.52	1.90	1.53	.81
Working Capital	21.13	15.47	9.77	5.44
Share Owners' Equity	29.32	25.37	16.84	8.10
Expenditures for Employee Compensation, Pensions and Insurance	16.95	15.73	9.67	6.24

*At March 31, 1958 there were 557,802 shares outstanding. The currently outstanding shares were used for the prior five year averages.

The drastic and steady decline in world price of copper, from a high of 54 cents per pound in March 1956 down to approximately 20 cents per pound in early 1958, caused an earlier reduction in incoming order volume in the copper fabricating business than was true of industry generally. As a result, your Company's sales and earnings showed a sizable decline from the previous year.

Earnings and Financial Condition

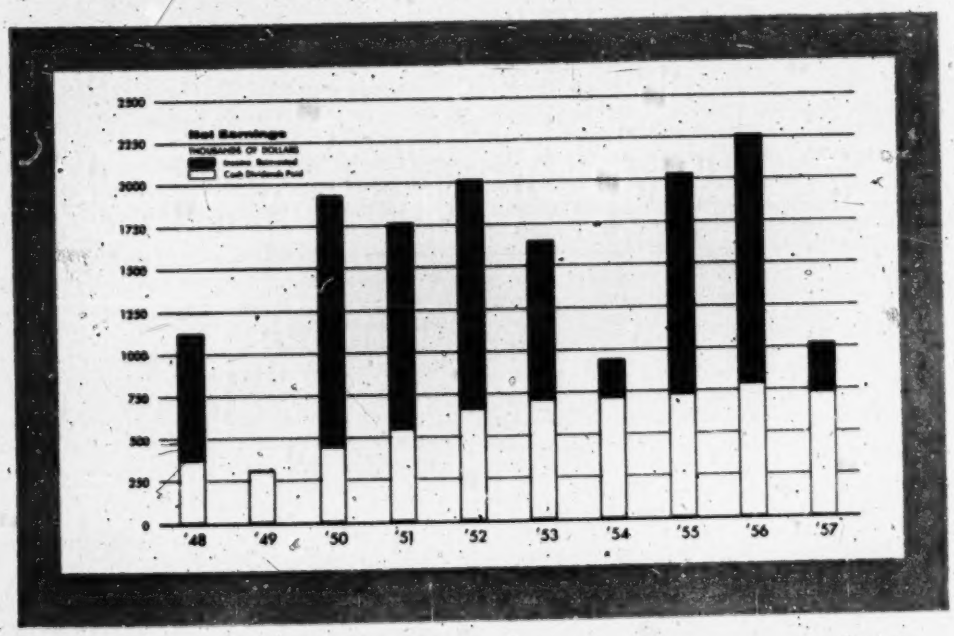
Net earnings for the year ended March 31, 1958 were $1,019,000, equal to $1.82 per share (557,802 shares outstanding) compared to $2,256,000, equal to $4.04 per share in the prior year with the same number of shares outstanding. Our strong cash position at the end of the year is reflected in an increase in working capital of $1,168,000, to a new high of $11,789,000. Fifty-two cents per share were added to share owners' equity, making the current book value $29.32 for each share of common stock outstanding, the highest in our twenty-two year history.

Earnings were affected not only by lower volume and higher labor rates, but also by several competitive price cuts which far exceeded reduction in the cost of materials.

Dividends

Dividends were paid in the amount of $1.30 per share, a total amount of $725,000 during the year.

On May 9, 1958 the Board of Directors declared consecutive dividend No. 77 at the rate of 25 cents, payable on July 1, 1958 to share owners of record June 13, 1958.



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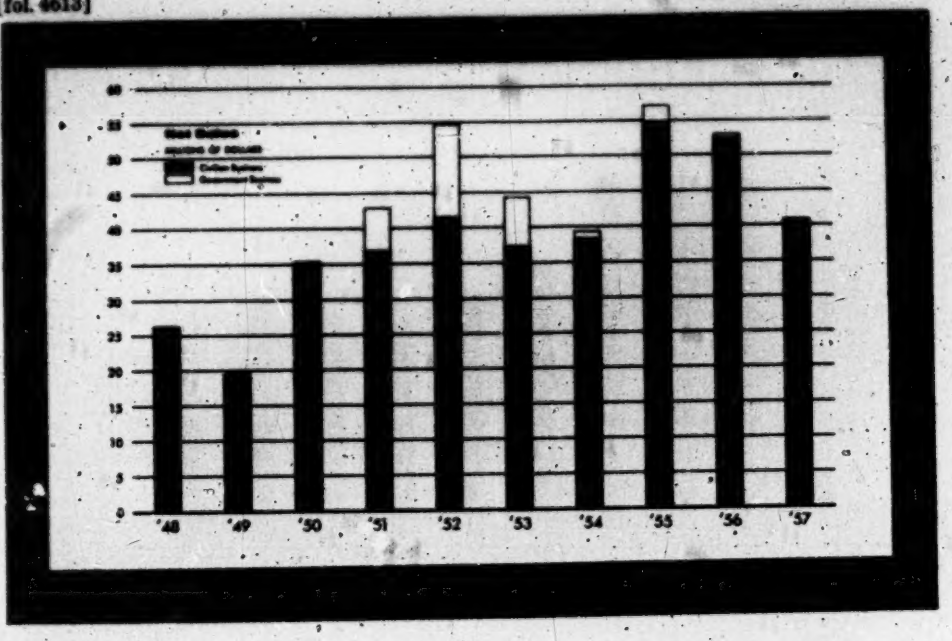


Sales

The dollar value of sales declined twenty-three per cent. Actual physical volume decline was somewhat less as falling copper prices and lower selling prices accentuated the percentage drop between the two years. Inventory liquidation by customers and decline in construction were largely responsible for the decrease.

Order backlogs declined steadily during the year. Since December, however, each month has registered a small but encouraging increase in incoming orders. April orders received were only slightly behind those of a year ago. Recent competitive selling prices in the wire and cable industry compared to those of a decade ago strongly refute government and labor's claims of price increases following wage advances. It is estimated that these unrealistic competitive price reductions affected net earnings in excess of one dollar per share.

Materials

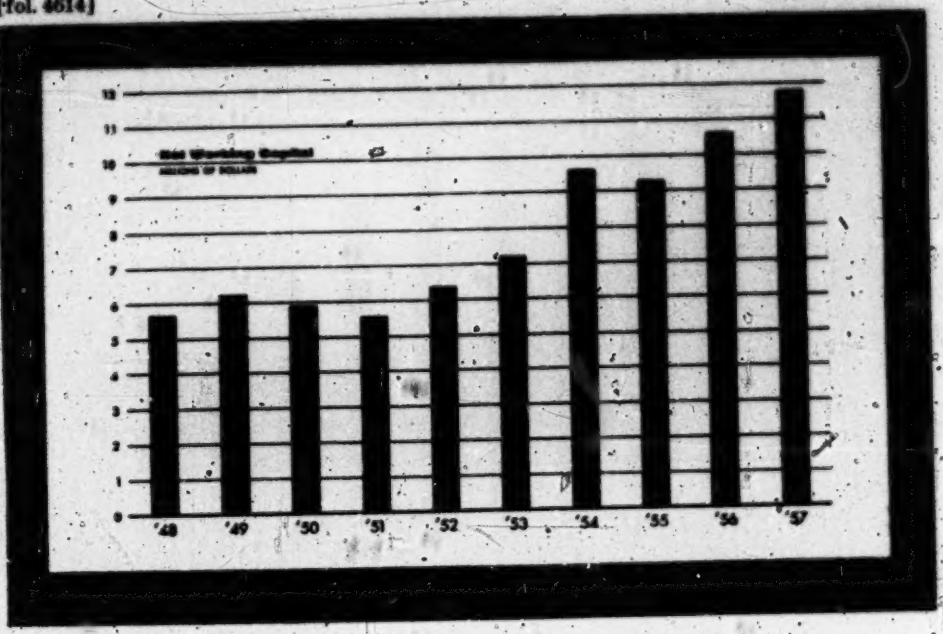
World prices for copper have remained appreciably below the domestic producer levels throughout the year. Although sizable cutbacks in production were announced at various times in the past year, U. S. refined production continued in the first quarter of 1958 at the same rate of two years ago, a time when copper fabricators were meeting an unprecedented demand. Present supplies in producers' hands have climbed to a postwar high since new mines and expanded properties have balanced the cutbacks.

Aluminum, steel and other materials are likewise in plentiful supply. Because of foreign competition it is probable that some import tax will be restored to copper after June 30th. This may stimulate some inventory replacement buying.

Labor

In April 1957 production employees of the Rome plant voted for the first time to have a union, The International Association of Machinists, as their bargaining representative. A contract was negotiated providing mainly the same terms as those previously granted voluntarily by the Company. Negotiations at Torrance with the United Steelworkers Union had similar results.

Employee relations have been harmonious despite a sizable reduction in the working force at Rome due to depressed volume.



Rome

Our Rome plant which makes wire and cable products suffered most from reduced volume and competitive price cutting, despite impressive reductions in the cost of production. Hand-to-mouth buying on a smaller scale and the multiplicity of items encouraged by the advent of new materials without adequately relinquishing the old required many uneconomical production runs to meet service demands and quality standards of customers. An incentive plan covering all production and maintenance indirect labor employees was installed and is realizing sizable savings.

Torrance

Our Torrance plant which makes conduit and steel tubing set a new record in sales volume and earnings. The improved earnings, despite increased labor and material costs, reflect the lower unit costs obtainable with increased volume and an aggressive cost reduction program.

Arrangements have been made to purchase five additional acres of land adjacent to our Torrance plant, and a program is well under way to expand our manufacturing facilities so as to be able to produce a broader range of conduit sizes.

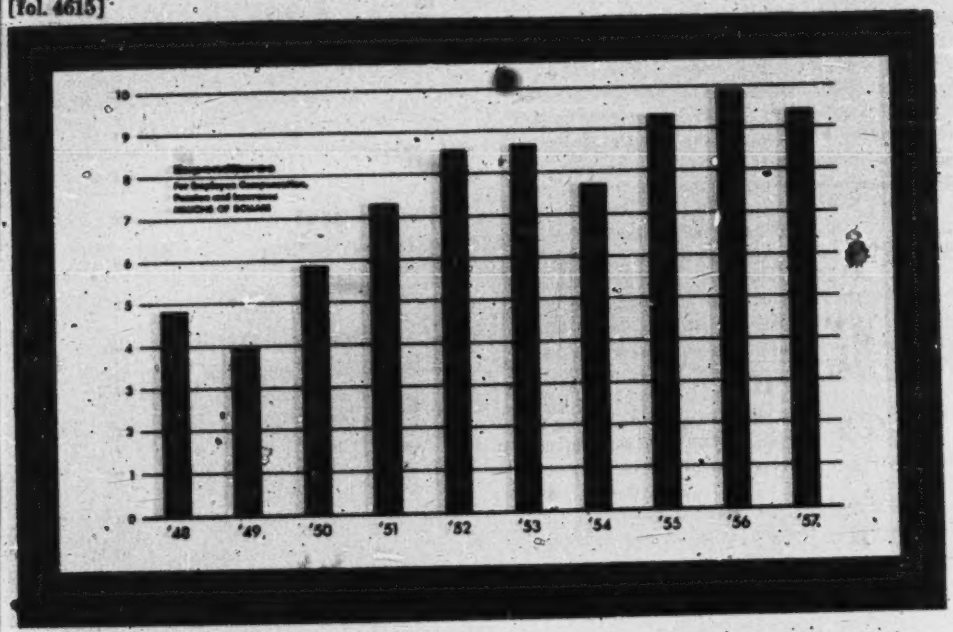
We have increased our participation in the mechanical tube market on the West Coast.

Copo

This division became a part of our Company at the beginning of the fiscal year as a further part of our policy of diversification to meet better the needs of our customers. Total sales volume set a record for this seventy-two year old Company, and earnings results warrant our faith in its potentialities. Considerable progress was made in the introduction and development of several new products, revamping of selling policies and promotional activities. While the Division is old in years, it has a young progressive organization that already works well with the parent Company.

Research and Development

In late April 1958 we started moving into our new Research Center, a picture of which is on the cover of this report. With this move in mind, certain technical personnel has been transferred to strengthen our manufacturing department for routine production control, and laboratory personnel has been re-



grouped to permit a greater amount of time for research and development activities. The move to the new laboratory provides space to bring all administrative manufacturing personnel together. The year saw further recognition of our organization's technical abilities and products by increased requests from customers to work on special projects. These involve certain utilities, industrials and government programs of a highly specialized nature, including missile and instrumentation cables. Several significant new patents have been granted. As evidence of the changing and progressive character of our business it is noted that almost forty per cent of the product sales last year were on items that we did not manufacture prior to 1950. We consider the completion of our new Research Center will stimulate future progress in the development of new products, of new and improved processes and practices.

Capital Expansion

A total of over one million nine hundred thousand dollars was expended for capital improvements. Major outlay included acquisition of our T. J. Cope Division at Collegeville, construction of our new Research Center, expanding our product range at Torrance and new stranding, flat rolling and enameling equipment at Rome. We started the manufacture of our own diamond dies in Rome during the year. Predicted improvements in quality and cost reductions have already been demonstrated even on reduced operations. Completion of some of the above installations and projected expenditures for the current year should total less than annual depreciation charges. The above planned expansion and rounding out of our product lines should stand us in good stead to meet the changing needs and potential increased demands of the future.

Long Term Loan

In order adequately to finance our capital expense program detailed elsewhere in the report, in July 1957 we paid off the balance of our former long-term loan amounting to $3,049,000 and borrowed $5,000,000 on fifteen year notes. J. P. Morgan & Co. Incorporated participated to the extent of $1,000,000 for a period of four years at 4¼% interest repayable at the rate of $250,000 per year. The Connecticut Mutual Life Insurance Company, Hartford, Conn. and Massachusetts Mutual Life Insurance Company, Springfield, Mass. participated equally in the remaining $4,000,000, and these notes bear interest at the rate of 4¾% to be retired

[fol. 4616]

after the four-year note at the rate of $300,000 per year until August 1, 1971, with the balance of $1,000,000 being due August 1, 1972. Provision is made for a sinking fund based on an earnings formula for retiring the insurance company notes at a maximum rate of an additional $100,000 per year at par starting August 1, 1958.

New York Stock Exchange

On July 24, 1957 the listing of your Company's shares was transferred from The American Stock Exchange to the New York Stock Exchange.

Rome Cable Foundation, Inc.

We contributed $40,000 to Rome Cable Foundation, Inc. compared to $100,000 a year ago. The Foundation now has resources totalling $335,000.

From Foundation funds twenty-two additional new scholarships have been granted bringing the total presently in effect to fifty-eight, of which thirty-four have been awards to relatives of employees of the Company.

Present and Future

As previously stated last year's dip in overall business, which affected our industry and our Company earlier and more severely than most industries, has slowed our growth trend. In offsetting lowered volume and more competitive pricing, cost reductions exceeding half a million dollars were made. Salary reductions effective May 1st will save an additional several hundred thousand dollars in the current year. This annual report you are reading will cost less than one-third what last year's did. Other steps have already been taken or planned for sizable cost reductions in other elements.

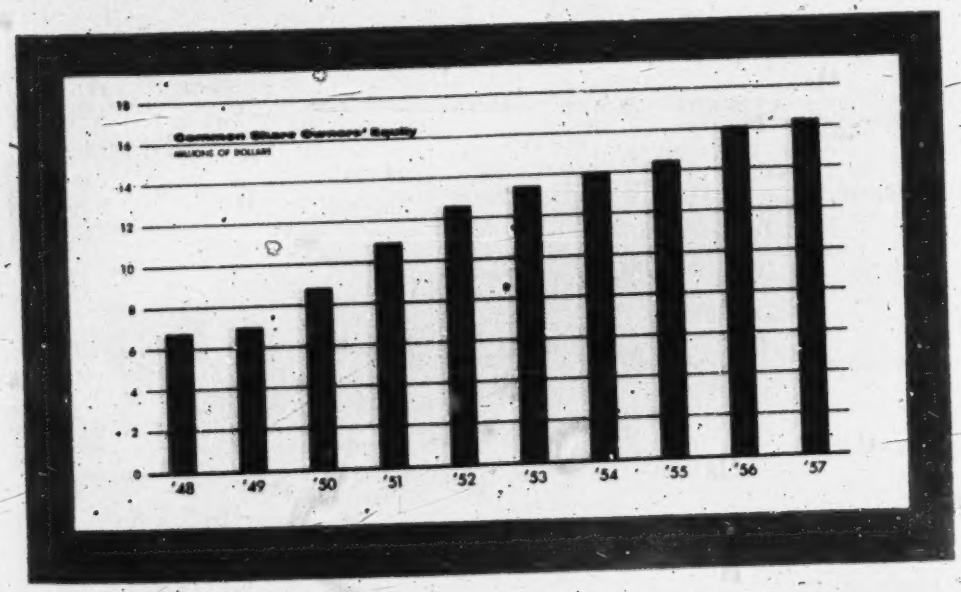
The results achieved at our Torrance and Collegeville plants at a time when our wire and cable products were suffering from lack of volume and low prices emphasize the wisdom of our diversification program. We are also carefully studying our best means of combatting rises in the cost of freight, ever increasing local and state taxes, and other manufacturing costs.

We continue to have faith in the growth of the electrical industry. Our facilities as well as the spirit of our organization should enable us to get our share in that growth.

We wish to thank the entire organization for their cooperation and teamwork during a difficult year.

On Behalf of the Board of Directors,
H. T. Dyett, *Chairman of the Board*
A. D. R. Fraser, *President*

May 22, 1958



...that Rome Cable received for its products

Rome Cable received	$40,615,000
These receipts were used	
To buy copper, steel, aluminum, rubber, plastics, textiles, etc.	23,465,000
To meet expenditures for employee compensation, pensions and insurance	9,452,000
To pay Federal, State and Local taxes	1,673,000
To provide for retiring worn out and obsolete plant and equipment	858,000
To pay other costs such as power, maintenance, supplies, insurance, advertising, interest, etc.	4,148,000
Leaving	
For dividends to Rome Cable share owners	725,000
For use in the business, to provide improvements	294,000

Distribution of Each Sales Dollar

58¢	Materials
23¢	Employee Compensation, Pensions and Insurance
10¢	Services
4¢	Taxes
2¢	Depreciation
2¢	Dividends
1¢	Maintain the Business

[fol. 4618]

ASSETS AS OF MARCH 31, 1958

CURRENT ASSETS:		
Cash		$ 4,571,808
Receivables — trade and sundry — less allowance		2,691,211
Inventories — Note A		
In process and finished goods	$ 5,397,623	
Raw materials	1,180,147	
Manufacturing supplies, etc.	336,882	6,914,652
Prepaid expenses and sundry supplies		565,775
TOTAL CURRENT ASSETS		$14,743,446
OTHER ASSETS:		
Sundry investments	$ 98,000	
Receivables from employees under stock purchase plan (18,870 shares of Common Stock held as collateral)	182,632	280,632
PLANTS AND EQUIPMENT:		
Land	$ 305,137	
Buildings	6,201,103	
Machinery and equipment	9,633,023	
Total plants and equipment — at cost	$16,139,263	
Less allowances for depreciation and amortization	7,173,697	8,965,566
		$23,989,644

NOTES TO FINANCIAL STATEMENTS

NOTE A — Inventories are stated generally at cost, and include an amount of $6,321,765 (over 90%) which was computed by the last-in, first-out method. Total inventory valuation is well below aggregate market prices.

NOTE B — The promissory notes (4¼%) provide for additional payments, due each August 1st, limited to $100,000 for each year, contingent on earnings of the preceding fiscal year, to be applied to the latest maturities of the notes.

So long as the notes are outstanding, the Company is required, among other things, to maintain net working capital (excess of current assets over current liabilities) at stipulated amounts. At March 31, 1958, net working capital exceeded such requirement by more than $4,400,000.

The terms of issuance of the notes place certain restrictions upon the payment of dividends (except stock dividends) and the redemption, retirement or purchase by the Company of its capital shares. At March 31, 1958, the portion of earnings retained in the business not affected by these restrictions was approximately $2,293,000.

[fol. 4619]

LIABILITIES AS OF MARCH 31, 1958

CURRENT LIABILITIES:		
Portion of long-term debt payable within one year		$ 350,000
Accounts payable		1,116,235
Accrued expenses		670,540
Federal taxes on income — estimated		817,754
TOTAL CURRENT LIABILITIES		$ 2,954,529
LONG-TERM DEBT — Note B:		
Promissory note (4¼ %), due in semi-annual installments of $125,000 to August 1, 1961 less $250,000 due and payable within one year and included above	$ 625,000	
Promissory notes (4¾ %), due in annual installments of $300,000 from August 1, 1962, balance due August 1, 1972, less $100,000 payable within one year and included above	3,900,000	4,525,000
RESERVE:		
For difference between cost and prices charged to customers for returnable reels, spools and cases		156,115
CAPITAL INVESTED:		
Capital Shares:		
Common Stock ($5 par value) — Note C:		
Authorized 1,200,000 shares; outstanding 557,802 shares; in treasury 34,000 shares; issued 591,802 shares	$ 2,959,010	
Additional capital paid in for stock, plus amounts transferred from earnings retained in the business	3,285,612	
	$ 6,244,622	
Earnings retained in the business — Notes B and D:		
Unappropriated	10,425,822	
Appropriated for contingencies	450,000	
	$17,120,444	
Less cost of Common Stock in treasury — 34,000 shares	766,444	16,354,000
		$23,989,644

NOTE C — At March 31, 1958, 37,800 shares of Common Stock were reserved under a Stock Option Plan for certain key employees. On June 20, 1956, options were granted to 31 officers and key employees to purchase an aggregate of 34,400 shares of Common Stock at a price equivalent to $25.57 per share (95% of fair market value at date of grant). The options, none of which had been exercised at March 31, 1958, are exercisable in cumulative annual installments and continue in force for ten years from date of grant. No options were granted during the year ended March 31, 1958.

NOTE D — Renegotiation proceedings for years up to the fiscal year ended March 31, 1953 have been concluded. It is believed that any renegotiation refunds which might be required for subsequent years would not materially affect the financial position of the Company at March 31, 1958, or earnings for the year then ended.

NOTE E — There is in effect a non-contributory pension plan for the benefit of all regular employees. The unfunded past service cost, at March 31, 1958, was approximately $2,160,000. During the year, the Company provided $348,517 under the plan, of which $130,116 was applicable to past service cost.

[fol. 4620]

YEAR ENDED MARCH 31, 1958

Net Sales	$40,614,730
Cost of products sold ($34,805,653), distribution, administrative and general expenses (including provision for depreciation and amortization of $858,193) — Note E	38,316,483
	$ 2,298,247
Interest expense ($211,365) less other income — net	202,176
	$ 2,096,071
Provision for federal taxes on income	1,077,000
NET EARNINGS FOR YEAR	$ 1,019,071

(SEE NOTES TO FINANCIAL STATEMENTS ON PAGES 8 & 9)

YEAR ENDED MARCH 31, 1958

CAPITAL SHARES:		
Balance at March 31, 1958 (no change during year) — Note C		$ 6,244,622
EARNINGS RETAINED IN THE BUSINESS — Notes B and D:		
Unappropriated:		
Balance at April 1, 1957	$10,131,893	
Add net earnings for year	1,019,071	
	$11,150,964	
Deduct cash dividends paid ($1.30 per share)	725,142	
Balance March 31, 1958	$10,425,822	
Appropriated:		
Balance at March 31, 1958 (no change during year)	450,000	10,875,822
		$17,120,444
DEDUCT:		
Cost of 34,000 shares of Common Stock in treasury		766,444
TOTAL CAPITAL INVESTED AT MARCH 31, 1958		$16,354,000

(SEE NOTES TO FINANCIAL STATEMENTS ON PAGES 8 & 9)

To The Board of Directors,
Rome Cable Corporation:

We have examined the financial statements of Rome Cable Corporation for the year ended March 31, 1958. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying statement of financial condition, operating statement and analysis of capital invested present fairly the financial position of Rome Cable Corporation at March 31, 1958, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Ernst & Ernst

New York, New York
May 6, 1958

[fol. 4621]

WORKING CAPITAL AND SHARE OWNERS' EQUITY

	MARCH 31, 1958	MARCH 31, 1957
CURRENT ASSETS:		
Cash	$ 4,571,808	$2,914,326
Receivables — less allowance	2,691,211	4,345,212
Inventories	6,914,652	7,245,818
Prepaid expenses and sundry supplies	565,775	576,692
TOTAL CURRENT ASSETS	$14,743,446	$15,082,048
LESS CURRENT LIABILITIES:		
Portion of long-term debt payable within one year	350,000	460,000
Accounts payable and accruals	1,786,775	1,967,510
Federal taxes on income — estimated	817,754	2,033,249
TOTAL CURRENT LIABILITIES	$ 2,954,529	$ 4,460,759
WORKING CAPITAL (NET CURRENT ASSETS)	$11,788,917	$10,621,289
Land, buildings, machinery and equipment, less depreciation and amortization	8,965,566	7,901,698
Sundry other assets	280,632	321,537
TOTAL WORKING CAPITAL AND OTHER ASSETS	$21,035,115	$18,844,524
LESS:		
Long-term debt	4,525,000	2,589,000
Reserve for returnable reels, spools and cases	156,115	195,453
	$ 4,681,115	$ 2,784,453
	$16,354,000	$16,060,071
SHARE OWNERS' EQUITY EVIDENCED BY:		
Common Stock ($5 par value) Issued 594,802 shares	$ 2,959,010	$ 2,959,010
Additional capital paid in for stock, plus amounts transferred from earnings retained in the business	3,285,612	3,285,612
Earnings retained in the business:		
Unappropriated	10,425,822	10,131,893
Appropriated	450,000	450,000
	$17,120,444	$16,826,515
Less cost of Common Stock in treasury	766,444	766,444
TOTAL SHARE OWNERS' EQUITY	$16,354,000	$16,060,071

22 YEARS OF GROWTH AT ROHR CORP.

Fiscal Year Ended March 31	Net Sales	Inventories	Net Working Capital	Net Investment in Plant	Total Capital Invested
1957	52,790,000	7,246,000	10,621,000	7,902,000	16,060,000
1956	56,997,000	6,980,000	9,286,000	8,172,000	14,489,000
1955	39,186,000	6,025,000	9,613,000	7,882,000	14,041,000
1954	44,115,000	5,873,000	7,242,000	7,844,000	13,552,000
1953	54,633,000	5,236,000	6,382,000	8,034,000	12,630,000
1952	42,658,000	4,938,000	5,561,000	8,027,000	11,439,000
1951	35,143,000	3,611,000	5,895,000	6,302,000	10,295,000
1950	19,603,000	4,007,000	6,206,000	5,254,000	8,761,000
1949	26,089,000	3,678,000	5,637,000	4,415,000	8,549,000
1948	25,203,000	3,658,000	3,947,000	4,168,000	7,933,000
1947	18,436,000	3,296,000	4,720,000	2,957,000	7,150,000
1946	16,975,000	2,645,000	3,420,000	1,720,000	4,338,000
1945	22,798,000	1,675,000	2,397,000	1,519,000	4,055,000
1944	16,910,000	1,566,000	2,404,000	1,288,000	3,698,000
1943	12,712,000	1,523,000	2,228,000	1,301,000	3,359,000
1942	11,632,000	1,146,000	2,314,000	1,159,000	3,124,000
1941	9,465,000	1,452,000	2,021,000	1,144,000	2,636,000
1940	6,081,000	988,000	1,141,000	1,084,000	2,306,000
1939	5,371,000	872,000	1,061,000	955,000	2,083,000
1938	4,957,000	643,000	812,000	947,000	1,833,000
1937	1,798,000	563,000	821,000	892,000	1,762,000
TOTALS	$564,167,000				

4623]

k Value Share of mmon Stock	Total Taxes	Net Earnings	*Net Earnings Per Share of Common Stock	Cash Dividends Paid	Expenditures for Employee Compensation, Pensions and Insurance
28.79	3,042,000	2,256,000	4.04	776,000	9,945,000
25.97	2,823,000	2,023,000	3.62	720,000	9,346,000
25.17	1,307,000	931,000	1.66	709,000	7,709,000
24.29	3,709,000	1,638,000	2.93	698,000	8,696,000
22.64	6,021,000	2,008,000	3.59	647,000	8,598,000
20.50	5,268,000	1,753,000	3.14	539,000	7,308,000
18.45	2,575,000	1,922,000	3.44	430,000	5,874,000
15.70	426,000	302,000	.54	291,000	3,989,000
15.32	961,000	1,116,000	2.00	357,000	4,822,000
14.22	929,000	1,152,000	2.06	361,000	4,981,000
12.81	1,102,000	1,359,000	2.43	320,000	4,244,000
7.77	760,000	399,000	.71	114,000	3,530,000
7.26	1,692,000	487,000	.87	161,000	4,073,000
6.62	1,619,000	467,000	.83	114,000	3,363,000
6.02	874,000	368,000	.65	114,000	2,195,000
5.60	1,051,000	592,000	1.06	114,000	1,745,000
4.72	331,000	432,000	.77	95,000	1,184,000
4.13	123,000	298,000	.53	76,000	837,000
3.73	97,000	245,000	.43	—	664,000
3.28	63,000	71,000	.12	—	577,000
3.15	16,000	2,000	—	—	257,000
	$36,462,000	$20,840,000	$37.24	$7,361,000	$103,389,000

*Based on 557,802 shares outstanding on March 31, 1958

C14
ROMB CABLE

[fol. 4625] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 23

Question 6

The names and locations of all companies, from whom stock or assets were acquired within the last ten years (i) by Rome and (ii) by Alcoa.

Rome

Acquisitions by Rome are:

T. J. Cope, Inc. (Assets) — Collegeville, Pa.

Andersen-Carlson Mfg. Company (Assets) — Torrance, Calif.

Note: Rome also owns some stock in American Synthetic Rubber Corporation, Louisville, Kentucky and some debentures in Mohawk Airlines, Inc., Utica, New York.

Alcoa

Acquisitions by Alcoa which relate to the business conducted by Rome are:

Aco, Socieded Anonima (Stock) (1) — Caracas, Venezuela

D.P.C. plant from War Assets Administration (Assets) (2) — Massena, N. Y.

---

(1) Alcoa, through a subsidiary, owns forty-five percent of the stock of Aco. Aco does no manufacturing. It is included here because it sells, among other products, Alcoa electrical conductor.

(2) This is a smelting plant which is now part of Alcoa's Massena Works. It is included because electrical conductor pig, which is made at this plant, is used in making conductor.

[fol. 4626] Question 11

For each product listed in your answer to question 9, give the ten principal manufacturers of similar products in the industry and their approximate share of the total sales in the various product categories. To give an accurate account, include not only Rome's and Alcoa's shares in the markets, but also those of foreign manufacturers if applicable.

It is not possible on the basis of available information to assign to individual companies approximate shares of total industry sales for the products listed in the answer to question 9, except for Alcoa and Rome; in many cases it is not even possible to indicate which of the companies manufacturing a given product are the "ten principal manufacturers." We, therefore, have prepared and enclose herewith a list for each product of all manufacturers of that product known to us and have indicated by asterisks the ones we believe are among the first ten. These lists have been compiled from information tabulated by BDSA, reinforced by our knowledge of the industry. In cases where an industry sales figure for a given product is available, we have given Alcoa's and Rome's share of that industry figure.

[fol. 4627] Manufacturers of
Bare Copper Wire & Cable

Acme Wire Co.
American Insulated Wire Corp.
American Steel & Wire Co.
•Anaconda Company
(American Brass Co. Subs.)
•Anaconda Company
(Anaconda Wire & Cable Co. Subs.)
Belden Mfg. Co.
Beryllium Corp.
(Nonotuck Mfg. Co. Subs.)
Borg-Amphenol Electronics Corp.
•Camden Wire Co.
Central Cable Corp.
Cerro de Pasco Corp.
(Circle Wire & Cable Corp. Subs.)
Collyer Insulated Wire Co.
•Colorado Fuel and Iron Corp.
(John A. Roebling's Sons Co. Subs.)
Consolidated Copper Mines Corp.
(Rockbestos Products Corp. Subs.)
Continental Copper & Steel Industries Inc.
(Hatfield Wire & Cable Co. Div.)
Copperweld Steel Co.
Crescent Company
Crescent Insulated Wire & Cable Co.
Electric Auto-Lite Co.
•Essex Wire Corp.
•General Cable Corp.
General Electric Co.
General Motors Corp.
(Packard Electric Co. Div.)
Hudson Wire Co.
International Telephone & Telegraph Corp.
(Royal Electric Co., Inc. Subs.)
International Wire Products Corp.
Jordan Wire & Cable Co.
Judd Wire Mfg. Co.
Kaiser Aluminum & Chemical Corp.

*Kennecott Copper Corp.
(Kennecott Wire & Cable, Div. of the Okonite Co. Div.)
Kennecott Copper Corp.
(Okonite Co., Div.)
Kerite Company
Laribee Wire & Equipment Corp.
Miami Copper Co.
(Chester Cable Corp. Subs.)
Narragansett Wire Co.
Narragansett Wire Co.
(Texas Wire & Cable Co. Div.)
[fol. 4628] Neptune Meter Co.
(Revere Corp. of America, Subs.)
Nesor Alloy Product Co.
New England Electric Works, Inc.
Northern Engineering and Designing Co.
Olin Mathieson Chemical Corp.
(Southern Electrical Corp., Div.)
Overlakes Corp.
(Lowell Insulated Wire Corp., Subs.)
*Phelps-Dodge Corp.
(Phelps-Dodge Copper Product Corp., Subs.)
Plastic Wire and Cable Corp.
Plastoid Corp.
H. K. Porter Co., Inc.
(National Electric, Div.)
Rea Magnet Wire Co., Inc.
Rome Cable Corporation (Est. 1957 share of total industry sales 2.1%)
Sequoia Wire & Cable Co.
Simplex Wire & Cable Corp.
Southwire Company
Spargo Wire Company
Sprague Electric Company
Suprenant Mfg. Co.
*Triangle Conduit & Cable Co., Inc.
*U. S. Steel Corp.
(American Steel & Wire Co., Div.)
Up-State Wire Co.

Utica Wire Corp.
Walker Brothers
Warren Wire Co.
Western Electric Co., Inc.
Western Insulated Wire Co.
Westinghouse Electric Corp.
Whitaker Cable Corp.
Whitney-Blake Co.

[fol. 4629] Manufacturers of
Copper Communication Wires

Alden Wire Co.
American Electric Cable Co.
American Enka Corp.—Wm. Brand Co. Inc., Subs.
American Enka Corp.—Rex Corp. Subs.
American Insulated Wire Corp.
Ampere Wire & Cable Corp.
*Anaconda Co. (Anaconda Wire & Cable Co., Subs.)
*Ansonia Wire & Cable Co., Inc.
Belden Mfg. Co.
Berkshire Electric Cable Co.
Boston Insulated Wire & Cable Co.
Colonial Wire & Cable Co.
*Colorado Fuel & Iron Co. (John A. Roebling Sons, Subs.)
Continental Wire Corp.
Essex Wire Corp. (Diamond Wire & Cable Div.)
*General Cable Corp.
General Cable Corp. (Cornish Wire Co. Inc. Subs.)
General Dynamics Corp. (Stromberg Carlson Co. Div.)
General Electric Company
General Telephone Co. (Automatic Elec. Co. Subs.)
General Telephone Co. (Leich Sales Co. Subs.)
Holyoke Insulated Wire Co.
International Telephone & Telegraph Co. (Kellogg Switchboard & Supply Co. Div.)
International Silver Co. (Times Wire & Cable Co. Subs.)
Judd Wire Mfg. Co.
*Kennecott Copper Co. (Kennecott Wire & Cable Div. of The Okonite Co. Div.)
Lenz Electric Mfg. Co.

Mohawk Wire & Cable Co.
Overlakes Corp. (Lowell Ins. Wire Div.)
Pacific Automation Co.
Paragon Wire & Cable Corp.
Phalo Plastics Corp.
*Phelps Dodge Corp. (Habirshaw Cable & Wire Co. Div.)
*Plastic Wire & Cable Corp.
Plastoid Corp.
Rome Cable Corp. (Est. 1957 share of total industry sales 0.1%)
Runzel Cord & Wire Co.
Sequoia Wire & Cable Co.
Southwire Co.
State Wire & Cable Corp.
*Superior Cable Corp.
Suprenant Mfg. Co.
Victor Electric Wire & Cable Co.
*Western Electric Co. Inc.
*Whitney-Blake Co.

[fol. 4630] Manufacturers of
Copper Appliance Wire and Flexible Cords

Triple A Wire Works, Inc.
Advance Ins. Wire Co.
American Electric Cable Co.
American Electrical Heater Co.
*American Enka Corp.
(Wm. Brand & Co., Inc. Subs.)
American Insulated Wire Corp.
American Wire & Cable Co., Inc.
Ames Mfg. Corp.
Anaconda Company
(Anaconda Wire & Cable Co. Div.)
Ansonia Wire & Cable Co., Inc.
Apex Wire & Cable Corp.
Atlantic Wire & Cable Co.
*Belden Mfg. Co.
Boston Insulated Wire & Cable Co., Inc.
Cerro de Pasco Corp.
(Circle Wire & Cable Corp. Subs.)
Cleveland Insulated Wire Co.

Coast Cable Corp.
Collyer Insulated Wire Co.
Colorado Fuel & Iron Corp.
(J. A. Roebling & Sons Co. Subs.)
Consolidated Coppermines Corp.
(Rockbestos Products Corp. Subs.)
Continental Steel & Copper Industries, Inc.
(Hatfield Wire & Cable Co. Div.)
Continental Wire Corp. of Connecticut
Corona Insulated Wire Co.
Crescent Company, The
(Carol Cable Co. Div.)
*Crescent Insulated Wire & Cable Co.
Dixie Wire Corp.
Eagle Electric Mfg. Co.
Eastern Insulated Wire Corp.
Electric Auto-Lite Co.
Electric Parts Corp.
Essex Wire Corp.
(Carolina Industrial Plastics Corp. Div.)
Essex Wire Corp.
(Diamond Wire & Cable Co. Div.)
*Essex Wire Corp.
(Paranite Wire & Cable Co. Div.)
Gavit Wire & Cable Co.
*General Cable Corp.
*General Electric Co.
General Motors Corp.
(Packard Electric Co. Div.)
Good-Lite Electric Mfg. Co.
[fol. 4631] Jemco Insulated Wire Co.
Hi-Temp Wires, Inc.
Holyoke Wire & Cable Corp.
International Silver Co.
(Times Wire & Cable Co. Subs.)
*International Telephone & Telegraph Corp.
(Royal Electric Corp. Div.)
*Kaiser Aluminum & Chemical Corp.
Kennecott Copper Corp.
(The Okonite Co. Div.)
Miami Copper Co.
(Chester Cable Corp. Subs.)

Montrose Products Co.
Narragansett Wire Co.
Ohio Wire & Cable Corp.
Phalo Plastics Corp.
Phelps Dodge Corp.
(Habirshaw Cable & Wire Co. Subs.)
Philadelphia Ins. Wire Co.
Plastic Wire & Cable Corp.
Plastoid Corp.
H. K. Porter Co., Inc.
(National Electric Co. Div.)
Radix Wire Co.
Rego Insulated Wire Co.
Rome Cable Corp. (Est. 1957 share of total industry sales 0.7%)
Safety Insulated Wire & Cable Corp.
Simplex Wire & Cable Co.
Suprenant Mfg. Co.
Tech Wire Associates, Inc.
Tevco Insulated Wire
Triangle Conduit & Cable Co.
Trio Wire & Cable Corp.
U. S. Steel Corp.
(American Steel & Wire Co. Div.)
U. S. Wire & Cable Co.
Victor Electric Wire & Cable Co.
Walker Brothers
Waterbury Products Corp.
Welcraft Products Co.
*Western Insulated Wire Co.
Whitaker Cable Corp.
*Whitney Blake Co.
(Koiled Kords Co. Div.)
Woodhead Co.

[fol. 4632] Manufacturers of
Other Copper Insulated Wire & Cable

Ace Wire Mills
Acme Wire Co.
Advance Insulated Wire Co.

A-K Mfg. Co.
American Electric Cable Co.
American Enka Corp.
(Wm. Brand & Co. Subs.)
American Enka Corp.
(Rex Corp. Subs.)
American Electric Cable Co.
American Insulated Wire Corp.
Amphenol Electronics Corp.
Ampere Wire & Cable Corp.
*Anaconda Co.
(Anaconda Wire & Cable Co. Subs.)
Ansonia Wire & Cable Co., Inc.
Apex Wire & Cable Corp.
Atlantic Wire & Cable Co.
Belden Mfg. Co.
Berkshire Electric Cable Co.
Boston Insulated Wire & Cable Co., Inc.
Bradford Kyle & Co.
Bridgeport Insulated Wire
C & W Insulated Wire Co.
Calcon Mfg. Co.
Central Cable Corp.
Cerro De Pasco Corp.
(Circle Wire & Cable Corp. Subs.)
Cleveland Insulated Wire Co.
Coast Cable Co.
Collyer Insulated Wire Co.
Colonial Wire & Cable Co.
Colorado Fuel & Iron Co.
(John A. Roebling Sons' Co. Subs.)
Columbia Cable & Electric Corp.
Consolidated Coppermines Corp.
(Rockbestos Products Co. Subs.)
*Continental Copper & Steel Industries, Inc.
(Hatfield Wire & Cable Div.)
Continental Wire Corp. of Connecticut
Corona Insulated Wire Co.
Crescent Co.
Crescent Co. (Carol Cable Co., Div.)
Crescent Insulated Wire & Cable Co.
Dielectric Materials Co.

Eastern Insulated Wire Co.
Electric Auto-Lite Co.
Electric Parts Corp.
Essex Wire Corp.
(Diamond Wire & Cable Co. Div.)
Essex Wire Corp.
(Paranite Wire & Cable Co. Div.)
Essex Wire Corp.
(Carolina Industrial Plastics Corp. Div.)
Ettco Wire & Cable Corp.
Gavitt Mfg. Co.
*General Cable Corp. (Alphaduct Wire & Cable Co. Subs.)
*General Cable Corp. (Cornish Wire Co. Subs.)
*General Cable Corp. (General Ins. Wire Works, Inc. Subs.)
*General Cable Corp. (New England Cable Co. Subs.)
*General Electric Co.
General Motors Corp.
(Packard Electric Co. Div.)
General Telephone Co.
(Automatic Electric Co. Div.)
Good, Don, Inc.
Good-Lite Electric Mfg. Co.
Gordon, Claud S. Co.
Hi-Temp Wires, Inc.
Holyoke Wire & Cable Corp.
Hudson Wire Co.
Imperial Wire Co., Inc.
International Silver Co.
(Times Wire & Cable Co. Div.)
International Tel. & Tel. Corp.
(Kellogg Switchboard & Suppiy Co. Div.)
Judd Wire Mfg. Co.
*Kaiser Aluminum & Chemical Corp.
*Kennecott Copper Corp.
(Kennecott Wire & Cable Co. Div. of the Okonite Co. Div.)
Kerite Co.
Kerrigan-Lewis Mfg. Co.
Lenz Electric Mfg. Co.
Lewis Engineering Co.

Magnet Wire Co.
McGraw-Edison Co.
(National Elec. Coil Co. Subs.)
Miami Copper Co.
(Chester Cable Co. Subs.)
Miller Electric Co.
Montrose Products Co.
Narraganset Wire Co.
Narraganset Wire Co. (Texas Wire & Cable Co. Div.)
New England Elec. Works, Inc.
Olin Mathieson Chemical Corp.
(Southern Electrical Corp. Div.)
Overlakes Corp.
(Lowell Insulated Wire Div.)
Paragon Wire & Cable Corp.
Phalo Plastics Corp.
*Phelps Dodge Corp. (Habirshaw Cable & Wire Corp. Subs.)
Philadelphia Insulated Wire Co.
Plastic Wire & Cable Corp.
Plastoid Corp.
[fol. 4633] H. K. Porter Co.
H. K. Porter Co.
(National Elec. Subs.)
Radio Wire Mfg. Corp.
Radix Wire Co.
Rea Magnet Wire Co., Inc.
Rego Electric Co.
Revere Corp. of America (Div. Neptune Meter Co.)
Rome Cable Corp. (Est. 1957 share of total industry sales 2.0%)
Royal Electric Co., Inc. (Div. of IT&T Corp.)
Runzel Cord & Wire Co.
Sequoia Wire & Cable Co.
*Simplex Wire & Cable Corp.
Slepian, Arthur & Co.
Southwire Co.
Sprague Electric Co.
Standard Wire Co.
Starring & Co., Inc.
State Wire & Cable Corp.
Suflex Corp.

Suprenant Mfg. Co.
Tensolite Insulated Wire Co.
Tevco Insulated Wire
Thermo Electric Co.
*Triangle Conduit & Cable Co., Inc.
Trip Wire & Cable Corp.
Union Plastics Corp.
United States Steel Corp.
(American Steel & Wire Co. Div.)
U. S. Wire & Cable Co.
Vector Mfg. Co.
Victor Electric Wire & Cable Co.
Viking Wire Co.
Walker Brothers
Warren Wire Co.
Western Electric Co., Inc.
Western Insulated Wire Co.
Westinghouse Elec. Corp.
Wheeler Insulated Wire Co., Inc.
Whitaker Cable Corp.
Whitney-Blake Co.

[fol. 4634] Producers of
E. C. Aluminum Pig and Ingot

Alcoa
Aluminium Limited
Anaconda Company
Harvey Aluminum Company
Kaiser Aluminum & Chemical Corporation
Ormet Corporation
Reynolds Metals Company
Various Foreign Sources

[fol. 4635] Manufacturers of
E. C. Aluminum Redraw Rod

Alcoa
Anaconda Company
Essex Wire Company
General Cable Corporation
Kaiser Aluminum & Chemical Corporation
Olin Mathieson Chemical Corporation

Reynolds Metals Company
Rome Cable Corporation
Southwire Company

[fol. 4636] Manufacturers of Copper Rods

American Brass Company
Anaconda Wire & Cable Company
Circle Wire & Cable Company
Essex Wire Corporation
General Cable Corporation
Kennecott Copper Corporation
Phelps Dodge Copper Products Company
John A. Roebling's Sons Corporation
Rome Cable Corporation
Triangle Conduit & Cable Company

[fol. 4637] Manufacturers of
Bare Aluminum Wire and Cable and ACSR

*Alcoa (est. 1958 share of total industry sales 31.7%)
*Anaconda Co. (The Anaconda Wire & Cable Co.)
*Central Cable Corporation
*Essex Wire and Cable Company
*General Cable Corporation
*Kaiser Aluminum & Chemical Corporation
*Nehring Electrical Works
*Olin Mathieson Chemical Corp. (Southern Electrical Corp.)
*Reynolds Metals Company
Rome Cable Company (est. 1958 share of total industry sales 0.3%)
*Southwire Company

[fol. 4638] Manufacturers of
Aluminum Insulated Wire and Cable

*Alcoa (est. 1958 share of total industry sales 11.3%)
*Anaconda Co. (The Anaconda Wire & Cable Co.)
Belden Manufacturing Company
*Central Cable Corporation
Cerro de Pasco Corp. (Circle Wire & Cable Corp.)

Collyer Insulated Wire Company
Crescent Insulated Wire & Cable Company
Electric Auto-Lite Company
*Essex Wire & Cable Company
*General Cable Corporation
General Electric Company
General Motors Corporation (Packard Electric)
Hendrix Wire & Cable Corporation
Hudson Wire Company
*Kaiser Aluminum & Chemical Corporation
Kennecott Copper Corp. (Kennecott Wire & Cable Co., incl. Okonite)
Kerite Company
Leviton Mfg. Co. (American Insulated Wire Corp.)
Narragansett Wire Company
Nehring Electric Works
*Olin Mathieson Chemical Corp. (Southern Electrical Corp.)
Plastoid Corporation
H. K. Porter Company (National Electric Products Corp.)
Rea Magnet Wire Company
*Reynolds Metals Company
Roebling's (John A.) Sons Company
*Rome Cable Corporation (est. 1958 share of total industry sales 4.6%)
Simplex Wire & Cable Company
*Southwire Company
Suprenant Manufacturing Company
Triangle Conduit & Cable Company, Inc.
Walker Brothers
Western Electric Company
Westinghouse Electric Corporation

[fol. 4639] Manufacturers of Steel Conduit

Armco Steel Corp.
(Spang, Chalfant Div.)
Cerro De Pasco Corp.
(Circle Wire & Cable Co. Subs.)
Clayton-Mark & Co.

Columbia Cable & Electric Corp.
General Cable Corp.
(Clifton Conduit Co. Div.)
General Electric Co.
Laclede Steel Co.
Nikoh Tube Co.
Pittsburgh Standard Conduit Co.
H. K. Porter Co.
(National Elec. Div.)
Republic Steel Corp.
Rome Cable Corporation (Est. 1957 share of total industry sales 2.4%)
The Steelduct Company
Triangle Conduit & Cable Co.
Walker Brothers
Westmoreland Metal Mfg. Co.
Youngstown Sheet & Tube Co.

[fol. 4640] Manufacturers of
Cable Accessories for Aluminum Conductor

Alcoa
Anderson Electric Company
Jasper Blackburn Corporation
Burndy Engineering Company
A. B. Chance Company
Dossert & Company
James R. Kearney Corporation
Ohio Brass Company
Penn Union Electric Corporation
Reliable Electric Company
The Thomas & Betts Company, Inc.

[fol. 4641] Manufacturers of Aluminum Conduit

Alcoa
Kaiser Aluminum & Chemical Corporation
Reynolds Metals Company

[fol. 4642] Manufacturers of Cable Troughs

Chalfant Products Co.
De Vois Engineering Co.
ETS, Hokin & Galvin Co.
Globe Mfg. Co.
Husky Products Co.
H. K. Porter Co., Inc.
(Delta Star Electric Co., Inc. Div.)
P. W. Mfg. Co.
Rome Cable Corporation

[fol. 4643]

18. Describe the extent, if any, to which (i) Rome and (ii) Rome's competitors now supply and for the last five years have supplied, materials to Alcoa, listing the products supplied by each and the quantity and dollar volume thereof in each year.

18 i - Extent Rome Cable Corporation Supplied Alcoa.

	PRODUCT CLASSIFICATION								
	Bare Aluminum Wire and Cable		Bare Copper Wire and Cable		Insulated Aluminum Wire and Cable		Insulated Copper Wire and Cable		Insulation of Alcoa Aluminum Wire & Cable		
YEAR	QUANTITY	VALUE	QUANTITY	VALUE	QUANTITY	VALUE	QUANTITY	VALUE	QUANTITY	VALUE	TOTAL VALUE
1954					238,000 ft.	$ 32,675	10,500 ft.	$ 162	2,349,000 lb.	$ 852,000	$ 884,839
1955			10,000 ft.	$ 2,521	938,855 ft.	$ 52,980	20,500 ft.	$ 4,420	4,120,000 lb.	$1,571,000	$1,640,921
1956			35,500 ft.	$18,215	1,599,496 ft.	$ 59,265	52,000 ft.	$12,739	5,755,700 lb.	$2,004,000	$2,094,219
1957	3,500 ft.	$ 40	14,400 ft.	$ 4,973	4,789,926 ft.	$353,941	13,250 ft.	$ 3,186	2,381,000 lb.	$ 940,000	$1,302,140
1958	51,100 ft.	$1,061	5,500 ft.	$ 1,300	776,340 ft.	$ 41,581	44,555 ft.	$ 6,300	1,993,000 lb.	$ 821,000	$ 871,157

18 ii - Extent Rome Cable Corporation's Competitors Supplied Alcoa.

	PRODUCT CLASSIFICATION								
	Bare Aluminum Wire and Cable		Bare Copper Wire and Cable		Insulated Aluminum Wire and Cable		Insulated Copper Wire and Cable		
YEAR	QUANTITY	VALUE	QUANTITY	VALUE	QUANTITY	VALUE	QUANTITY	VALUE	TOTAL VALUE
1954									
Anaconda					3,000 ft.	$ 4,319			$ 4,319
General Cable					1,800 ft.	2,700			$ 2,700
General Electric									
Nehring									
Okonite (Kennecott)					94,000 ft.	12,367	10,000 ft.	$7,644	$ 20,011
Simplex									
U.S.Rubber (Kaiser)					2,750,000 ft.	$114,182	106,000 ft.	$9,564	$ 123,746

[fols. 4644-4645]

(ii) Rome's competitors, now supply and for the last five years have supplied, materials to Alcoa, listing the products supplied by each and the quantity and dollar volume thereof in each year.

18 ii Continued

YEAR	PRODUCT CLASSIFICATION 1. Bare Aluminum Wire and Cable QUANTITY	VALUE	2. Bare Copper Wire and Cable QUANTITY	VALUE	3. Insulated Aluminum Wire and Cable QUANTITY	VALUE	4. Insulated Copper Wire and Cable QUANTITY	VALUE	TOTAL VALUE
1955									
Anaconda							10,500 ft.	$ 4,216	$ 24,028
General Cable					86,000 ft.	$ 19,812	8,000 ft.	$ 2,337	$ 2,337
General Electric							650 ft.	$ 325	$ 68,240
Mehring					82,875 ft.	$ 67,915			
Okonite (Kennecott)									
Simplex					3,758,000 ft.	$230,392	156,000 ft.	$15,262	$245,654
U.S.Rubber (Kaiser)									
1956									
Anaconda			4,600 ft.	$ 311			2,000 ft.	$ 789	$ 1,100
General Cable					22,500 ft.	$ 6,751	26,550 ft.	$ 3,193	$ 9,944
General Electric			5,000 ft.	$1,385					$ 1,385
Mehring					542,000 ft.	$177,940	12,500 ft.	$ 5,376	$183,316
Okonite (Kennecott)					1,350 ft.	$ 1,575	500 ft.	$ 2,632	$ 4,207
Simplex					3,587,000 ft.	$374,000	197,000 ft.	$16,336	$390,336
U.S.Rubber (Kaiser)									
1957									
Anaconda					,936,000 ft.	$246,394			$246,394
General Cable					125,000 ft.	$ 93,338	8,200 ft.	$ 3,740	$ 97,078
General Electric			11,500 ft.	$3,428					$ 3,428
Mehring					750,000 ft.	$176,585	27,000 ft.	$15,157	$191,742
Okonite (Kennecott)					16,800 ft.	$ 44,239	11,000 ft.	$ 2,486	$ 46,715
Simplex					400,000 ft.	$ 21,111	87,000 ft.	$ 2,746	$ 23,857
U.S.Rubber (Kaiser)									
1958									
Anaconda							2,000 ft.	$ 692	$ 692
General Cable					50,000 ft.	$ 19,476	21,000 ft.	$ 2,673	$ 22,149
General Electric									
Mehring					285,000 ft.	$ 12,776	9,600 ft.	$17,989	$ 30,765
Okonite (Kennecott)									
Simplex					2,200 ft.	$ 775	25,000 ft.	$ 925	$ 1,600
U.S.Rubber (Kaiser)									

1528

[fol. 4646] IN UNITED STATES DISTRICT COURT
PLAINTIFF'S EXHIBIT 27

Question 3. For each of the years 1953 through 1958 and for each quarterly period in 1959, state:

(a) The total quantity and dollar value of aluminum E.C. Redraw Rod manufactured by Rome.

Redraw Aluminum Rod Manufactured

	Total Production	Value*
1953	982,967 lbs.	$ 260,486
1954	1,818,226	485,466
1955	3,259,250	977,775
1956	4,778,372	1,570,651
1957	3,796,028	1,300,140
1958	3,360,216	1,114,584
1st Q. 1959	946,117	306,060
2nd Q. 1959	1,105,760	357,271

*Value shown is derived for 1953 and 1954 by multiplying production by annual average market price, because Rome sold no rods for these years, and for other years by multiplying production by annual average sales price.

(b) The total quantity and dollar volume of aluminum E.C. Redraw Rod purchased by Rome from other companies, giving a breakdown showing the name and address of, and the quantity and dollar volume purchased from each such other company.

	Purchased Rods	Seller
1953	100,423 lbs.	$ 26,310 Alcoa
1954	483,845	127,511 Alcoa
	3,982	1,102 Aluminium Ltd. Sales
1956	150,936	43,433 Kaiser Aluminum Co.
1957	442	161 Reynolds Metal Co.

(c) The quantity and dollar value of aluminum E.C. Redraw Rod used by Rome in the manufacture of wire and cable.

Rod Used by Rome Cable Corp. in Manufacture of Wire and Cable

		Value*
1953	1,083,390 lbs.	$ 287,098
1954	2,302,686	614,817
1955	3,254,470	976,341
1956	4,790,229	1,574,548
1957	3,378,150	1,157,016
1958	2,972,748	986,061
1st Q. 1959	843,245	272,790
2nd Q. 1959	957,805	309,467

*Value shown is derived for 1953 and 1954 by multiplying production by annual average market price, because Rome sold no rods for these years, and for other years by multiplying production by annual average sales price.

[fol. 4647] (d) The total quantity and dollar volume of aluminum E.C. Redraw Rod sold by Rome to other companies, giving a breakdown showing (i) the name and address of, and the quantity and dollar volume sold to each such other company and (ii) the quantity and dollar volume of shipments to each state and to Canada.

Aluminum Rods Sold

	1953	None	
	1954	None	
	1955	4,780 lbs.	$ 1,434
	1956	139,079	45,854
	1957	417,878	143,138
	1958	387,468	128,531
1st Q.	1959	102,872	33,275
2nd Q.	1959	147,955	47,799

Aerofin Corporation—Syracuse, N. Y.

	1956	124,191	40,641
	1957	341,296	116,530
	1958	372,559	123,261
1st Q.	1959	89,266	28,744
2nd Q.	1959	133,666	43,040

Westinghouse Electric Corp. Buffalo, N. Y.

	1955	4,780	1,434
	1956	—	—
	1957	—	—
	1958	4,884	1,627
1st Q.	1959	13,606	4,531
2nd Q.	1959	14,289	4,759

Central Cable Corporation—Jersey Shore, Pa.

	1957	65,356	22,613
	1958	10,025	3,643

Phillips Electrical Works—Brockville, Canada

	1957	10,074	3,606

[fol. 4648]

Carrier Corporation—Syracuse, N. Y.

	1957	1,152 lbs.	389

General Cable Corporation—Perth Amboy, N. J.

	1956	14,829 lbs.	5,195

Revere Copper & Brass—Rome, N. Y.

	1956	59	18

Rod Sales—By State

	1955	New York	4,780 lbs.	$ 1,434
	1956	New York	124,250	40,659
		New Jersey	14,829	5,195
	1957	New York	342,448	116,919
		Penna.	65,356	22,613
		Canada	10,074	3,606
	1958	New York	377,443	124,888
		Penna.	10,025	3,643
1st Q.	1959	New York	102,872	33,275
2nd Q.	1959	New York	147,955	47,799

[fol. 4649] 13. (a) List the machinery and equipment for the manufacture of rod which can be used interchangeably in the manufacture of aluminum E.C. Redraw Rod and copper rod.

(b) To the extent that machinery or equipment for the manufacture of rod cannot be used interchangeably, please explain what steps would be necessary including the economic factors involved,

(i) to convert machinery or equipment for the making of aluminum E.C. Redraw Rod to machinery or equipment for the making of copper rod;

(ii) to convert machinery or equipment for the making of copper rod to machinery or equipment for the making of aluminum E.C. Redraw Rod; and

(iii) to convert machinery or equipment to make both aluminum E.C. Redraw and copper rod.

(a) None

(b) (i) Equipment cannot be converted

(ii) Copper rod rolling mill could be converted but only upon a basis which would be completely uneconomic. Under present known circumstances, no one would make the decision to do this. Moreover, any such conversion would mean the loss of all copper rod production capacity, since the equipment could not be used interchangeably.

(iii) For the reasons given in (b i) and (b ii) above this would be impossible, impractical or uneconomic.

[fol. 4650] 14. Describe Rome's machinery and equipment used at any time for the manufacture of copper rod which also has been used at any time since January 1, 1953 for the manufacture of aluminum rod.

None

[fol. 4651] 15. (a) List the machinery and equipment for the manufacture of wire and cable which can be used interchangeably in the manufacture of aluminum wire and cable and the manufacture of copper wire and cable.

(b) To the extent that machinery or equipment for the manufacture of wire or cable cannot be used interchangeably, please explain what steps would be necessary, including the economic factors involved.

(i) to convert machinery or equipment for the making of aluminum wire and cable to machinery or equipment for the making of copper wire and cable;

(ii) to convert machinery or equipment for the making of copper wire and cable to machinery or equipment for the making of aluminum wire and cable; and

(iii) to convert machinery or equipment to make both aluminum wire and cable and copper wire and cable.

(a) Bare Wire—

(4) Flat Rolling Machines
(10) Small Larmouth Type Strand-ers
(5) Large Larmouth Type Strand-ers
(1) Large Rigid Frame Strander
(11) New England Butt Bunch Stranders
(7) Haskell Dawes Bunch Strand-ers
(1) 61 Bobbin Watson Strander

Magnet Wire—

(12) Horizontal Cotton and Paper Covering Machines
(2) 10 Spindle Vertical Cotton Covering Machines
(1) Heavy Asbestos Covering Ma-chine
(7) Horizontal Glass Covering Ma-chines
(1) 8 Spindle Vertical Glass Cover-ing Machine
(1) Heavy 5 Wire Enamelling Unit
(1) Heavy 6 Wire Enamelling Unit

Weatherproof—	(4) Cable Braiders
	(12) Sinfra Knitters
	(3) Saturating Units
	(2) Large Finishing Units
	(1) Small Finishing Unit
Rubber Covered—	(3) 3¼" Rubber Type Insulating Machines
	(2) 3½" Rubber Type Insulating Machines
	(4) 4½" Rubber Type Insulating Machines
	(2) 6" Rubber Type Insulating Machines

[fol. 4652]

Plastic Dept.—	(4) 1½" Plastic Insulating Machines
	(1) 2½" Plastic Insulating Machines
	(2) 3¼" Plastic Insulating Machines
	(3) 4½" Plastic Insulating Machines
	(1) 6" Plastic Insulating Machines

In addition to the above we have secondary or supplemental equipment or machinery as follows:

Bare Wire—	(17) Electric Annealing Pots
	(4) Water-Seal Annealing Furnaces
Magnet Wire—	None
Weatherproof—	None
Rubber Covered—	(4) Small Wire Twisters
	(1) Large 37 Bay Cabler
	(1) 48 Bay Cabler
	(1) Large 7 Wire Cabler
	(2) 30" Cord Twisters
	(1) 44" Cable Twister
	(1) Reverse Lay Cabler
	(1) Service Entrance Cable Machine
	(2) Taping Machines
	(2) Lead Extruders

(2) Saturating Machines
(2) Finishing Machines
(4) Water Test Tanks
(4) Horizontal Vulcanizers
(2) Dome Vulcanizers
(1) 8 Spindle Lacquer Tower
(141) Small Braiders
(7) Cable Braiders
(2) Rubber Banburys

Plastic Dept.— (2) Non Metallic Sheath Cable Finishers
(24) Non Metallic Sheath Cable Braiders
(16) Non Metallic Sheath Cable Paper Wrap Machines
(8) Striping Machines
(1) Small Edmands Twister
(1) Large Edmands Twister
(3) Water Test Tanks
(1) Plastic Banbury

b (i) To convert (1) Heavy Intermediate Aluminum Rod Drawing machine and (1) Heavy Aluminum Rod Drawing machine would necessitate the following:

(1) A new motor on the Heavy Intermediate Machine—
(2) A new motor on the Heavy Rod Drawing Machine—
(3) Change the type of drawing lubricant.

[fol. 4653] Note: Due to the condition of these machines, speeds would have to be reduced to the point where they would be uneconomical to run.

b (ii) Would necessitate changing the type of drawing lubricant on all copper drawing machines:

(2) Heavy Intermediate Machines
(4) Light Intermediate Machines
(4) Heavy Rod Drawing Machines
(1) Bull Block
(29) Fine Wire Machines

b (iii) Would have to install a copper drawing lubricant system at the aluminum drawing machines (b (i) above) and would have to install an aluminum drawing lubricant system at the copper drawing machines (b (ii) above). Quality of both copper and aluminum products would be adversely affected.

[fol. 4654] 16. Describe Rome's machinery and equipment, used at any time for the manufacture of copper wire and cable which has also been used at any time since January 1, 1953 for the manufacture of aluminum wire and cable.

Bare Wire— 5 Large Larmouth Type Stranders
2 Small Larmouth Type Stranders
1 New England Butt Bunch Strander
1 Haskell Dawes Bunch Strander

Magnet Wire— Small experimental runs have been made on approximately 6 Horizontal Paper and Cotton Machines.

Weatherproof— (4) Cable Braiders
(12) Sinfra Knitters
(3) Saturating Units
(2) Large Finishing Units
(1) Small Finishing Unit

Rubber Covered—Detail records are not available but approximately one-half the number of the Rubber Type Insulating Machines have been used at various times.

Plastic Dept.— Detail records are not available but approximately one-half the number of the Plastic Insulating Machines were also used at various times.

Note: In addition to the above, the secondary or supplemental equipment listed in 15 (a) above has also been used at one time or another.

[fol. 4655] 17. Describe the changes, if any, in Rome's production facilities and marketing organization which have been made since March 31, 1959 and the changes which are contemplated.

Production Facilities

Changed since March 31, 1959:

(a) New 6 Spindle Heavy Wire Enamel Unit mentioned 15 (a) above.

Changes which are contemplated:

(b) (1) 37 Wire Cabler being transferred to Rome Plant from surplus equipment at the Vancouver, Washington Plant (formerly a stranding machine)
(2) New double spindle Haskell Dawes Bunch Stranders (replacement).
(5) New small Larmouth Type Stranders (one of these is a replacement).

Marketing Organization

Since March 31, 1959 five employees, previously associated with the Alcoa marketing organization, have been transferred to the Rome marketing organization. It is expected that, ultimately the Alcoa marketing organization for electrical conductors and conduit will be integrated with the Rome marketing organization and all marketing responsibility for electrical conductors and conduit will be lodged with Rome.

[fol. 4656] In United States District Court

Plaintiff's Exhibit 28

Memorandum

Re: Arrangement Between Rome Cable Corporation and Aluminum Company of America

1. Rome Cable Corporation (hereinafter referred to as Rome Cable) will cover bare aluminum wire furnished by Aluminum Company of America (hereinafter referred to as Alcoa) for the account of Alcoa.

2. Upon Alcoa's request, Rome Cable will, from time to time, quote its prices for processing various sizes of bare aluminum wire with various types of covering. Rome Cable may adjust its quoted prices downward at any time without notice or upward upon thirty five (35) days' notice to Alcoa.

3. Rome Cable is prepared to process 500,000 pounds of

bare aluminum wire with Neoprene and 400,000 pounds of bare aluminum wire with plastic during the balance of the calendar year 1952 and is prepared to process a minimum of 3,000,000 pounds of bare aluminum wire with either type of covering during the calendar year 1953, and a minimum of 1,000,000 pounds during the period January 1-March 31, 1954.

Rome Cable and Alcoa contemplate that Alcoa's requirements for covered wire may increase to such an extent that if Rome Cable is to meet those requirements it will need additional facilities. If Alcoa requests Rome Cable to acquire additional facilities involving a substantial capital investment, Rome Cable will, within thirty (30) days of such request, advise Alcoa as to its decision with regard to making such investment and in the event Rome Cable agrees to make such investment, the period of this arrangement will be extended.

4. The arrangement between Rome Cable and Alcoa shall continue until terminated by either party upon 9 month's notice to the other, provided, however, that the earliest [fol. 4657] termination date shall be April 1, 1954, and provided further that in the event Rome Cable at the request of Alcoa makes a substantial capital investment for the purpose of meeting Alcoa's increasing requirements for covered wire, the period of this arrangement will be extended.

5. Alcoa will designate a representative at its plant at Massena, New York, and a representative at its principal office in Pittsburgh, Pennsylvania. These representatives will have full power and authority to act on behalf of Alcoa in connection with the administration of the arrangement between Alcoa and Rome Cable and Rome Cable will be fully justified in relying wholly on the decisions of, and acting pursuant to the directions of, either of such representatives in any matters pertaining to the carrying out of such arrangement.

Rome Cable will designate a representative at its principal office in Rome, New York, who will have full power and authority to act on behalf of Rome Cable in connection with the administration of the arrangement between Alcoa and Rome Cable and Alcoa will be fully justified in relying wholly on the decisions of, and acting pursuant to the directions of, such representative in any matter pertaining to the carrying out of such arrangement.

[fol. 4658] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 30

Aluminum Company of America
Pittsburgh 19, Pa.

November 21, 1955.

Mr. Glenn Reston,
Rome Cable Corporation,
Rome, New York.

Dear Glenn:

Please refer to my letter to you dated November 4th, 1955. As a result of our subsequent discussions and in the light of the second paragraph of numbered paragraph 3 of the "Memorandum Re: Arrangement Between Rome Cable Corporation and Aluminum Company of America" initialed by Mr. R. V. Davies on March 7th, 1952, we hereby request that Rome Cable Corporation acquire additional facilities for increasing its production for the application of neoprene covering on aluminum wire and cable.

Alcoa has no immediate intention of acquiring similar facilities and hereby gives you assurance that it intends to rely upon Rome Cable Corporation to continue the covering of aluminum wire and cable, as outlined in numbered paragraph 1 of the memorandum, with neoprene for the period ending January 1st, 1957, after which date the period may be extended from time to time by mutual agreement, all provided, of course, that Rome Cable Corporation acquires and maintains ample facilities to handle the order load in accordance with Alcoa's present and future requirements.

Very truly yours, Aluminum Company of America,
Philip T. Coffin, Manager, Electrical Industry Sales.

PTC:ags

[fol. 4659] In United States District Court

Plaintiff's Exhibit 31

Rome Cable Corporation
Rome, N. Y.

A. D. R. Fraser, President

December 16, 1955.

Mr. Ralph V. Davies, Vice President,
Aluminum Company of America,
1501 Alcoa Building,
Pittsburgh 19, Pa.

Dear Ralph:

In accordance with the request, per Mr. P. T. Coffin's letter of November 21, 1955 to our Mr. G. E. Rolston, we are acquiring additional facilities for increasing our production for the application of neoprene covering on aluminum wire cable. We have already made available to you starting December 1, 1955 sufficient capacity to apply a neoprene covering to 5,700,000 Factor I feet per month and to twist 2,500,000 ft. per month, continuing for the duration of our agreement. With an additional capital investment we will acquire facilities enabling us to make available to you capacity for an additional 1,300,000 feet of neoprene covering starting in May, 1956. In view of the capital investment required, we feel that the agreement should be extended until May 1, 1957.

We suggest that about the year ended 1956, we should consider whether a further extension is mutually desired.

If this letter meets with your approval, we would appreciate it if you will sign and return the enclosed copy.

Sincerely, Ron Fraser, President.

ADRF/m

Approved: Aluminum Company of America, by R. V. Davies, December 26, 1955.

[fol. 4660] Question 20. (a) List the names of companies, other than Alcoa, for whom Rome performed, during the period from January 1, 1953 to date, insulation work on copper or aluminum conductor, whether pursuant to contract or otherwise.

(b) For each such company, give the amount received by Rome for such work during each of the years 1953 through 1958 and each quarterly period of 1959, and describe the arrangements under which such work was performed.

Westinghouse Electric Corporation

Year	Amount Received	
1953	$584,655	Charge generally computed by subtracting copper cost from regular price for finished material.
1954	435,533	
1955	382,220	
1956	477,658	
1957	555,749	
1958	195,657	
1st Q. 1959	45,843	
2nd Q. 1959	47,673	

U. S. Government (Griffiss Air Force Base-Rome, N.Y.)

1955	$ 12,796	Bid Price
1956	317,668	Bid Price

Langdon & Hughes Electric Co., Inc., Utica, N.Y.
(Subcontract on Air Force Contract)

1955	$ 47,817	Bid Price

Allis Chalmers Manufacturing Co.
Pittsburgh, Penna.

1953	$ 217	
1954	2,028	Agreed price for service.

[fol. 4661] Question 21. Submit all market, industry and company surveys, studies or reports made or considered in anticipation of, or in connection with, the acquisition of Rome by Alcoa or any other company.

None.

[fol. 4662] Question 22. Submit all market, industry and company surveys or reports concerning competition, actual or potential, between aluminum and copper wire and cable.

None.

[fol. 4663] Question 23. Please supply us with (a) Section 12 of the Rome Product Catalog, entitled "Conductor Materials" and (b) the Rome Cable Manual of Technical Information—Second Edition.

Section 12 of the Rome Product Catalog was reserved for insertion of data referring to "Conductor materials". However no such data have been added to the catalog.

We submit a copy of the Rome Cable Manual of Technical Information—Second Edition.

[fol. 4664] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 32

Manual of Technical Information
Second Edition

$4.50 Per Copy

Copyrighted 1957

Rome Cable Corporation
Rome, New York

[fols. 4665-4666]

Properties of Metals at 20 C

Metal	Specific Gravity	Specific Heat Cal/ Gram-Deg C	Melting Point Degrees C	Resistivity Microhm-Cm	Resistivity Ohms (mil, foot)	Temperature Coef. of Resistivity per Deg C	Thermal Cond. Cal-Cm/ Sec-Deg C-Cm²	Thermal Coef. of linear Expansion/ Deg C	Tensile Strength Lbs./Sq. In.
Aluminum	2.71	0.214	660	2.828	17.00	.00446	0.52	23 x 10⁻⁶	24,000
Brass									
Commercial Bronze (90% Cu-10% Zn)	8.80	0.092	1045	4.66	28.03	.00145	0.45	18 x 10⁻⁶	95,000
Low Brass (80 Cu-20% Zn)	8.67	0.092	995	5.95	35.78	.00114	0.34	19 x 10⁻⁶	105,000
High Brass (70% Cu-30% Zn)	8.53	0.092	930	6.90	41.50	.00098	0.26	20 x 10⁻⁶	120,000
Copper									
Annealed Wire (100% Cond)	8.89	0.0921	1083	1.7241	10.37	.00393	0.92	17 x 10⁻⁶	36,000-40,000
Hard Drawn Wire (97.5% Cond)	8.89	.....	.....	1.7683	10.63	.00383	.....	.....	50,000-70,000
Gold	19.30	0.031	1063	2.42	14.55	.0034	0.71	14.2 x 10⁻⁶	.....
Iron	7.86	0.107	1535	10	60.14	.0050	0.16	11.7 x 10⁻⁶	50,000
Lead	11.3	0.031	327	22	132.31	.0039	0.083	28 x 10⁻⁶	1,800-4,000
Molybdenum	10.2	0.061	2625	5.7	34.28	.0033	0.35	5 x 10⁻⁶	100,000
Nickel	8.9	0.105	1452	7.8	46.91	.006	0.14	14 x 10⁻⁶	155,000
Platinum	21.45	0.032	1773	10.60	63.75	.00300	0.17	8.9 x 10⁻⁶	.....
Silver	10.5	0.056	960	1.63	9.80	.0038	1.01	18 x 10⁻⁶	42,000
Steel (Mild)	7.8	0.107	1300-1475	12	72.17	.005	0.11	9 x 10⁻⁶	50,000-70,000
Tin	7.3	0.054	232	11.5	69.16	.0042	0.15	21 x 10⁻⁶	4,000-5,000
Tungsten	19.3	0.032	3410	5.52	33.20	.0045	0.48	4 x 10⁻⁶	490,000
Zinc	7.14	0.092	419	6	36.08	.00347	0.27	28 x 10⁻⁶	7,000-30,000

[fol. 4667] Galvanic Series of Industrial Alloys in Sea Water

Corroded End (Anodic or least noble)

Magnesium
Magnesium alloys
Zinc
Aluminum 2S
Cadmium
Aluminum 17ST
Steel or Iron
Cast Iron
Chromium-Iron (active)
Ni-Resist
18-8 Stainless (active)
18-8-3 Stainless (active)
Lead-Tin solders
Lead
Tin
Nickel (active)
Inconel (active)
Brasses
Copper
Bronzes
Copper-Nickel alloys
Monel
Silver Solder
Nickel (passive)
Inconel (passive)
Chromium-Iron (passive)
18-8 Stainless (passive)
18-8-3 Stainless (passive)
Silver
Graphite
Gold
Platinum

Protected End (Cathodic or most noble)

(a) In general, when determining which of the two materials will be attacked by electrolytic corrosion, the material nearer the bottom of the list will not be corroded and the material nearer the top will be.

(b) Galvanic corrosion will usually take place only if the two materials are in intimate contact and in the presence of a conducting solution, which need be only a thin film of water.

(c) Galvanic action is an area effect, i.e. if a large steel sheet has a copper rivet in it, the steel will be corroded only in the area of the rivet, whereas if a large copper sheet has a steel rivet in it, the steel rivet would be attacked relatively quickly.

(d) Corrosion can occur by galvanic action if a metal is placed in a solution of a metallic salt which is lower in the galvanic series.

[fol. 4668]

IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 33

Question 1(a)

For each of the years 1953 through 1958 and for each quarterly period in 1959, state: (a) the total quantity and dollar value of aluminum E.C. redraw rod manufactured by Alcoa

	1953		1954		1955		1956		1957		1958		1st Quarter - 1959		2nd Quarter - 1959	
	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars
E.C. Redraw Rod Manufactured on Toll Conversion Basis(1)	1,468	109	11,549	756	2,125	148	4,892	366	0	0	0	0	0	0	0	0
E.C. Redraw Rod Manufactured for Sale and for Own Use(2)	102,075	27,050	101,003	26,968	98,102	27,469	89,537	28,562	90,544	30,694	81,168	24,394	20,132	5,818	24,924	7,178
Total E.C. Redraw Rod Manufactured	103,543	27,159	112,552	27,724	100,227	27,617	94,429	28,928	90,544	30,694	81,168	24,394	20,132	5,818	24,924	7,178

Notes: (1) The value shown for toll conversion E.C. redraw rod represents the price paid for the toll conversion service.

(2) The value assigned to E.C. redraw rod manufactured for sale and own use is the annual average revenue from sales in the United States and Canada.

[fol. 4669] Question 1(b)

For each of the years 1953 through 1958 and for each quarterly period in 1959, state: the total quantity and dollar volume of aluminum R.C.-reducer rod sold by Alcoa (exclusive of sales by its subsidiary, Rome) to other companies, giving a breakdown showing the quantity and dollar volume of shipments to each state and to Canada

	1954		1955		1956		1957		1958		1st Quarter - 1959		2nd Quarter - 1959	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
	(Thousands)		(Thousands)		(Thousands)		(Thousands)		(Thousands)		(Thousands)		(Thousands)	
Total Sales to Other Companies, by:														
Aluminum Company of America	16,437	4,396	15,037	4,212	16,361	5,218	14,638	4,963	6,978	2,116	3,496	1,010	4,303	1,240
Alcoa International, Inc.	0	0	0	0	0	0	1,798	1,196	1,509	437	0	0	0	0
Total	16,437	4,396	15,037	4,212	16,361	5,218	16,436	6,159	8,487	2,553	3,496	1,010	4,303	1,240
Sales to Each State and to Canada:														
Alabama	2,194	579	849	237	580	188	2,337	797	2,626	844	266	76	0	0
California	860	232	2,684	750	710	226	957	323	1,508	488	702	202	1,116	320
Connecticut	10	2	142	41	64	21	243	83	266	82	83	25	17	5
Florida	0	0	0	0	705	232	355	119	437	125	527	154	361	104
Georgia	0	0	10	3	0	0	100	33	46	15	82	26	55	18
Illinois	2,644	713	1,844	508	1,706	537	3,037	1,016	153	46	0	0	152	44
Indiana	176	52	660	188	363	121	387	136	784	236	279	83	276	80
Maryland	30	8	0	0	0	0	0	0	0	0	0	0	0	0
Massachusetts	112	30	91	26	283	89	181	61	93	28	20	6	51	15
Michigan	280	75	221	61	0	0	0	0	0	0	0	0	0	0
Missouri	2,055	541	401	108	3,566	1,148	1,364	460	102	29	52	15	0	0
Montana	0	0	281	56	0	0	0	0	0	0	0	0	0	0
New Hampshire	30	8	0	0	0	0	0	0	0	0	0	0	0	0
New Jersey	1,676	450	905	261	1,333	421	852	289	372	111	360	103	307	88
New York	1,324	357	2,388	671	319	106	226	79	96	28	185	53	843	71
Ohio	1,760	467	607	170	1,474	462	769	259	0	0	0	0	613	176
Pennsylvania	1,328	355	1,640	459	2,423	767	1,195	400	122	37	30	9	50	15
Rhode Island	1,354	363	1,147	326	966	307	0	0	0	0	0	0	0	0
Tennessee	131	34	1,247	347	1,869	593	0	0	2	1	0	0	0	0
Texas	0	0	0	0	0	0	40	13	371	106	900	258	1,062	304
Canada, by:														
Aluminum Company of America	0	0	0	0	0	0	2,596	895	0	0	0	0	0	0
Alcoa International, Inc.	0	0	0	0	0	0	352	117	0	0	0	0	0	0
Total	0	0	0	0	0	0	2,948	1,012	0	0	0	0	0	0

Notes: (1) Total Aluminum Company of America sales to all companies for 1953 were 26,254,000# and $6,947,000. No records of 1953 sales by states and Canada are available.

(2) For 1954, records are slightly incomplete. 473,000# and $130,000 of the total sales cannot be identified by territory.

[fol. 4670]

Question 2

"Facts for Industry," Series M33-2-08, for release March 18, 1959, Table 2, gives for 1958 a total industry shipments figure of 174,847,000 pounds for "ACSR and aluminum cable, bare". The response to question 10 of our letter of February 2, 1959, gives a total industry sales figure of "Bare Aluminum Wire and Cable & ACSR" in the amount of 178,906,000 pounds.

(a) How may these two figures be reconciled?

(b) Is the answer to question 9 of our letter of February 2, 1959, with respect to "Bare Wire and Cable -- Aluminum & ACSR", limited to conductor wire and cable?

Answer:

(a) Total industry shipments of "Bare Aluminum Wire and Cable & ACSR" shown in the response to Question 10 of the Department of Justice letter of February 2, 1959, included bare E. C. wire. Industry shipments of E. C. wire were not included in the 1957 or 1958 Facts for Industry report of shipments of "ACSR and Aluminum Cable, Bare." As indicated in Note (3) to the response to Question 10, the volume of bare E. C. wire shipments was estimated. The estimate for 1958 was 4,059,000 pounds.

(b) The volumes reported as "Bare Wire and Cable -- Aluminum & ACSR" and "Bare Aluminum Wire and Cable and ACSR" in the response to Question 9 of the Department of Justice letter of February 2, 1959, are of products designated as Electrical Conductor. It should not be implied, however, that these products are always used for the purpose of conducting electricity. Some customers purchase E. C. grade wire for non-electrical applications, such as refrigerator shelves.

Question 3

For each of the years 1953 through 1958, and for each quarterly period in 1959, (A) state the total quantity and volume of sales by Alcoa (exclusive of sales by its subsidiary, Rome) of each of the following products, and (B) give a breakdown showing the quantity and dollar volume of shipments to each state and to Canada of each such product sold:

(a) Bare Aluminum Wire and Cable and ACSR

	1954		1955		1956		1957		1958		1st Quarter - 1959		2nd Quarter - 1959	
	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars
3(A) Total Sales to Other Companies, by:														
Aluminum Company of America	71,101	28,492	68,389	27,149	58,022	26,607	55,602	25,313	56,680	23,663	14,096	5,610	15,398	6,058
Alcoa International, Inc.	0	0	0	0	164	87	3,412	1,611	652	283	0	0	0	0
Total	71,101	28,492	68,389	27,149	58,186	26,774	59,014	26,924	57,332	23,946	14,096	5,610	15,398	6,058
3(B) Sales to each State and to Canada:														
Alabama	765	288	792	324	784	365	632	282	1,709	728	872	341	23	8
Arizona	449	170	135	52	289	133	221	118	787	308	96	35	194	75
Arkansas	793	323	1,344	523	107	52	364	168	65	28	4	2	3	1
California	2,902	1,076	4,226	1,651	6,885	2,834	3,619	1,621	6,096	2,236	1,268	462	1,206	462
Colorado	589	260	830	374	1,048	526	1,532	747	533	236	82	36	872	107
Connecticut	89	14	133	60	367	180	265	132	151	64	1	1	77	35
Delaware	345	130	335	116	79	34	3	2	85	36	81	42	89	13
District of Columbia	0	0	64	27	109	50	5	3	2	1	0	0	0	0
Florida	742	299	1,436	633	2,379	1,118	579	266	596	237	2	1	3	1
Georgia	411	165	1,023	412	955	447	836	391	899	377	470	196	328	148
Idaho	317	132	224	92	585	259	1,188	563	1,306	565	67	31	665	193
Illinois	2,093	836	1,474	616	2,606	1,328	2,446	1,172	1,463	627	366	215	77	32
Indiana	2,740	1,232	2,898	1,114	1,537	724	2,066	1,052	6,085	3,376	342	152	796	300
Iowa	361	137	779	327	1,196	569	914	418	965	404	211	93	161	68
Kansas	185	94	621	270	637	301	543	273	619	256	568	258	40	19
Kentucky	4,809	2,197	1,786	720	1,131	508	1,351	663	1,050	426	45	20	520	206
Louisiana	570	210	980	388	756	343	1,681	717	810	338	389	145	538	210
Maine	471	168	601	239	556	260	749	341	319	132	37	14	398	155
Maryland	395	153	403	172	647	302	552	254	1,526	552	218	90	489	190
Massachusetts	821	266	37	17	440	195	122	51	844	312	96	35	125	52
Michigan	1,647	685	2,233	919	2,756	1,318	832	416	1,430	575	973	355	403	157
Minnesota	1,673	649	703	288	803	367	407	191	785	325	206	82	174	72
Mississippi	407	172	750	290	691	302	797	343	933	373	537	222	110	43
Missouri	462	190	1,047	426	475	214	934	417	833	354	93	40	351	132
Montana	22	10	33	17	40	21	87	47	410	140	2	1	128	55
Nebraska	541	234	687	296	439	220	250	127	211	89	26	13	689	276
Nevada	199	87	106	47	5	3	15	8	22	9	0	0	0	0
New Hampshire	306	114	81	31	217	94	134	61	148	59	15	6	25	10
New Jersey	991	353	1,275	456	2,023	962	1,532	720	1,821	691	285	112	177	64
New Mexico	43	18	22	10	249	127	203	98	0	0	0	0	35	15
New York	1,048	409	2,546	966	3,074	1,294	4,118	1,793	4,144	1,617	1,403	527	770	297
North Carolina	1,420	581	1,380	551	1,046	483	1,485	637	1,549	686	142	56	300	121
North Dakota	810	240	695	284	69	34	136	63	149	65	16	6	137	59
Ohio	12,706	5,717	4,680	2,026	4,342	2,028	4,328	2,112	2,735	1,060	696	309	1,845	703
Oklahoma	1,222	568	1,210	501	849	417	1,272	611	925	391	95	36	94	40
Oregon	839	346	2,015	816	1,777	831	1,111	803	1,310	537	282	124	250	87
Pennsylvania	3,837	1,118	1,602	611	2,648	1,282	2,477	1,168	2,876	1,140	635	264	852	378

[fol. 4672] Question 3 (Continued)

(a) Bare Aluminum Wire and Cable and ACSR

	1954 Pounds (Thousands)	1954 Dollars	1955 Pounds (Thousands)	1955 Dollars	1956 Pounds (Thousands)	1956 Dollars	1957 Pounds (Thousands)	1957 Dollars	1958 Pounds (Thousands)	1958 Dollars	1st Quarter - 1959 Pounds (Thousands)	1st Quarter - 1959 Dollars	2nd Quarter - 1959 Pounds (Thousands)	2nd Quarter - 1959 Dollars
Rhode Island	111	43	194	79	218	99	21	10	61	22	19	7	51	17
South Carolina	111	42	677	267	428	205	374	159	110	48	273	104	186	47
South Dakota	1,619	598	404	167	273	128	161	81	483	218	21	10	85	21
Tennessee	500	181	360	142	201	96	855	409	1,211	523	76	33	199	80
Texas	5,468	1,515	6,629	2,632	5,076	2,342	5,381	2,403	2,269	929	917	364	231	95
Utah	167	72	758	297	765	364	160	78	541	229	24	10	43	19
Vermont	226	94	143	62	201	91	652	244	595	225	28	10	24	10
Virginia	1,055	423	1,837	709	1,101	476	2,439	1,176	952	414	101	41	224	95
Washington	8,408	2,899	6,204	2,149	1,620	666	988	462	1,235	516	643	256	1,553	551
West Virginia	1,267	543	1,885	855	1,212	561	1,164	539	642	264	9	4	36	15
Wisconsin	920	385	1,310	554	1,100	551	1,335	604	1,750	725	520	202	191	80
Wyoming	199	85	113	48	141	72	174	88	63	30	5	2	21	8
Canada, by:														
Aluminum Company of America	0	0	0	0	15	7	3	0	1	1	0	0	0	0
Alcoa International, Inc.	0	0	0	0	0	0	5	2	0	0	0	0	0	0
Total	0	0	0	0	15	7	5	2	1	1	0	0	0	0

Notes: (1) Total Aluminum Company of America sales to all companies for 1953 were 61,386,000# and $25,156,000. No records of 1953 sales by states and Canada are available.
(2) For 1954, records are slightly incomplete, and 1,275,000# and $1,362,000 of the total sales cannot be identified by territory.

[fol. 4673] Question 3 (Continued)

(b) Aluminum Insulated Wire and Cable

	1954		1955		1956		1957		1958		1st Quarter - 1959		2nd Quarter - 1959	
	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars
3(A) Total Sales to Other Companies, by:														
Aluminum Company of America	2,270	1,886	4,010	3,477	4,743	4,248	4,699	4,015	5,766	4,224	1,357	893	1,579	1,085
Alcoa International, Inc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2,270	1,886	4,010	3,477	4,743	4,248	4,699	4,015	5,766	4,224	1,357	893	1,579	1,085
3(B) Sales to each State and to Canada:														
Alabama	4	5	48	45	44	41	81	72	135	104	0	0	0	0
Arizona	23	18	12	10	14	15	172	156	131	106	37	24	38	25
Arkansas	2	2	2	2	6	6	11	10	30	26	3	3	8	6
California	71	52	253	216	254	218	339	298	225	180	41	28	94	77
Colorado	148	135	173	148	19	19	21	20	179	156	21	17	136	100
Connecticut	9	9	0	0	0	0	0	0	0	0	0	0	0	0
Delaware	24	19	86	65	64	52	12	10	114	69	18	11	14	9
District of Columbia	0	0	12	11	10	10	3	3	2	2	0	0	0	0
Florida	115	106	301	282	266	264	110	111	208	150	63	42	41	29
Georgia	11	9	6	5	48	49	85	84	146	114	49	37	23	18
Idaho	2	2	7	6	35	32	43	39	31	24	6	6	9	6
Illinois	34	30	140	181	52	50	62	54	73	56	14	10	13	10
Indiana	28	25	42	37	149	135	107	96	88	73	19	14	31	23
Iowa	11	9	62	56	180	158	218	181	264	195	126	83	59	37
Kansas	51	40	103	93	125	121	105	90	43	37	9	7	7	5
Kentucky	2	1	13	11	5	5	7	7	26	20	10	7	15	10
Louisiana	4	3	5	4	3	3	30	25	134	115	86	46	75	50
Maine	1	2	7	8	8	6	17	13	22	17	10	7	16	10
Maryland	89	68	24	23	18	19	93	60	74	48	5	3	33	17
Massachusetts	6	4	36	30	58	47	5	5	48	31	9	6	0	0
Michigan	16	15	134	108	32	31	17	17	27	24	4	3	3	2
Minnesota	19	16	41	36	48	40	70	63	220	147	56	33	49	31
Mississippi	1	1	62	53	93	86	17	16	59	38	21	14	43	30
Missouri	119	90	117	95	82	72	103	86	209	153	82	53	78	53
Montana	15	12	5	5	6	6	17	16	3	3	0	0	0	0
Nebraska	6	5	27	25	46	45	16	14	32	32	(3)	(2)	15	12
Nevada	8	7	4	4	1	1	0	0	0	0	0	0	0	0
New Hampshire	0	0	1	1	66	57	56	46	(16)	(1)	0	0	1	1
New Jersey	93	62	206	167	278	246	327	269	214	166	67	46	63	44
New Mexico	8	8	6	7	6	6	2	2	2	1	0	0	0	0
New York	274	206	699	546	1,016	817	774	576	840	538	115	69	150	94
North Carolina	67	66	38	32	101	106	30	34	67	51	2	1	11	8
North Dakota	13	9	16	12	52	47	42	36	76	51	6	4	13	8
Ohio	88	73	166	140	93	84	132	120	199	145	37	24	61	41
Oklahoma	27	23	66	58	57	53	62	54	28	18	4	3	8	5
Oregon	21	19	20	19	47	43	76	65	83	68	28	20	24	17
Pennsylvania	191	152	184	154	133	171	235	191	357	253	116	80	111	75
Rhode Island	2	2	0	0	1	1	0	0	0	0	0	0	0	0
South Carolina	4	4	8	7	6	7	11	10	10	10	1	1	1	1
South Dakota	24	22	40	34	69	69	62	51	94	72	29	20	31	21
Tennessee	40	36	68	58	30	35	49	43	83	66	11	8	11	8

[fol. 4674]

Question 3 (Continued)

(b) Aluminum Insulated Wire and Cable

	1954		1955		1956		1957		1958		1st Quarter - 1959		2nd Quarter - 1959	
	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars
Texas	328	292	412	376	459	443	356	331	393	307	81	59	86	62
Utah	10	10	25	22	58	53	49	47	48	38	11	8	6	4
Vermont	22	15	6	4	20	17	2	2	9	6	9	6	0	0
Virginia	42	32	46	36	149	118	109	88	168	107	64	42	38	16
Washington	34	30	77	69	167	160	231	204	244	190	26	19	68	47
West Virginia	2	3	9	9	11	11	7	7	22	16	0	0	0	0
Wisconsin	39	34	180	149	155	136	294	240	229	164	42	27	73	47
Wyoming	18	18	11	11	13	13	24	23	26	20	3	3	0	0
Canada, by:														
Aluminum Company of America	0	0	0	0	0	0	0	0	1	1	0	0	0	0

Notes: (1) Total Aluminum Company of America sales to all companies for 1953 were 1,484,000# and $1,303,000. No records of 1953 sales by states and Canada are available.

(2) For 1954, records are slightly incomplete, and 103,000# and $85,000 of the total sales cannot be identified by territory.

(3) ( ) denotes credit. Credit figures result from cases where customers' returns and adjustments exceed shipments in a given territory and year.

[fol. 4675]

Question 3 (Continued)

(c) Aluminum Conduit

	1954		1955		1956		1957		1958		1st Quarter - 1959		2nd Quarter - 1959	
	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars
3(A) Total Sales to Other Companies, by:														
Aluminum Company of America	354	180	478	279	1,075	661	1,134	727	996	527	626	295	1,418	612
Alcoa International, Inc.	0	0	0	0	0	0	0	0	4	3	0	0	0	0
Total	354	180	478	279	1,075	661	1,134	727	1,000	530	626	295	1,418	612
3(B) Sales to each State and to Canada:														
Alabama	0	0	6	4	17	11	1	1	7	4	1	1	6	3
Arkansas	0	0	0	0	2	1	4	2	23	12	5	3	2	1
California	0	0	18	10	13	8	31	19	53	27	15	8	26	12
Colorado	0	0	0	0	0	0	3	2	5	3	0	0	7	4
Connecticut	0	0	1	1	0	0	0	0	3	2	19	8	28	12
Florida	0	0	0	0	0	0	3	2	160	85	24	12	111	56
Georgia	0	0	0	0	111	70	33	24	51	26	49	27	100	47
Idaho	2	1	0	0	0	0	0	0	0	0	0	0	4	2
Illinois	18	13	118	67	272	167	309	208	97	47	42	20	126	55
Indiana	15	8	0	0	13	8	57	34	67	36	3	1	89	39
Iowa	0	0	0	0	0	0	0	0	2	1	28	12	34	15
Kansas	15	7	14	6	0	0	2	1	9	5	22	10	15	6
Kentucky	0	0	2	1	19	12	26	21	14	8	1	1	3	1
Louisiana	12	6	0	0	85	49	44	28	33	17	16	8	24	11
Maine	0	0	1	1	0	0	0	0	8	5	0	0	0	0
Maryland	1	1	4	2	0	0	0	0	0	0	0	0	3	1
Massachusetts	9	6	2	2	10	8	0	0	0	0	1	1	0	0
Michigan	0	0	1	1	4	3	11	7	21	11	3	2	55	25
Minnesota	5	3	1	1	0	0	3	3	10	6	5	2	18	8
Mississippi	1	1	0	0	0	0	3	3	0	0	0	0	0	0
Missouri	0	0	6	4	12	8	16	11	7	4	10	5	11	5
Montana	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Nebraska	0	0	7	4	0	0	0	0	12	6	1	1	3	1
Nevada	0	0	0	0	0	0	0	0	8	5	0	0	5	2
New Hampshire	0	0	0	0	3	3	4	3	8	4	0	0	0	0
New Jersey	26	13	13	7	49	27	27	16	28	14	75	32	60	24
New York	6	5	1	1	8	6	9	5	27	15	101	45	185	77
North Carolina	0	0	0	0	0	0	0	0	6	3	0	0	2	1
Ohio	17	8	73	39	111	65	152	90	82	44	9	5	70	30
Oklahoma	11	5	39	29	34	22	23	12	8	4	2	1	5	2
Oregon	0	0	0	0	0	0	0	0	12	7	4	2	2	1
Pennsylvania	34	18	53	31	116	72	82	56	80	43	77	36	249	107
South Carolina	0	0	0	0	0	0	0	0	20	11	1	1	7	3
Tennessee	37	18	0	0	1	1	23	17	17	9	10	5	0	0
Texas	7	4	1	1	40	25	54	33	31	16	22	11	17	7
Utah	0	0	0	0	6	4	1	1	1	1	0	0	3	1
Virginia	1	1	0	0	1	1	8	5	25	13	7	4	10	4
Washington	31	15	0	0	0	0	9	6	22	11	0	0	5	2
West Virginia	0	0	36	22	142	86	174	104	30	18	0	0	74	31
Wisconsin	4	2	7	5	4	3	3	2	4	2	73	33	0	0

Notes: (1) Total Aluminum Company of America sales to all companies for 1953 were 494,000# and $210,000. No records of 1953 sales by state and Canada are available.

(2) For 1954, records are slightly incomplete, and 102,000# and $45,000 of the total sales cannot be identified by territory.

[fol. 4676] Question 3 (Continued)

(d) Cable Accessories for Aluminum Conductors

	1954		1955		1956		1957		1958		1st Quarter - 1959		2nd Quarter - 1959	
	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)
3(A) Total Sales to Other Companies, by:														
Aluminum Company of America	1,468	3,706	2,899	3,774	3,029	4,507	3,078	4,832	2,290	3,672	505	816	565	921
Alcoa International, Inc.	0	0	0	0	0	0	118	299	13	37	5	7	0	0
Total	1,468	3,706	2,899	3,774	3,029	4,507	3,196	5,131	2,303	3,709	510	823	565	921
3(B) Sales to each State and to Canada														
Alabama	60	89	64	77	80	107	18	35	35	67	3	12	9	21
Arizona	2	11	15	20	20	36	20	38	16	31	2	7	11	12
Arkansas	16	53	68	87	4	12	19	36	13	17	3	7	3	7
California	47	119	142	165	263	303	121	214	147	256	36	53	41	93
Colorado	23	41	32	51	45	66	36	53	19	46	2	3	10	15
Connecticut	0	3	2	3	5	8	4	8	2	4	1	1	0	0
Delaware	1	6	10	12	3	4	5	6	3	5	1	1	1	1
District of Columbia	0	0	7	9	7	8	2	3	3	9	1	1	1	2
Florida	89	58	80	93	182	214	244	381	103	146	23	35	15	26
Georgia	46	57	83	93	96	138	82	121	65	94	20	34	21	34
Idaho	8	15	6	15	30	41	31	73	44	65	5	9	5	8
Illinois	81	132	67	113	82	141	135	230	90	136	27	38	16	26
Indiana	146	169	77	126	73	128	228	355	274	356	27	42	14	23
Iowa	18	36	38	51	45	126	28	39	38	57	8	12	11	17
Kansas	6	19	38	50	34	77	38	73	18	38	2	2	10	12
Kentucky	52	196	53	73	57	82	36	68	36	71	3	8	8	14
Louisiana	17	49	60	81	63	87	67	88	34	51	3	8	6	6
Maine	3	6	11	12	12	11	13	14	10	9	1	1	3	3
Maryland	9	23	36	43	24	30	9	15	11	15	4	5	6	8
Massachusetts	7	13	11	15	17	39	23	43	19	38	4	5	6	8
Michigan	52	134	163	235	180	251	102	146	111	158	38	51	18	25
Minnesota	53	103	95	134	98	212	72	122	53	98	11	18	16	25
Mississippi	47	62	73	77	78	83	55	65	77	98	12	17	18	25
Missouri	51	81	94	129	87	142	60	99	66	97	8	14	23	31
Montana	2	12	4	7	19	35	3	7	9	13	1	2	9	18
Nebraska	9	20	28	36	44	78	40	54	31	52	4	9	9	18
Nevada	2	4	3	3	1	3	1	1	1	2	0	0	1	1
New Hampshire	15	17	14	14	12	10	15	12	15	14	2	2	3	3
New Jersey	44	32	23	24	55	97	27	24	47	84	7	9	11	18
New Mexico	3	13	4	7	16	110	38	73	6	15	3	5	1	1
New York	69	63	70	88	97	118	142	273	154	268	37	78	37	78
North Carolina	9	30	33	48	43	59	42	69	49	70	10	11	12	19
North Dakota	7	12	16	43	18	32	11	23	14	20	11	15	10	15
Ohio	119	614	189	254	93	176	122	318	56	158	12	22	14	22
Oklahoma	24	61	56	55	56	59	66	67	56	73	16	25	11	17
Oregon	7	33	42	52	37	83	45	85	45	83	4	7	13	20
Pennsylvania	29	72	54	70	91	132	92	131	80	134	18	27	30	50
Rhode Island	0	2	2	2	3	5	6	11	3	7	1	2	1	2
South Carolina	50	55	26	30	39	53	28	32	19	25	14	13	4	6
South Dakota	5	110	76	137	11	47	25	34	23	37	6	13	5	8

[fol. 4677] Question 3 (Continued)

(4) Cable Accessories for Aluminum Conductors

	1954		1955		1956		1957		1958		1st Quarter - 1959		2nd Quarter - 1959	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
	(Thousands)		(Thousands)		(Thousands)		(Thousands)		(Thousands)		(Thousands)		(Thousands)	
Tennessee	96	143	59	79	86	137	74	152	49	84	14	22	11	17
Texas	130	236	402	411	326	353	343	424	165	226	52	71	45	61
Utah	2	16	21	36	19	30	10	25	9	14	2	3	2	3
Vermont	3	4	6	5	8	8	4	7	7	10	1	1	2	2
Virginia	10	56	52	84	69	89	69	143	46	78	13	13	10	12
Washington	130	252	172	197	74	127	46	95	44	93	17	31	39	50
West Virginia	13	66	66	94	28	65	31	94	10	29	2	3	1	2
Wisconsin	14	54	35	60	52	85	45	73	43	81	9	23	7	14
Wyoming	2	4	3	6	25	51	9	23	4	6	0	0	0	0
Canada, by:														
Aluminum Company of America	0	0	2	7	1	5	1	2	2	5	0	0	0	0
Alcoa International, Inc.	0	0	0	0	0	0	1	1	1	1	0	0	0	0
Total	0	0	2	7	1	5	2	3	3	6	0	0	0	0

Notes: (1) Total Aluminum Company of America sales to all companies for 1953 were 1,932,000# and $4,276,000. No records of 1953 sales by states and Canada are available.

(2) For 1954, records are slightly incomplete, and $149,000 of the total sales cannot be identified by territory.

[fol. 4678] Questions 4 and 5.

List all products manufactured by Alcoa during the year 1954 (and 1958) showing, for each such product separately, the product code, unit of measure, quantity and value, as reported for the 1954 and 1958 Census of Manufactures, excluding those census code products manufactured by Alcoa which are not the same or similar to those manufactured by Rome and reported for the 1954 and 1958 Census of Manufactures

	Product Code	Unit of Measure	1954 Quantity (Short Tons)	1954 Dollars (Thousands)	1958 Quantity (Short Tons)	1958 Dollars (Thousands)
Aluminum Rod and Bar Rolled and Continuous Cast	33522-11-9	Short Tons	104,109(1)	65,165(1)	73,074(1)	58,422(1)
Bare Wire, Conductor	33922-11-1	Short Tons	241	162	137	137
Aluminum Cable Steel Reinforced (ACSR) and Other Bare Aluminum Cable	34892-61-1	Short Tons	35,561	26,594	28,418	23,883
Thermoplastic Covered	36312-35	(2)		63		
Polychloroprene (Neoprene) Covered	36312-37-5	(2)		88		488
Other (Include Thermoplastic Covered)	36312-39-1	(2)				980
Service Entrance Cable	36312-46-3	(2)		1,060(3)		3,033(4)
Unclassified	36312-98	(2)		728(5)		

Notes: (1) E.C. redrav rod is included in this code on Census of Manufactures report. However, a large part of the tonnage and value reported against this code is alloyed rod and bar, which is not manufactured by Rome.
(2) Census of Manufactures does not provide for reporting quantities on these items.
(3) Reported in error on Census of Manufactures report as Code 36312-46-3, service entrance cable. It is estimated that $790,000 should have been reported as rubber insulated, Code 36312-44-7, and $270,000 as thermoplastic insulated, Code 36312-45-0.
(4) Reported in error on Census of Manufactures report as Code 36312-46-3, service entrance cable. It is estimated that $1,185,000 should have been reported as rubber insulated, Code 36312-44-7, and $1,848,000 as thermoplastic insulated, Code 36312-45-0.
(5) Reported in error on Census of Manufactures report as Code 36312-98, unclassified. It is estimated that $276,000 should have been reported as thermoplastic covered, Code 36312-35, and $452,000 as polychloroprene (neoprene) covered, Code 36312-37-5.
(6) Shipments of aluminum conduit (Codes 36112-31 and 36112-32) were not reported separately on Census of Manufactures report due to insignificant tonnages involved.

[fol. 4679]

Question 6

With respect to each of the following categories, give for each of the years 1948, 1950, 1952, 1954, 1956 and 1958 (a) the quantity and dollar volume of (i) Alcoa's total sales and (ii) such sales broken down as to shipments to each state and to Canada

	(2) Open Wire (Covered for Distribution)						(3) Open Wire (Bare for Distribution) (4) Open Wire (Bare for Transmission)						(5) Service Drop Cable					
	1954		1956		1958		1954		1956		1958		1954		1956		1958	
	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars	Pounds (Thousands)	Dollars
6(a)(i) Total Sales to Other Companies, by:																		
Aluminum Company of America	1,200	912	2,312	1,944	2,046	1,378	70,804	23,380	55,448	25,342	56,416	23,530	1,070	974	2,431	2,304	3,720	2,846
Alcoa International, Inc.	0	0	0	0	0	0	0	0	164	87	652	283	0	0	0	0	0	0
Total	1,200	912	2,312	1,944	2,046	1,378	70,804	23,380	55,612	25,429	57,070	23,813	1,070	974	2,431	2,304	3,720	2,846
6(a)(ii) Sales to each State and to Canada:																		
Alabama	0	0	33	30	133	102	765	288	784	364	1,709	728	4	5	11	11	2	2
Arizona	7	5	6	6	49	38	449	170	289	133	787	308	16	13	8	9	82	66
Arkansas	0	0	4	4	0	0	793	323	107	52	65	28	2	2	2	2	30	26
California	54	37	108	84	74	46	2,901	1,075	6,834	2,834	6,096	2,235	17	15	146	134	151	134
Colorado	71	71	1	1	41	30	589	260	1,044	524	531	235	73	64	18	18	138	126
Connecticut	0	0	0	0	0	0	23	11	359	174	150	64	9	9	0	0	0	0
Delaware	0	0	13	11	1	1	345	130	79	34	85	36	24	19	51	41	113	68
District of Columbia	0	0	0	0	0	0	0	0	109	50	2	1	0	0	10	10	2	2
Florida	0	0	10	9	2	1	742	299	2,379	1,118	596	237	115	106	276	275	206	149
Georgia	6	5	34	35	75	59	411	165	955	447	699	377	5	4	14	14	71	55
Idaho	1	1	0	0	0	0	317	132	506	259	1,306	565	1	1	35	32	31	24
Illinois	0	0	33	31	18	12	2,093	836	1,575	751	1,403	627	34	30	19	19	55	44
Indiana	0	0	40	37	7	5	2,632	1,175	1,536	723	6,035	3,376	28	25	109	99	81	68
Iowa	4	3	60	49	81	54	301	120	1,595	772	965	404	7	6	120	109	183	141
Kansas	30	20	29	27	3	2	185	94	238	99	619	256	21	20	96	94	40	35
Kentucky	0	0	0	0	1	1	4,775	2,187	775	360	1,050	487	2	1	5	5	25	19
Louisiana	4	3	1	1	3	2	570	210	756	343	810	338	0	0	2	2	181	113
Maine	1	1	2	1	7	5	471	168	556	260	319	132	0	1	6	5	15	12
Maryland	89	68	10	10	35	23	395	153	647	302	1,526	552	0	0	8	9	39	25
Massachusetts	0	0	49	40	7	5	788	253	378	166	802	285	6	4	9	7	41	26
Michigan	7	6	7	6	0	0	1,646	634	2,663	1,232	1,430	575	9	9	25	25	27	24
Minnesota	6	4	25	17	164	103	1,643	639	803	367	754	310	13	12	23	23	56	44
Mississippi	0	0	3	2	44	26	407	172	691	302	933	373	1	1	90	84	15	12
Missouri	84	59	50	41	89	58	462	190	471	213	782	331	35	31	32	31	120	95
Montana	3	2	0	0	1	1	22	10	40	21	410	141	12	10	6	6	2	2
Nebraska	4	3	29	27	16	13	541	234	439	220	211	90	2	2	17	18	10	10
Nevada	3	2	1	1	0	0	199	87	5	3	22	9	5	5	0	0	0	0
New Hampshire	0	0	42	37	(21)	(6)	306	114	217	94	148	59	0	0	24	20	5	7
New Jersey	82	52	198	154	88	61	718	265	1,250	514	1,316	689	11	10	80	82	126	109
New Mexico	0	0	0	0	0	0	43	18	249	126	0	(2)	8	8	6	6	2	1
New York	247	183	771	616	573	352	1,009	383	2,870	1,197	4,040	1,588	27	23	245	201	267	186
North Carolina	6	4	8	7	3	3	1,420	581	1,046	433	1,549	626	61	62	93	101	64	48
North Dakota	7	4	32	28	53	33	810	240	69	34	149	65	6	5	20	19	23	18
Ohio	29	25	55	51	38	32	12,696	5,711	4,342	2,029	2,735	1,051	59	48	38	33	101	113
Oklahoma	9	7	20	17	9	6	1,222	568	849	417	925	391	18	16	37	36	19	12
Oregon	4	3	1	1	2	2	839	346	1,777	830	1,310	536	17	16	46	42	81	60
Pennsylvania	79	55	104	82	81	52	3,215	1,111	2,028	1,273	2,309	1,139	112	97	89	89	274	201

[fol. 4680]

Question 6 (Continued)

	(2) Open Wire (Covered for Distribution)						(3) Open Wire (Bare for Distribution) (4) Open Wire (Bare for Transmission)						(5) Service Drop Cable					
	1954		1956		1958		1954		1956		1958		1954		1956		1958	
	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)
Rhode Island	2	2	0	0	0	0	70	28	206	94	61	22	0	0	1	1	0	0
South Carolina	2	2	4	4	1	1	111	42	428	205	110	48	2	2	2	3	9	9
South Dakota	8	7	11	14	31	34	1,819	598	274	128	433	213	16	15	58	55	43	33
Tennessee	0	0	3	2	22	16	497	150	194	93	1,210	523	40	36	35	33	61	50
Texas	163	139	182	176	125	90	5,468	1,515	5,975	2,342	2,269	929	165	153	277	267	208	217
Utah	0	0	34	32	24	17	167	72	766	364	541	229	10	10	24	21	24	21
Vermont	22	15	13	10	6	4	226	94	201	91	595	225	0	0	7	7	3	2
Virginia	17	12	133	107	31	21	1,055	423	1,101	476	952	414	25	20	11	11	137	86
Washington	12	10	8	8	9	8	8,408	2,899	1,620	686	1,235	516	22	20	159	152	235	182
West Virginia	0	0	7	6	4	3	1,267	543	1,212	561	642	264	2	3	4	5	16	13
Wisconsin	30	25	131	110	82	51	920	385	1,100	551	1,750	725	9	9	24	26	147	113
Wyoming	0	0	0	0	2	1	199	85	141	72	63	30	18	18	13	13	24	17
Canada, by: Aluminum Company of America	0	0	0	0	1	1	0	0	15	7	1	1	0	0	0	0	0	0

Notes: (1) Item (1) aerial cable, and Item (6) service entrance cable, are not produced, or sold, by Alcoa.
(2) Item (3) open wire (bare for distribution), and Item (4) open wire (bare for transmission) are combined into one category, since sales of bare conductor cannot be divided accurately between distribution and transmission. A large percentage of bare conductor can be used for either purpose, and our records do not show the use to which such conductor is put by the customer.
(3) Prior to 1954, no records of sales by state and Canada are available. Aluminum Company of America's total sales for 1948, 1950 and 1952 are as follows:

	1948		1950		1952	
	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)	Pounds (Thousands)	Dollars (Thousands)
(2) Open wire (covered for distribution)	0	0	0	0	202	175
((3) Open wire (bare for distribution))	63,450	20,882	65,018	23,504	81,690	31,914
((4) Open wire (bare for transmission))						
(5) Service drop cable	0	0	0	0	76	85

(4) For 1954, records are slightly incomplete, and 103,000# and $77,000 of the total sales for open wire (covered for distribution), and 1,639,000# and $1,506,000 of the total sales for open wire (bare for distribution and transmission) cannot be identified by territory.
(5) ( ) denotes credit resulting from cases where customers' returns and adjustments exceed shipments in a given territory and year.

[fol. 4681] Question 6 (continued)

With respect to each of the following categories, give for each of the years 1948, 1950, 1952, 1954, 1956 and 1958 * * * (b) estimates of Alcoa's percentage of the total industry sales as determined or compiled by company, industry, associations, or other private or public studies or surveys:

(1) Aerial Cable

(2) Open Wire (covered for distribution)

(3) Open Wire (bare for distribution)

(4) Open Wire (bare for transmission)

(5) Service Drop Cable

(6) Service Entrance Cable

Answer: Other than for the year 1954, data are not available for total industry sales classified under the above categories. Further, Alcoa does not produce and has not produced either Aerial Cable (1) or Service Entrance Cable (6). Percentages given for 1954 are based on the Census of Manufactures data for dollar sales, adjusted to reflect those errors of Alcoa and Rome in reporting to Census that are shown in Alcoa's answer to Questions 4 and 5 of its questionnaire of August 19, 1959, and Rome's answer to Questions 8 and 9 of its questionnaire of August 18, 1959.

Category Number	Category and Census Code Numbers Included	Alcoa's Percentage of Industry Sales for 1954 (dollar value)
(2)	Open Wire (covered for distribution) Census Code Numbers 36312-31, 36312-35 and 36312-37	1.37
(3) & (4)	Open Wire (bare for distribution) and Open Wire (bare for transmission) Census Code Numbers 33923-11, 33923-51, 33923-71, 33922-11 and 34892-61	11.87
(5)	Service Drop Cable Census Code Numbers 33612-44 and 33612-45	2.21

[fol. 4682] Question 7

Specify the extent to which each of the products listed in response to 4 and 5 above are included in each of the categories listed above in 6.

Products Listed in Questions 4 and 5	Relationship to Question 6
Aluminum Rod and Bar, Rolled and Continuous Cast—Code 33522-11-9	Not included
Bare Wire, Conductor—Code 33922-11-1	Not included
Aluminum Cable, Steel Reinforced and Other Bare Aluminum Cable—Code 34892-61-1	All Covered in Items (3) and (4)
Thermoplastic Covered—Code 36312-35 (1954 Census only)	All Covered in Item (2)
Polychloroprene Covered—Code 36312-37-5	All Covered in Item (2)
Other (including Thermoplastic Covered) Code 36312-39-1 (1958 Census only)	All Covered in Item (2)
Thermoplastic Insulated—Code 36312-45-0 and Rubber—Code 36312-44-7 (Reported in error as Service Entrance Cable—Code 36312-46-3)	All Covered in Item (5)
Thermoplastic Covered—Code 36312-35 and Polychloroprene Covered—Code 36312-37-5 (Reported in error as Unclassified—Code 36312-98)	All Covered in Item (2)

[fol. 4683] Question 8

(a) List the machinery and equipment for the manufacture of rod which can be used interchangeably in the manufacture of aluminum E. C. Redraw Rod and copper rod.

Answer: Alcoa has no such machinery or equipment.

(b) To the extent that machinery or equipment for the manufacture of rod cannot be used interchangeably, please explain what steps would be necessary, including the economic factors involved.

(1) to convert machinery or equipment for the making of aluminum E. C. Redraw Rod to machinery or equipment for the making of copper rod,

(2) to convert machinery or equipment for the making of copper rod to machinery or equipment for the making of aluminum E. C. Redraw Rod and

(3) to convert machinery or equipment to make both aluminum E. C. Redraw Rod and copper rod,

Answer: (b)(1) The following steps would be necessary to convert the continuous rod rolling mill at Massena to equipment for the making of copper rod:

Installation of four (4) preheat furnaces, including conveyors, and revisions of building to accommodate such furnaces

Installation of high pressure descaling and cooling sys-
[fol. 4684] tem, one (1) Dorr Thickener for recovery of copper scale fines, pickling system for descaling coils, water quench for cooling coils prior to pickling, and pickling solution reclamation system
Cleaning of existing soluble oil system
Replacing zinc-lined tubes and coiling pans

The steps that would be necessary to convert the rod mill at Vancouver to equipment for the making of copper rod would be the same except that three (3) rather than four (4) preheat furnaces would be required, a new set of rolls would be required, and replacement of zinc-lined tubes and coiling pans would not be necessary.

With respect to both such mills, the cost of such conversion would be substantial and would result in lower production. The cost and results obtained would be so disparate as to be uneconomic.

(b)(2) Alcoa has no equipment or machinery for the making of copper rod.

(b)(3) To convert the continuous rod rolling mill at Massena and the rod mill at Vancouver so as to make both aluminum E. C. Redraw Rod and copper rod would require, in addition to the steps described in the answer to subdivision (b)(1) of this question, a revision of the soluble oil system in each mill so as to permit it to be sealed off from the copper coolant system, and additional coil storage space at Vancouver. Not only would the conversion be uneconomic for the reasons stated in the answer to subdivision (b)(1) of this question, but in addition interchangeability of these mills between copper and aluminum would be completely impractical due to the difficulty of cleaning up the rolling mill and coolant system. Any copper oxide scale contamination of the soluble oil coolant used for aluminum rolling would lead to the production of poor quality aluminum rod and in turn aluminum flake contamination of the water coolant used for copper rolling would lead to poor quality copper rods.

[fol. 4685] Question 9

(a) List the machinery and equipment for the manufacture of wire and cable which can be used interchangeably

in the manufacture of aluminum wire and cable and the manufacture of copper and wire and cable.

Answer: The following stranding equipment:

20 tubular stranders
6 rigid frame stranders
5 planetary stranders
2 rewind and repair lines

The following insulating and cabling equipment:

1 rewind and repair line
1 electrical test tank
1 bunch strander
1 4½" plastic extruder
1 cable twister

(b) To the extent that machinery or equipment for the manufacture of wire or cable cannot be used interchangeably, please explain what steps would be necessary, including the economic factors involved,

(1) to convert machinery or equipment for the making of aluminum wire and cable to machinery or equipment for the making of copper wire and cable.

(2) to convert machinery or equipment for the making of copper wire and cable to machinery or equipment for the making of aluminum wire and cable, and

(3) to convert machinery or equipment to make both aluminum wire and cable and copper wire and cable.

[fol. 4686] Answer: (b)(1) The following steps would be necessary to convert wire-drawing equipment for the making of aluminum wire to equipment for the making of copper wire:

Revisions to 1 fine wire and 20 breakdown machines.
Replacement of 20 electric rod welders with welders having double capacity
Installation of 3 water-seal and 9 electric-bell annealing furnaces for bright copper anneal, including additional floor space for the furnaces
Clean-up machines and lubricant systems
Wire-drawing capacity, on a footage basis, would be lost since the speed of drawing copper on such equipment would be one-half that of drawing aluminum.

(b)(2) Alcoa has no machinery or equipment for the making of copper wire or cable except that which, as noted in the answer to subdivision (b)(1) of this question, may be used interchangeably in making aluminum and copper wire.

(b)(3) To convert wire-drawing equipment to make both aluminum wire and copper wire would require the steps described in the answer to subdivision (b)(1) of this question plus the supplying of separate lubricating systems and necessary valving at the wire-drawing machines, and there would be the same loss of wire-drawing capacity on a footage basis since the speed for copper would be only one-half of that for aluminum.

[fol. 4687] Question 10

Describe the changes, if any, in Alcoa's or Rome's production facilities and marketing organization which have been made since March 31, 1959, and the changes which are contemplated.

Answer: The changes are described in the answer of Rome Cable Corporation to Question 17 in the list of questions submitted to that corporation under date of August 18, 1959.

[fol. 4688] Question 11

List the names and addresses of customers common to both Rome and Alcoa in the sale of rod, wire or cable during each of the years 1957 and 1958, and the first three months of 1959, classifying the rod, wire and cable products sold to each such customer by Rome, Alcoa or both.

Answer: This information is correctly given in the answer of Rome Cable Corporation to Question 18 in the list of questions submitted to that corporation under date of August 18, 1959.

[fol. 4689] Question 12

Submit copies of all contracts or agreements between Rome and Alcoa providing for the manufacture by Rome of insulated conductor for Alcoa on conductor furnished by Alcoa.

Answer: These are submitted with the answer of Rome Cable Corporation to Question 19 in the list of questions

submitted to that corporation under date of August 18, 1959.

[fol. 4690] Question 13

(a) List the names of companies, other than Rome, which performed, during the period from January 1, 1953 to date, insulation work on aluminum conductor supplied by Alcoa, whether pursuant to contract or otherwise.

(b) For each such company, give the amount paid by Alcoa for such work during each of the years 1953 through 1958 and each quarterly period of 1959, and describe the arrangements under which such work was performed.

Answer: (a) and (b) The only such company was Rea Magnet Wire Company, Inc., which has performed such work pursuant to a letter agreement dated August 20, 1958, a copy of which is submitted herewith. Payments by Alcoa to Rea Magnet Wire Company, Inc. for such work were as follows:

1958	$ 2,994.19
First Quarter 1959	
Second Quarter 1959	16,170.86

[fol. 4690a] Question 14

Please submit

(a) All market, industry and company surveys, studies or reports made or considered in anticipation of, or in connection with, the acquisition of Rome or any other manufacturer of rod, wire or cable.

(b) All correspondence, memoranda, surveys, studies, reports and recommendations received from or sent to Ebasco Services Incorporated in connection with the proposed acquisition of Rome by Alcoa.

(c) All market, industry and company surveys or reports concerning competition, actual or potential, between aluminum and copper wire and cable.

Answer: (a) There were no such surveys, studies or reports.

(b) Reference is made to the letter dated January 2, 1959 from R. L. Schlesinger, Ebasco Services, Inc., to R. V. Davies, submitted in answer to Question 1 of the Depart-

ment of Justice letter of February 2, 1959, and there is submitted herewith a copy of a letter dated November 7, 1958 from R. L. Schlesinger to Ralph V. Davies.

(c) There is submitted herewith a copy of a report prepared by Alcoa's Commercial Research Division, dated July 25, 1957, entitled "Magnet Wire."

[fol. 4690b] Question 15

Question 6 of our letter of February 2, 1959, requested the names and locations of "all" companies from whom stock or assets were acquired within the last ten years by Alcoa and by Rome. Your response, however, gives only acquisitions by Alcoa "which relate to the business conducted by Rome." We would appreciate a list of all Alcoa acquisitions and mergers in the last ten years.

Answer: All Alcoa mergers or acquisitions in the last ten years of all or substantially all of the capital stock or assets are as follows:

All the capital stock of Columbia River Orchards, Inc., acquired in 1957. This company was engaged in the fruit-growing business at Wenatchee, Washington, in the vicinity of the company's Wenatchee Works.

All the capital stock of Rockdale, Sandow & Southern Railroad Company, acquired in 1951. This is a railroad company operating between Marjorie and Sandow, Texas, at the company's Rockdale Works.

Substantially all of the assets of Dillsboro and Sylva Electric Light Company, acquired in 1957. This company, which was capable of producing only 225 Kw and was in financial difficulty, was engaged in the distribution, as a public utility, of electric power in the vicinity of Dillsboro, North Carolina, near the company's Alcoa Works in Tennessee.

[fol. 4691] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 41

Internal Correspondence

January 18, 1960

From:
Leon E. Hickman,
Pittsburgh Office.

To: ——

Alcoa has this day purchased the assets of Rea Magnet Wire Company, Inc. The Rea Company has plants at Fort Wayne and Lafayette, Indiana. The company specializes in the manufaeture of smaller sizes of magnet wire, a product used in coil windings, transformers, motors and other electrical and electronic equipment. It is hoped that Rea, in affiliation with Alcoa, will bring aluminum wire into a number of these markets.

I attach a copy of a statement made to the Rea Company concerning Alcoa's proposed policies in the operation of the company.

Leon E. Hickman.

LEH:lhm

Distribution:

Officers: Pittsburgh General Office, Product Sales Managers, District Sales Managers, Branch Sales Managers, Works Managers, Public Relations Managers, Subsidiary Company Heads, Sales General.

[fol. 4692] Aluminum Company of America

1501 Alcoa Building
Pittsburgh 19, Pa.

January 15, 1960.

Mr. Samuel A. Rea,
Chairman of the Board,
Rea Magnet Wire Company, Inc.,
Fort Wayne, Indiana.

Dear Sam:

If the stockholders of Rea Magnet Wire Company, Inc., approve the sale of your company to Alcoa, the most challenging opportunity confronting us both is how to utilize your people to the best advantage. Plants and technology are only significant in the hands of the right people. When we were last together, we spent more time on this subject than any other. We in Alcoa have continued to give it a top priority in our thinking because, above all else, we want to maintain the high esprit de corps of the Rea organization and to open to every man and woman in your company improved opportunities under the new program. You are free to tell your people that our thinking is running along the following lines:

(1) *All manufacturing and selling activities of Rea Magnet Wire Company, Inc., now conducted in Fort Wayne and Lafayette, Indiana, will be continued in those locations.* We already operate aluminum fabricating plants in Lafayette and Richmond and in July, 1960 will open the finest aluminum smelter in the world at Warrick, Indiana. Our experience in Indiana has been outstanding and, with your plants combined with ours, Indiana becomes a major manufacturing center for Alcoa.

(2) *A new corporation, likewise to be known as Rea Magnet Wire Company, Inc., will be formed to take over the properties of the present Rea Company.* Its Board of Directors will consist of a small number of Rea and Alcoa officers selected with an eye to a functional coordination of activities. You and the other officers of Rea will be expected to manage the new company, as you have the old, with only such changes in titles and functions as you have recommended to us or as time and changing circumstances ulti-

mately indicate to be in our common interest. Likewise, the rest of your organization will be carried over intact into the new company.

[fol. 4693] (3) *Wages and benefits.* We agree with you that you should continue your present policies with respect to salaries and wage rates of hourly employees and that you should continue your existing employee benefit plans, including profit sharing. However, should the new company ever be required to negotiate with a union on such matters, the new company can make no commitment as to the continuation of these benefits under those conditions.

(4) *We expect the new company to assume leadership in the development and utilization of aluminum magnet wire.* While we have no intention of minimizing your operations in copper magnet wire, we do anticipate that your experience in the magnet wire field and our know-how in the properties of aluminum can be combined through aggressive research into leadership in the development and utilization of aluminum magnet wire in those applications where aluminum is equal or superior to copper.

(5) *Research.* Both Rea and Alcoa are research-minded. We expect the new company to continue its research activities, indeed to expand them, but also to make full use of the research staff and facilities of Alcoa by coordinating programs.

(6) *We expect the new company to continue the present sales organization and policies of Rea, subject only to such modifications as experience may show to be in the common interest.* It is hoped that the Alcoa and Rea selling organizations can support each other and coordinate activities to their mutual benefit.

(7) *Purchasing.* We anticipate that the purchasing activities of the new company, particularly in copper, will be handled through its own organization, but in coordination with Alcoa purchases in the same or related fields.

(8) *The new company will operate functionally as a Division of Alcoa.* It will have full responsibility for the manufacture and sale of the products presently manufactured by the Rea Company and such others as may be appropriate to its activities. As a Division of Alcoa, Rea will draw upon Alcoa for such help as Rea may desire and [fol. 4694] Alcoa may have available, whether it be in the

field of research, manufacturing or engineering know-how, selling experience, customer contacts, or staff services of any of the numerous kinds made available in Alcoa. It is our intention to give the new Rea organization autonomy and authority commensurate with its responsibilities and to depend upon the good judgment of the Rea organization to make full use of the strength available through affiliation with Alcoa.

(9) *Modifications in the light of experience.* I am sure you realize that, while we speak in complete candor and good faith, these policies must always be subject to modification or change as experience may dictate. A rigid commitment on any of these points would be no more in your interest than in ours. For example, tax considerations may ultimately make it advisable to liquidate the new company into Alcoa and thereafter operate it simply as one of the Divisions of the parent company. Some of your people are quite likely to find additional opportunities for advancement in the Alcoa organization. No decision can be reached now as to where it would be advisable to manufacture new products or supplement the production of existing items.

There is an element of faith in this, as in all worthwhile matters. If we did not share that faith, we would not have offered your company this affiliation with Alcoa, nor would your Board have recommended its acceptance to your stockholders. We are counting on your people, strengthened by the support that Alcoa can give them, to develop the magnet wire business of Rea, both in copper and aluminum, well beyond its present potential. We can go far together if we maintain a mutual confidence and a willingness to adapt our program to changing circumstances. Subject only to those inevitable contingencies, this letter expresses our full thinking to date.

And I may say that we welcome you and every man and woman in the Rea organization into the Alcoa family with genuine enthusiasm and a confidence that we shall do well in partnership.

With cordial regards, I am

Sincerely, Leon E. Hickman, Executive Vice President.

LEH:lhm

[fol. 4695] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 42

Rea Magnet Wire Company, Inc.
East Pontiac Street
Fort Wayne, Indiana

January 19, 1960.

To Our Organization:

It is a pleasure to be able to inform you of another progressive step in the history of our company, which will benefit each of us and our customers in many ways. Rea Magnet Wire has become a subsidiary of Aluminum Company of America.

Alcoa plans to continue the fundamental policies of our management *and no major changes in personnel or operating procedures are anticipated.* We are convinced that the Alcoa management shares our basic attitude toward customers, the community, and company personnel. In short, we expect to operate in the future very much as we have in the past.

Alcoa is an integrated producer of aluminum and a fabricator of aluminum products. It has pioneered in the use of aluminum as an electrical conductor and has developed new aluminum products and processes for the electrical industry. Its principal electrical product in Aluminum Cable Steel Reinforced (ACSR) used in power transmission lines. Rome Cable Corporation, a subsidiary of Alcoa, produces copper rods and bar and insulated wires and cables. It sells primarily to utilities, the construction industry, large equipment manufacturers, mines and refineries. As you know, we sell principally to manufacturers of smaller electrical components such as coil windings, transformers, motors, meters and the like.

Alcoa maintains one of the country's foremost research organizations. With the help of their labs, we expect to intensify our efforts to develop new products and money saving machinery for our customers.

Enclosed is a copy of a letter from Mr. L. B. Hickman, Executive Vice President of Alcoa, which outlines the basic principles which we have agreed should guide our opera-

tions in cooperation with Alcoa. Additional letters from time to time will deal with other aspects of this new partnership. Meanwhile we can pitch in on our respective jobs with the assurance that our possibilities, both as a company and as individuals, have been much improved.

I would be happy to answer any questions you might have about this new development.

Sam Rea.

[fol. 4696] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 44

Question A

Rea's total volume of sales in 1958 and 1959

Answer

1958	$18,446,591
1959	24,906,249

[fol. 4697] Question B

List of products made by Rea and dollar volume of sales therefor in 1958 and 1959.

Answer

The products made by Rea in 1958 and 1959, together with the dollar volume of sales therefor, are as follows:

	1958	1959
1. Round magnet wire, film insulated	$18,404,053	$24,984,596
2. Hard bare wire	38,602	11,653
3. Aluminum alloy film coated wire supplied for developmental purposes as guide wire for Army missiles	3,936	—

[fol. 4698] Question C

Total value of shipments including interplant transfers of magnet wire in 1954 and 1958 broken down into product categories as reported to Census of Manufactures and corresponding data for 1959.

Answer

1954—Magnet Wire, Code 3631221	$14,311,322
1958—Magnet Wire, Code 38312 20 3	17,651,000
1959—	24,085,000

Note: The amount for 1954 should have read $14,311,222. Erroneously included in the above figures were cotton wrapped enameled magnet wire, hard bare wire and missile guidance wire (defined in answer to Question A).

[fol. 4699] Question D

Amount of aluminum compared to copper magnet wire products made and sold in 1954, 1958 and 1959.

Answer

	1954	1958	1959
Copper, pounds	22,366,683	26,568,524	32,619,352
Aluminum, pounds	none	929	6,592

Note: Aluminum magnet wire was produced and sold by Rea on a toll and agency arrangement with Alcoa.

[fol. 4700] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 47

Report to Stockholders of Rome Cable Corporation
as of March 31, 1937

[fol. 4701] Rome Cable Corporation
Rome, N. Y.

To the Stockholders:

Your Company was incorporated on January 20, 1936 and started to do business about April 1, 1936. Actual manufacturing operations began, in our bare wire and weatherproof departments, approximately July 1, 1936 and all of the departments were under way by the end of 1936. The accompanying income account thus presents the results of our operations for a twelve-month period dating approximately from the time the Company commenced doing business.

There is presented herewith financial statements of your Company as of March 31, 1937 and a certificate of our auditors, Ernst & Ernst. As shown therein, net profit from manufacturing operations amounted to $48,982.24 which, after absorbing pre-production expenses incurred prior to July 1, 1936 of $47,366.00, leaves a balance of $1,616.24 carried to earned surplus at March 31, 1937.

The quarterly operating results since July 1, 1936 to March 31, 1937 were as follows:

From July 1, 1936 to September 30, 1936	(Loss)	$14,910.38
From October 1, 1936 to December 31, 1936	(Profit)	11,191.49
From January 1, 1937 to March 31, 1937	(Profit)	52,701.13
Total net operating profit for period		$48,982.24

As stockholders were previously advised, in considering these figures it should be remembered that few departments were in complete operation during all of those periods and, further, that during this time the Company absorbed the burden and expense of beginning production and perfecting its organization.

In connection with the preparation of our financial statements, special consideration has been given to the basis of inventory valuation by reason of the wide fluctuations in basic commodity prices which have occurred during recent months. In order to avoid including unrealized inventory profits in our financial statements, the Company has adopted the conservative policy of inventory valuation which is fully described in the accompanying auditors' report.

We have made it a practice to immediately purchase all necessary raw materials to cover orders placed with us by customers. As of March 31st we had a small surplus of copper purchased over and above commitments to customers at an average price of less than the present market price.

Deliveries of certain items of equipment to complete various departments have been considerably delayed, but we anticipate our plant operations will approach the level projected some time during the April/June quarter.

We are comfortably booked with business for the next several weeks of operation and we are hopeful that the present price of copper will induce buying in the near future.

Recent remarks of several executives of large utility companies indicate that further expansion in their facilities cannot long be delayed, and it seems highly probable that the utilities and electrical manufacturers will place additional business in the near future unless further unwise legislation or unforeseen events seriously affect the rising tide of business generally.

We are keeping in step with the present trend of increasing rates of pay of all employees and while this has a natural tendency of increasing costs of production, yet this is being largely offset by the loyal co-operation of our entire organization in greater efficiency of operation.

By Order of the Board of Directors.
H. T. Dyett, *President.*

May 3, 1937.

[fol. 4702]

Rome Cable Corporation

Balance Sheet

March 31, 1937

Assets

Current		
Cash	$121,612.16	
Customers trade acceptances receivable	12,348.33	
Accounts receivable—trade (after allowance of $763.51 for doubtful, etc.)	264,250.82	
Inventories—Raw materials, supplies, in process and finished goods	562,893.14	$ 961,104.45
Plant and Property		
Land, buildings (including $81,559.52 on leased property), machinery, equipment, etc.—at cost	919,744.20	
Less: Allowance for depreciation	28,008.42	891,735.78
Deferred Charges		
Inventories of supplies	49,258.32	
Unexpired insurance premiums, prepaid taxes, royalties, etc.	12,420.11	61,678.43
		$1,914,518.66

Balance Sheet—Continued

Liabilities

Current			
Accounts payable, etc.		$119,490.91	
Accrued wages, insurance, taxes, etc.		20,826.31	$ 140,317.22
Reserve			
For spools, reels, and cases returnable			12,007.84
Capital and Surplus			
Common stock (of $5.00 par value):			
189,250 shares issued of 200,000 shares authorized (10,750 unissued shares reserved for allotment by the Board of Directors to officers and employees of the Company at not less than $10.00 per share)		946,250.00	
Surplus:			
Capital	$814,327.36		
Earned	1,616.24	815,943.60	1,762,193.60
			$1,914,518.66

Note: This balance sheet is subject to the comments contained in the accompanying certificate.

[fol. 4703]

Rome Cable Corporation

Income and Surplus Accounts
For the period from organization of the Company in 1936 to March 31, 1937*

Income

Gross Profit on Sales	$168,734.46
Selling, Administrative, and General Expenses	119,469.05
Net Income From Operations (After providing $28,008.42 for depreciation of buildings, machinery, equipment, etc.)	49,265.41
Other deductions ($520.00), less other income	283.17
Net Profit From Operations	48,982.24
Deduct: Pre-production expenses incurred prior to July 1, 1936 (approximately as of which date certain manufacturing operations commenced)	47,366.00
Net to Earned Surplus	$ 1,616.24

Surplus

Earned			
Net from income account, as above			$ 1,616.24
Capital			
Excess of sales prices of 189,250 shares of common stock over par value thereof		$903,376.00	
Deduct: Commissions paid on sales of common stock	$77,072.00		
Expenses incident to incorporation, registration and sale of common stock, etc.	11,976.64	89,048.64	
Capital Surplus—Balance March 31, 1937			814,327.36
Total Surplus March 31, 1937			$815,943.60

* The Company was organized on January 20, 1936, but did not commence business until about April 1, 1936. Manufacturing operations were commenced in certain departments about July 1, 1936.

Rome Cable Corporation,
Rome, N. Y.

We have made an examination of the balance sheet of Rome Cable Corporation, Rome, N. Y., as at March 31, 1937, and of the statement of income and surplus for the period from organization of the Company in 1936 to March 31, 1937. In connection therewith we examined or tested accounting records of the Company and other supporting evidence, and obtained information and explanations from officers and employees of the Company; we also made a general review of the accounting methods and of the operating and income accounts for the year, but we did not make a detailed audit of the transactions.

The inventories, which were taken and certified to us by the management, were test checked as to the accuracy of the computations and reviewed as to the method of pricing. Values used represent the lower of cost or market at March 31, 1937. In respect to basic materials cost is determined on the principle of "last-in first-out", i.e., by charging during each month the cost of purchases of basic material received and taken into inventories against the equivalent amount of such material contained in finished product shipped to customers during that month. The excess quantity, if any, of such shipments over receipts is charged with its pro-rata share of the book value of remaining receipts most recently added to inventories. The excess quantity, if any, of receipts over shipments is added to inventories at cost of such purchases.

At March 31, 1937, the Company had purchase commitments for additional plant equipment and for the major raw material requirements of its sales orders at prices not in excess of those prevailing at that date.

In our opinion, based upon the foregoing, the accompanying balance sheet and related statements of income and surplus fairly present the financial position of Rome Cable Corporation as at March 31, 1937, and the results of its our opinion that the statements have been prepared in accordance with accepted accounting principles.

Ernst & Ernst.

New York, April 30, 1937.

[fols. 4704-4705] Officers

H. T. Dyett ..... President
H. W. Barnard ..... Vice-President and Treasurer
C. A. Scott ..... Vice-President and Sales Manager
V. W. Collins ..... Comptroller and Assistant Treasurer
A. D. R. Fraser ..... Secretary
C. H. Ellis ..... Works Manager

Directors

H. W. Barnard, Rome, N. Y. J. H. Dyett, Rome, N. Y.
V. W. Collins, Rome, N. Y. A. D. R. Fraser, Rome, N. Y.
H. T. Dyett, Rome, N. Y. P. Linz, New York, N. Y.
C. A. Scott, Rome, N. Y.

Counsel

Messrs. Ferris, Burgess, Hughes & Dorrance
Utica, N. Y.

Auditors

Messrs. Ernst & Ernst
New York, N. Y.

[fols. 4706-4709] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 48

Alcoa Annual Report 1959

[fols. 4710-4712] To the Shareholders of ALCOA

Alcoa's sales and earnings turned upward in 1959, keeping pace with the general recovery from the 1958 recession.

During the first half of the year, Alcoa's volume of aluminum shipments increased rapidly and reached the proportions of a peacetime record for the month of July. In August and September, however, incoming orders and shipping releases dropped abruptly, partially because of high inventories accumulated by customers in anticipation of a strike in the aluminum industry, and partially because the manufacture of many products using both aluminum and steel was necessarily curtailed when the steel strike occurred. The upward trend in business was not resumed until late in the fourth quarter.

Despite the wide fluctuation in demand during the year, the consumption of aluminum, as measured by the aluminum industry's shipments, evidenced an increase of 20 per cent over the previous record peak of 1956. At the year's end, customer inventories of aluminum apparently remained unusually high, a fact which still reflected the "strike buying" of the first and second quarters. The present outlook is for continued expansion of aluminum markets this year.

Foreign and domestic competition again was intense, adversely affecting prices and earnings. By December 17, 1959, however, your company was able to restore the price of primary aluminum pig to 26 cents. The increase of 1.3 cents per pound on that date, together with a 0.7 cents per pound increase on August 1, 1958, simply brought the price of aluminum back to its level of August 1, 1957.

During 1959, Alcoa carried on a broad, vigorous program to foster and take advantage of both new and growing markets. Research and development again resulted in new products, and in new and improved methods of production. Availability of increased smelting capacity was assured with resumption of construction at the Warrick smelter, near Evansville, Ind., which is expected to begin production by July, 1960. Sales, advertising and publicity efforts stimulated new uses for aluminum and gave increased impetus to existing applications. Foreign market opportunities for Alcoa were widened by agreements establishing affiliated

fabricating companies in Great Britain, Japan, Venezuela and Mexico.

In the domestic market, Alcoa took steps to provide more complete service to the electrical and architectural industries by acquiring three new subsidiaries. The principal objective of these new affiliations is to stimulate increased use of aluminum in the electrical and architectural fields.

The acquisition of Rome Cable Corporation, discussed in the Annual Report for 1958, was approved by Rome's shareholders. On March 31, 1959, the assets of Rome were transferred to Alcoa in exchange for 355,226 shares of common stock of Alcoa and the assumption by Alcoa of the obligations of Rome.

On January 19, 1960, 180,480 shares of Alcoa common stock were issued to Rea Magnet Wire Company, Inc., for the assets of that company and the assumption by Alcoa of the obligations of Rea. Rea manufactures copper magnet wire for use in electrical and electronic equipment, employing 770 people at two manufacturing plants in Fort Wayne and Lafayette, Ind.

On January 23, 1960, 64,209 shares of Alcoa common stock were issued to the shareholders of Cupples Products Corporation in exchange for all outstanding shares of that company. Cupples fabricates, sells, erects and installs aluminum in architectural applications. It employs 880 people at plants in St. Louis, Mo.; Dallas, Tex.; and Dowagiac, Mich.

The directors and officers of Alcoa wish to express their sincere appreciation to the men and women of the company whose efforts have been responsible for the progress noted in 1959, and whose initiative and enterprise are so essential to Alcoa's future success.

I. W. Wilson, Chairman of the Board, Frank L. Magee, President.

1501 Alcoa Building, Pittsburgh 19, Pennsylvania, March 1, 1960.

Annual Meeting: The annual meeting of shareholders of Aluminum Company of America will be held on Thursday, April 21, 1960, at 10:00 a.m., E.S.T., in Ballroom Number One, The Pittsburgh Hilton Hotel, Pittsburgh, Pa.

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[fol. 4713] Electrical

The electrical market for aluminum showed significant gains during 1959, with particular progress noted in aluminum bus bar and conductor for industrial buildings, conductor for utility service lines and utility substation structures. The use of aluminum conduit also increased as intensive sales efforts projected this product into a field long dominated by other materials.

With the acquisition of Rome Cable Corporation, Alcoa's position in the electrical wire and cable market was strengthened and diversified. Rome's bare and insulated conductor, [fols. 4714-4737] conduit, and cable supporting systems have been added to Alcoa's popular line of electrical products, thereby permitting the company to broaden its service to the electrical and other industries. Rome's facilities and techniques for the further commercial and technical development of insulated aluminum conductors should result in new and wider uses of aluminum in the utility, construction and missile industries. Distribution of these products is now handled primarily by Rome Cable Corporation, a wholly owned subsidiary of Alcoa.

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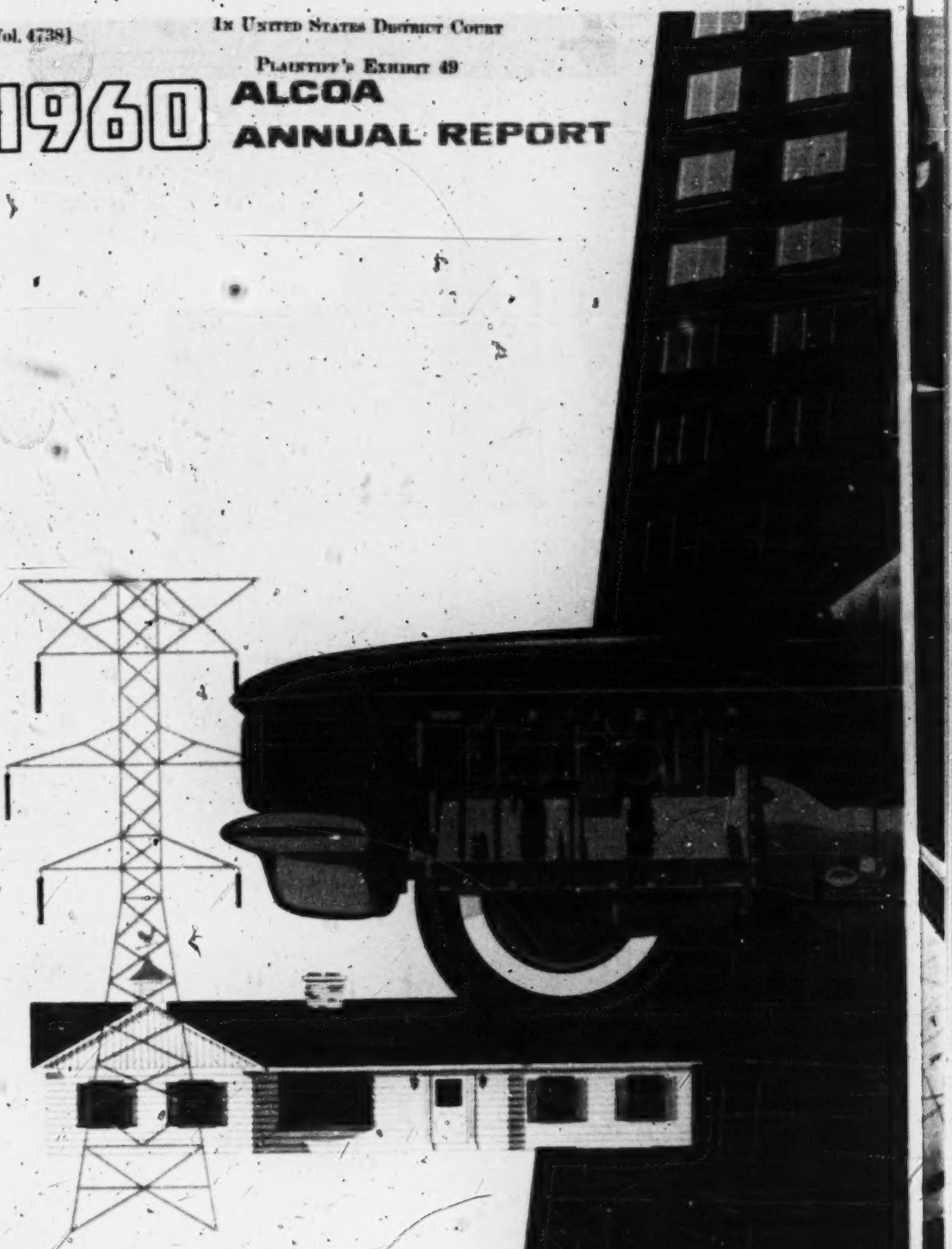
[fol. 4738]

IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 49

1960 ALCOA ANNUAL REPORT



ALUMINUM COMPANY OF AMERICA

[fol. 4739]

ALUMINUM COMPANY OF AMERICA

DIRECTORS AND OFFICERS
(as of December 31, 1960)

BOARD OF DIRECTORS

M. M. ANDERSON
RALPH V. DAVIES
LEON E. HICKMAN
ALFRED M. HUNT
ROY A. HUNT
LAWRENCE LITCHFIELD, JR.
FRANK L. MAGEE
RICHARD K. MELLON
I. W. WILSON
GEORGE W. WYCKOFF

HONORARY CHAIRMAN

ARTHUR V. DAVIS

OFFICERS

FRANK L. MAGEE, *Chairman of the Board*
LAWRENCE LITCHFIELD, JR., *President*
ROY A. HUNT, *Chairman of the Executive Committee*
I. W. WILSON, *Chairman of the Finance Committee*
M. M. ANDERSON, *Executive Vice President*
H. C. ERSKINE, *Executive Vice President*
LEON E. HICKMAN, *Executive Vice President*
N. R. ALTHAUSER, *Vice President and Controller*
THEODORE W. BOSSERT, *Vice President and Chairman of the Research and Development Committee*
FREDERICK J. CLOSE, *Vice President and General Sales Manager*
LEWIS P. FAVORITE, *Vice President in Charge of Product Sales and Commercial Research*
W. J. FLETCHER, *Vice President in Charge of Engineering*
ARTHUR P. HALL, *Vice President in Charge of Public Relations and Advertising*
JOHN D. HARPER, *Vice President in Charge of Smelting and Fabricating*
JOHN S. HARRISON, *Vice President in Charge of Personnel and Industrial Relations*
J. O. KEEFER, *Vice President in Charge of Purchasing*
ROBERT A. LEARNARD, *Vice President in Charge of Governmental Relations*
ROBERT B. McKEE, *Vice President in Charge of Sales*
GEORGE W. STREEPEY, *Vice President in Charge of Raw Materials and Refining*
EDWARD B. WILBER, *Vice President in Charge of Finance*
ALFRED M. HUNT, *Secretary*
MATT W. STANLEY, *Treasurer*
WILLIAM K. UNVERZAGT, *General Counsel*

ASSISTANT OFFICERS

R. E. COULTER ..... *Assistant Treasurer*
HARRY FLYNN ..... *Assistant General Counsel*
J. F. GUSTINA ..... *Assistant Controller*
J. T. THOMAS ..... *Assistant Secretary*

PRESIDENTS OF PRINCIPAL SUBSIDIARIES

JOHN M. ARCHER, JR., *Nantahala Power and Light Company*
ROBERT L. BECKER, *Wells Rich Aluminum, Inc.*
F. A. BILLHARDT, *Alcoa Steamship Company, Inc.*
D. D. ROSS FRASER, *Rome Cable Corporation*
E. K. HEINEMAN, *Alcoa and Southern Railroad*
LAWRENCE LITCHFIELD, JR., *Sarnamet Aluminum Company*
JOHN M. MITCHELL, *Alcoa International, Inc.*
CHARLES C. MORAN, *Cupples Products Corporation*
GEORGE W. STREEPEY, *Alcoa Exploration Company*
ROBERT L. WHEARLEY, *Rea Magnet Wire Company, Inc.*

[fol. 4740]

ANNUAL REPORT 1960

To the Shareholders of Alcoa

Difficult market conditions throughout the metals industry during 1960 extended to aluminum and were reflected in the results of the year's operations for Alcoa. Gross revenues of the company were slightly higher than those recorded in 1959, but problems common to the aluminum industry generally caused earnings to be disappointingly low.

The most important single element contributing to the low earnings was the depressed price situation with respect to fabricated products. The general deterioration of prices throughout the industry resulted from many factors, including an excessive amount of unused aluminum fabricating capacity, and the continued importation of aluminum products to a market already amply supplied.

In addition to the unsatisfactory price levels, earnings were also unfavorably affected by the reduced pace of the nation's economy, accentuated in our industry because of the accumulation by consumers during 1959 of aluminum mill and end product inventories. This condition adversely affected the volume of shipments in 1960. Carrying charges on idle facilities, extending from refining through the smelting and fabricating operations, also contributed to the decline in earnings, as did higher labor costs of recent years which were only partly offset by price increases.

On the other hand, aggressive new market promotions by Alcoa and the pattern of sales in certain areas of aluminum consumption justify a feeling of optimism and an expectancy of the return of business to more profitable levels. There is evidence that inventories in many lines have been considerably reduced. With any improvement in general economic conditions, there is every reason to expect that per capita consumption of aluminum will resume its growth in the United States and continue its upward movement in foreign markets. The current decade should be a period of great progress.

As a part of the company's continuing effort to reduce costs, studies are being made of the company's activities and the contribution that each makes to Alcoa's profit and development and, where indicated, vigorous steps are being taken to increase the operating efficiencies in all departments.

In the field of capital expenditures, prudent planning dictates that Alcoa must be prepared to meet the anticipated changing pattern of demand. At the same time, current conditions require that your management exercise great care in evaluating each proposed new expenditure, initiating only those which promise the most immediate gain.

At its December meeting, the Board of Directors adopted a comprehensive, company-wide program to insure that officers and employees would be free of conflicting interests when dealing with third parties on behalf of the company.

For all the directors and officers we extend sincere thanks to the men and women of Alcoa for their loyalty and devoted efforts in meeting the difficult problems of 1960.

FRANK L. MAGEE, *Chairman of the Board*
LAWRENCE LITCHFIELD, JR., *President*

1501 Alcoa Building, Pittsburgh 19, Pennsylvania
March 1, 1961

(left to right) FRANK L. MAGEE; LAWRENCE LITCHFIELD, JR.

[fol. 4741]

FINANCIAL HIGHLIGHTS

	1960	1959
Gross Revenues	$869,780,176	$864,967,722
Net Income	40,044,105	55,570,854
Per Share of Common Stock	1.76	2.52
Taxes	20,982,879	48,697,151
Per Share of Common Stock	.98	2.31
Dividends Declared		
Preferred Stock	2,474,688	2,474,688
Per Share	3.75	3.75
Common Stock	25,649,928	25,241,943
Per Share	1.20	1.20
Total Dividends	28,124,616	27,716,631
Earnings Reinvested in the Business	11,919,489	27,854,223
Capital Expenditures	80,341,301	54,660,992
Working Capital	303,849,551	319,298,650
Ratio of Current Assets to Current Liabilities	3.59 to 1	4.57 to 1
Common Stock Equity	693,219,271	667,040,079
Equity Per Share of Common Stock	32.52	31.71

Contents

Markets 3
Research and Development 9
Public Relations and Advertising Highlights 9
Facilities—raw materials—refining 10
Facilities—smelting 12
Facilities—fabricating 13
Foreign Activities 16
Organization Changes 16
Honors 17
Personnel and Industrial Relations 18
Financial Review 19
Alcoa Aluminum "From Mine to Market" Operating Locations (Insert)
Wholly Owned Subsidiaries (Inside back cover)

ANNUAL MEETING: The annual meeting of the shareholders of Aluminum Company of America will be held on Thursday, April 20, 1961, at 10:00 a.m., E.S.T., in Ballroom Number One, The Pittsburgh Hilton Hotel, Pittsburgh, Pa.

[fol. 4742]

MARKETS

Although an excessive amount of unused fabricating capacity and keen competition kept prices and profits low, there were encouraging indications of progress in major markets, as described on the following pages.

The distribution of Alcoa aluminum products to industries was as follows: building and construction, 24%; transportation, 20%; electrical equipment, 10%; consumer durables, 13%; industrial machinery, 6%; containers and packaging, 8%; all others, including exports, 19%. These figures reflect estimated percentages for distributors and jobbers as well as shipments for further conversion.

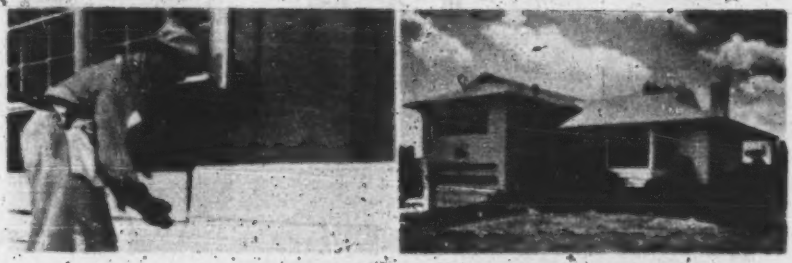
Building and Construction

The building and construction industry was the largest single market for aluminum in 1960. A number of new architectural products were announced and projects were undertaken which are expected to increase Alcoa's participation in this market.

For residential applications, an eight-inch, clapboard-type siding introduced by Alcoa in 1959 was supplemented during 1960 with vertical siding and a new clapboard-type siding of four-inch width. All three products have proved popular with both builders

These striking Colonnade Park Apartments in Newark, N. J., feature aluminum curtain walls fabricated and erected by Cupples Products Division of Alcoa.

[fol. 4743]



Alcoa Siding, available in three styles and ten colors, offers a high-quality building product which is ideal for refacing old homes as well as for new home construction.

and homeowners. Alcoa Siding with foamed polystyrene and aluminum foil insulation complies with the standards set forth by the Federal Housing Administration for home improvement and new construction.

In a further effort to promote the use of aluminum as a building material in locations and projects which will command attention, Alcoa has joined with Webb & Knapp, Inc., in purchasing the 260-acre studio tract of Twentieth Century Fox Film Corporation in the heart of West Los Angeles and in developing a self-contained community of high-rise apartment houses and office buildings on this property. The project, to be known as Century City, offers an unprecedented opportunity to use aluminum in a wide variety of architectural applications.

A similar joint venture has been undertaken with the same company on an entire city block immediately to the north of the United Nations' headquarters in New York City. It is planned to build on this property a high-rise aluminum and glass building which includes both office space and apartments of the luxury type. Here again, the modern architectural uses of aluminum will be dramatized in an effective setting.

Other Alcoa developments for the building and construction industry include the following products:

Alcoa Batten Roof—a walk-aluminum roof with a combined leakproof anchoring and gutter system for use on structures with large roof areas. This product is especially adapted for use on commercial and industrial buildings.

Alshade—a new die-cast aluminum grille for architectural purposes which can be used for both solar shading and decorative effects. Typical uses are for refacing old buildings, providing a design element for new construction and screening gardens and patios.

Architect's model of Century City, a self-contained, [illegible] Los Angeles, Calif., which will be [illegible] showcase for Alcoa aluminum [illegible] applications.

Automotive applications of aluminum continued to grow in 1960. This display [illegible] aluminum engine blocks, radiator grilles, transmission components and wheel assemblies.

Transportation

One of the most important developments in the transportation market in 1960 was the extended use of aluminum in producing engine blocks for 1961 model automobiles. Aluminum engines are now standard equipment on four 1961 model compact cars and optional on four other compact and standard sized domestic models. The use of aluminum engine components, transmission housings and brake drums continues to give automobile manufacturers flexibility of

design. It also makes possible the reduction of dead weight plus improved performance and economy.

Aluminum trim applications showed a sharp increase in 1960 aided by Alcoa's development of a new anodizing process for automotive and appliance parts. The process yields a brilliant finish for aluminum trim and bumper alloys. Aluminum trim utilization will average 10.78 pounds per 1961-model car, the highest poundage for such applications to date and an increase of more than 25 per cent over 1960 models.

Aluminum evaporators and condensers for automobile air-conditioning units are now widely accepted, and an all-aluminum radiator is standard equipment on one popular U. S.-produced sports car. Automotive engineers are evaluating aluminum bumpers for use on production model cars, and alloys developed by Alcoa are expected to hasten their acceptance.

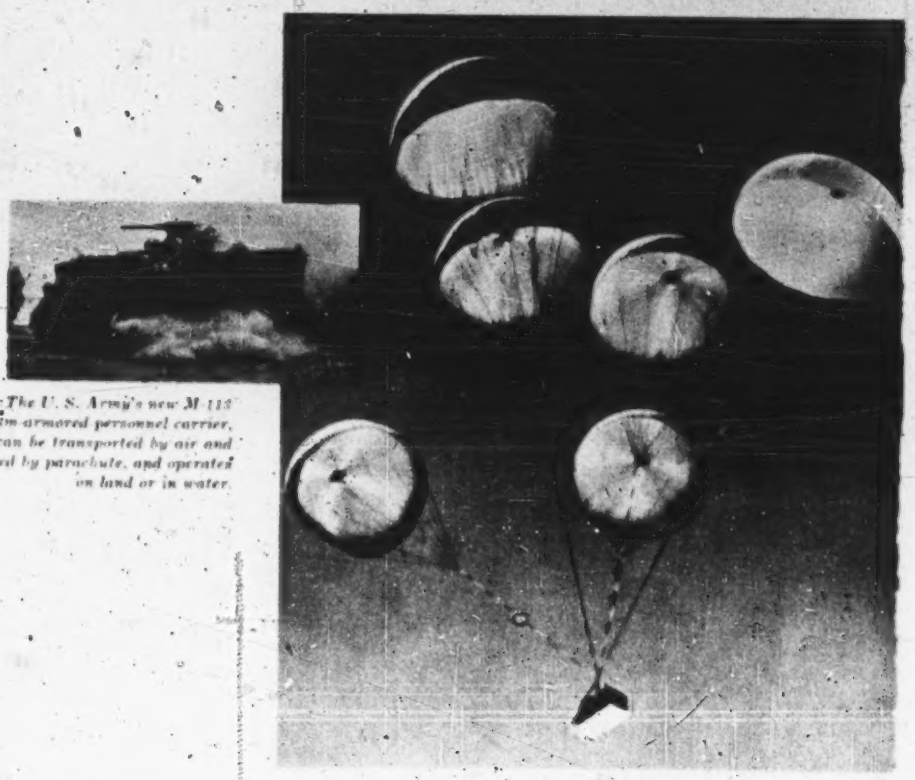
Use of aluminum in the average 1960-model automobile was 34.4 pounds, an increase of 7 per cent over the average of 30.6 pounds in 1959 models. As in past years, aluminum was also widely used in trucks, trailers and buses in such forms as sheet and structural shapes for body construction; extruded sections for flooring; forgings and castings for wheels and various fittings; and screw machine products for fastening.

In the aircraft, marine and railroad fields, aluminum also continued to find important applications. The expanding use of aluminum shipping containers and truck trailers in integrated freight service employing highway, rail and water movement, provides a significant extension to Alcoa's transportation market.

Defense

In cooperation with various government agencies and their contractors, Alcoa entered into a variety of projects in the defense industry. One of these projects was the application of high-strength weldable aluminum sheet as a structural material in the *Saturn* interplanetary space vehicle. In other projects, high-strength aluminum components were used in such applications as rocket motor cases and liquid fuel tanks.

The light weight of aluminum proved especially valuable in the design of military equipment, including armored tanks and airborne equipment that is capable of being dropped by parachute.



The U. S. Army's new M-113 aluminum armored personnel carrier, which can be transported by air and dropped by parachute, and operated on land or in water.

[fol. 4746]

Packaging and Containers

The use of aluminum in packaging and containers became more widespread during 1960 because of its popularity with American housewives. While shipments of foil to converters leveled off somewhat because of heavy inventory buying in 1959, foil was widely employed in flexible wrapping materials, closures and special composite forms called laminates where it was combined with paper, plastics and other materials.

Because of the growing demand for foil bonded or laminated to paper, paperboard and other materials for packaging uses, Alcoa has installed added equipment to produce these materials. Used especially for overwraps and sealed packaging applications, the foil laminates offer both functional and decorative advantages where product freshness and content protection are essential.

Substantial gains were scored during the year in the field of aluminum rigid containers. Alcoa is working closely with can manufacturers who are developing and producing aluminum containers for a variety of products, including motor oil and food products such as citrus concentrates and fish.

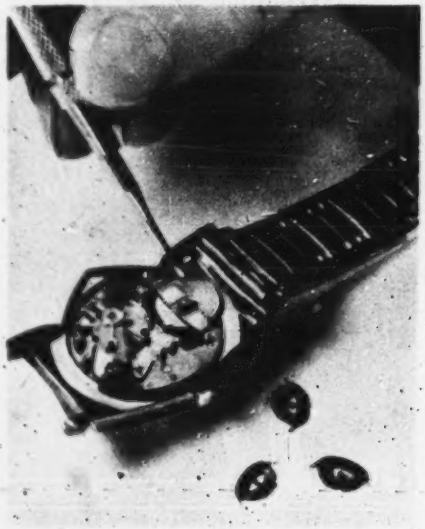
A revolutionary experimental development in this field is an easy-opening end for a new can having a low-cost foil and paperboard body. The container is called Safe-Pack. A test marketing program was successfully carried out during the year and work has begun on the development of a pilot production line.

During 1960, foil was especially popular in the bakery and frozen food fields. Packers and consumers alike have recognized aluminum foil as a superior packaging material for product protection and convenience in preparing and serving food.

Safe-Pack, a container development of 1960, has a foil-paper laminated body and aluminum ends with a quick-opening feature.

Electrical

An especially active field for aluminum in the electrical industry in 1960 was that of developing extra high voltage (EHV) networks employing large-diameter aluminum conductors. These conductors are suit



A coil of hair-thin magnet wire made by Rea Magnet Wire Division of Alcoa is essential to the precision performance of this new electric wrist watch.

[fol. 4747]

able for a power line with 10 times the load capacity of a typical 115,000-volt line. Power companies believe that the use of EHV will permit transmission of maximum flow over minimum rights of way.

Early in the year, Alcoa acquired Rea Magnet Wire Company, Inc., which, though operating independently, is now known as Rea Magnet Wire Division of Alcoa. This acquisition broadened Alcoa's service to the electrical industry and enabled the company to accelerate the use of aluminum sheet and foil strip conductors as well as aluminum magnet wire.

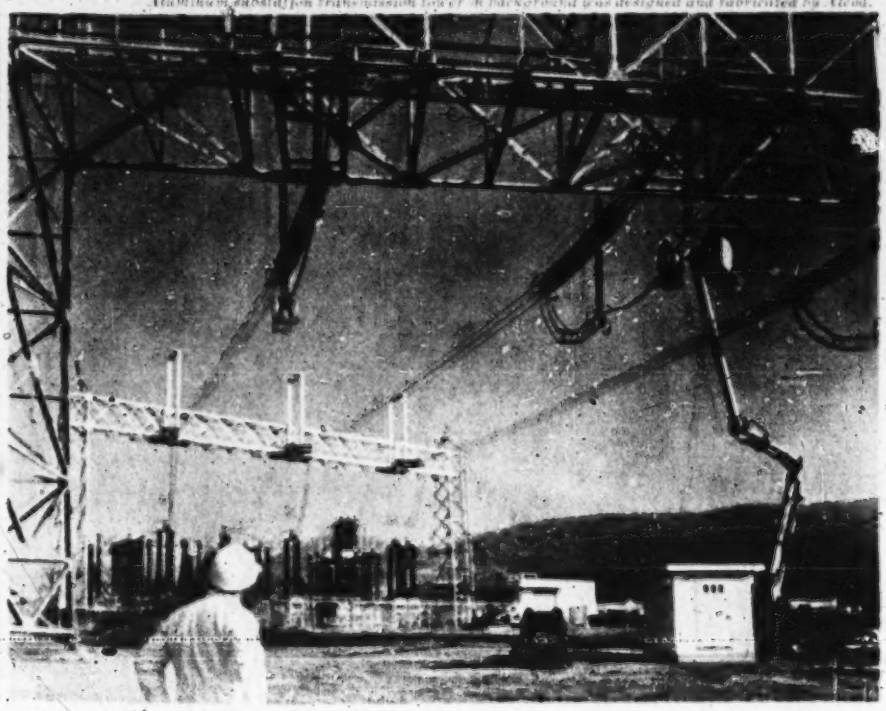
Rome Cable Division of Alcoa, which also operates as an independent subsidiary, now has a special products facility for the custom manufacture of cable products. Located in a new plant in Los Angeles, Calif., the new production unit is intended to serve the electronics market. Instrumentation cable supplied by the Rome Division is playing an important role in missile and rocket electrical systems, ground handling equipment and electronic data processing equipment in military and civilian applications.

Structural

Developments in the use of aluminum for electrical transmission towers are encouraging. Towers in sizes which utilize up to 34,000 pounds each have been designed, fabricated and shipped by Alcoa to utility companies. Several power lines using aluminum towers were completed and energized during 1960, and towers for additional lines are under construction or have been ordered. Aluminum towers have passed rigid tests that proved they fully met service requirements, while offering economy in erection and maintenance costs.

Alcoa's efforts to achieve widespread acceptance of aluminum substation structures in the electrical industry have now been extended to include specialized buildings associated with the chemical and process industries. Aluminum offers outstanding advantages for these applications because of its resistance to chemical corrosion. Alcoa's structural division has special facilities at the company's Cressona, Pa., works location to fabricate these and other structural assemblies.

Experimental EHV (extra high voltage) power line using Alcoa aluminum conductors. Aluminum substation transmission tower in background was designed and fabricated by Alcoa.



A noteworthy aspect of Alcoa's activities in 1957 was the company's continued effort to shorten the time between development of research findings and their profitable application. Through close cooperation between Research and other divisions of the company, working processes were improved and programs were initiated to stimulate new products.

Improved aluminum powders were developed for use as solid fuel propellants for the missile and rocket industry. New tarnishing aluminum pigments were produced that offer bright, attractive, durable coatings for automobile bodies. Methods were devised for preparing colored aluminum powder for use as a pigment in plastics, ink and paints.

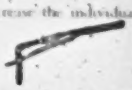
Production lithographic printing on foil, color and five-color presses to produce high quality pictorial designs was accomplished for the first time on aluminum foil because of a special transparent coating developed by Alcoa Research Laboratories. This coating permits the foil surface of a foil-paperboard laminate to be printed by the lithographic process with the same ease as ordinary coated papers.

During the second quarter, the company announced a packaging development laboratory at Morristown, Pa., as a division of the process development laboratories. The new laboratory will supplement the packaging development activities of Alcoa Research Laboratories and the sales development division. Work at the new location is directed toward expanding Alcoa's services to the packaging industry and increasing the use of aluminum flexible packaging, closures and rigid containers, including aluminum cans.

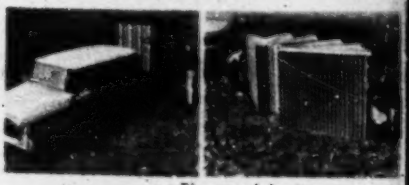
PUBLIC RELATIONS AND ADVERTISING HIGHLIGHTS

Through both advertising and publicity, the company sought to increase the demand for Alcoa products and to create an understanding of Alcoa by all segments of the public.

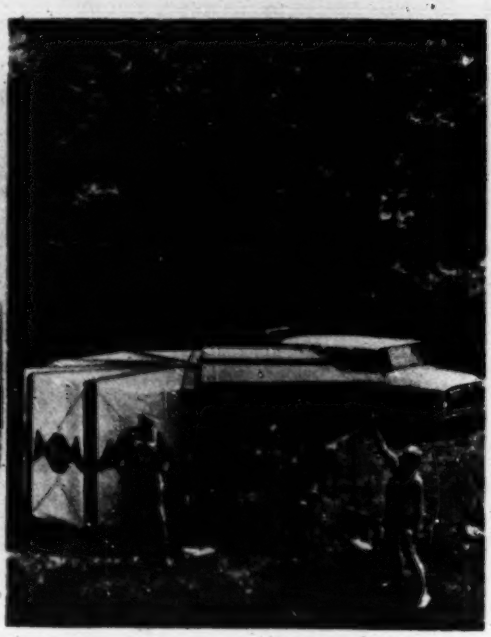
The public affairs program of Alcoa was broadened during the year. More than 2,300 salaried employees at plants and offices completed the Alcoa Course in Practical Politics designed to increase the individual's



Alcoa's mobile x-ray screening unit is a compact camping unit on wheels.



The expanded unit contains twenty sleeping quarters for six people.



employee's active participation in, and understanding of, our political system.

The company continued its aggressive advertising and promotional activities, with particular emphasis on automotive applications and on Alcoa Siding and related residential building products. Television, radio, newspapers, consumer magazines, trade and technical publications, direct mail, motion pictures, exhibits and store displays were used to stimulate demand for our own products and those of our manufacturing customers. The increased use of aluminum in rockets, missiles, lightweight military vehicles, ground handling equipment for missiles and other defense materials prompted a new advertising program designed to capitalize on Alcoa's wide range of experience and facilities in this important market.

FACILITIES

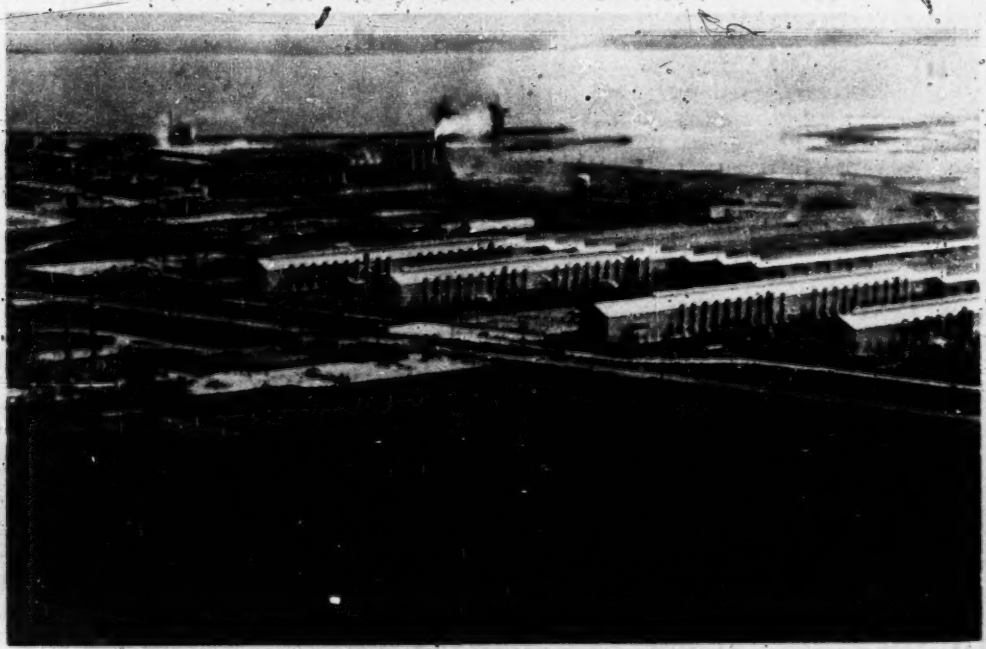
Alcoa's program of cost reduction and product improvement was intensified in 1960. One aspect of this program was the extensive application of computers and other electronic accounting equipment to improve the efficiency of the company's cost and budget control system. At all Alcoa operating locations, every effort was made to ensure that a high level of performance and product quality was maintained.

Raw Materials and Refining

Production of bauxite in the Dominican Republic increased steadily through the efforts of Alcoa Exploration Company. The new refining works at Point Comfort, Tex., includes special equipment for processing Dominican type bauxite.

Alcoa's fourth major source of bauxite was acquired

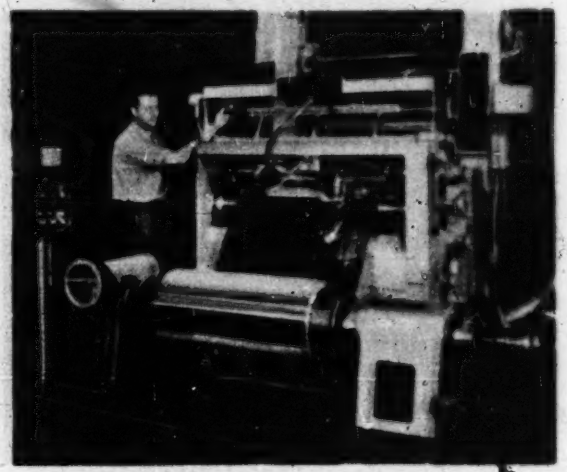
Aerial view of Alcoa's Point Comfort, Tex., operations, which involve both ore-refining and smelting of aluminum. Electric power for this large plant is generated by radial engines burning natural gas.



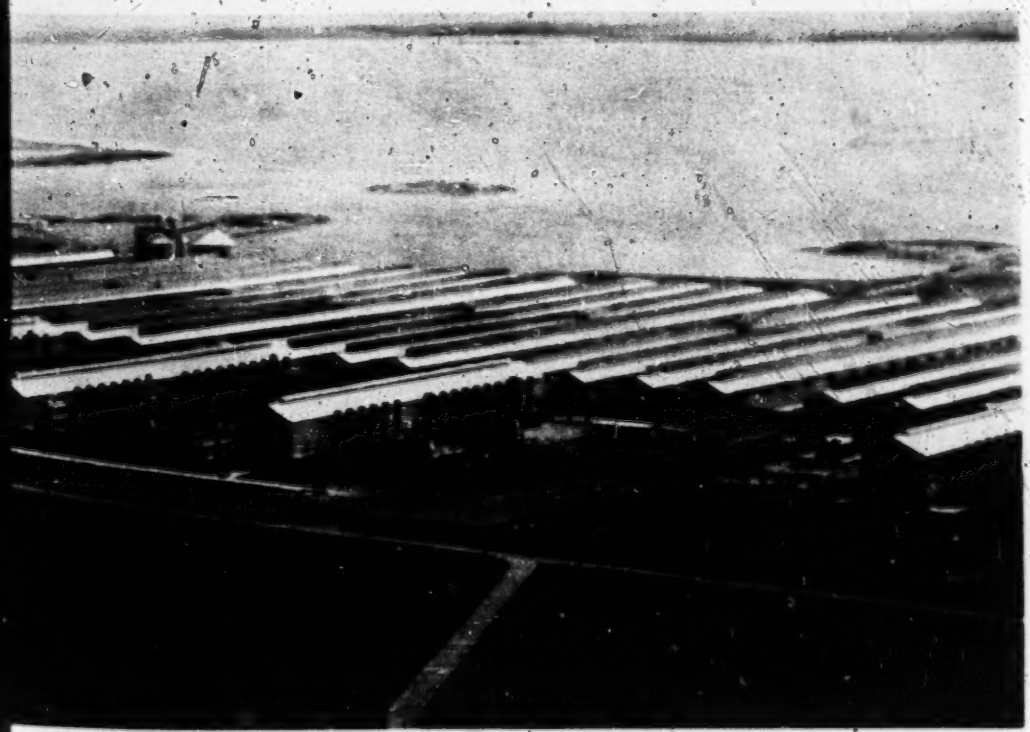
[fol. 4750]

on May 30 when the company exercised an option covering mining rights on more than 30,000 acres of bauxite-bearing lands in Jamaica. These deposits will be developed during the next three years by Alcoa Minerals of Jamaica, Inc. Alcoa's other major sources of bauxite are at Bauxite, Ark., and in Suriname, where operations are conducted by Suriname Aluminum Company.

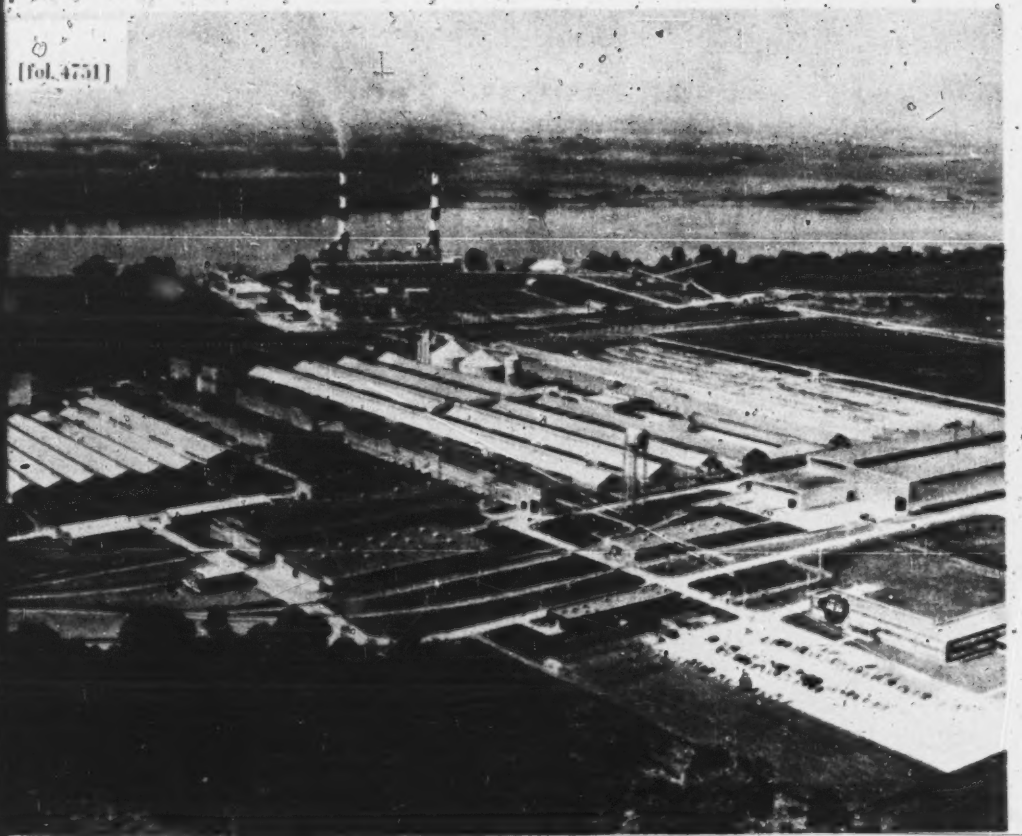
Remaining chemical operations at the East St. Louis, Ill., works have been scheduled to close early in 1962. New and more modern facilities at Bauxite, Ark., and Point Comfort, Tex., will replace the obsolete East St. Louis works for the production of aluminum fluoride, cryolite and alumina chemicals.



Alcoa's foil mills are now equipped to splice the ends of foil rolls by ultrasonic welding. The process permits converter customers to operate foil processing equipment at high speeds.



[fol. 4751]



Aerial view of Alcoa's newest smelter, Warrick works, which began operations in June, 1960, near Evansville, Ind., using electricity produced in a coal-fired, steam power plant.

Smelting

Production of primary aluminum by Alcoa totaled [illegible],000 tons in 1960 as compared with [illegible],000 tons in 1959. Although a number of idle potlines were restored to operation early in the year, one was closed in November and another was made inactive shortly after the end of the year.

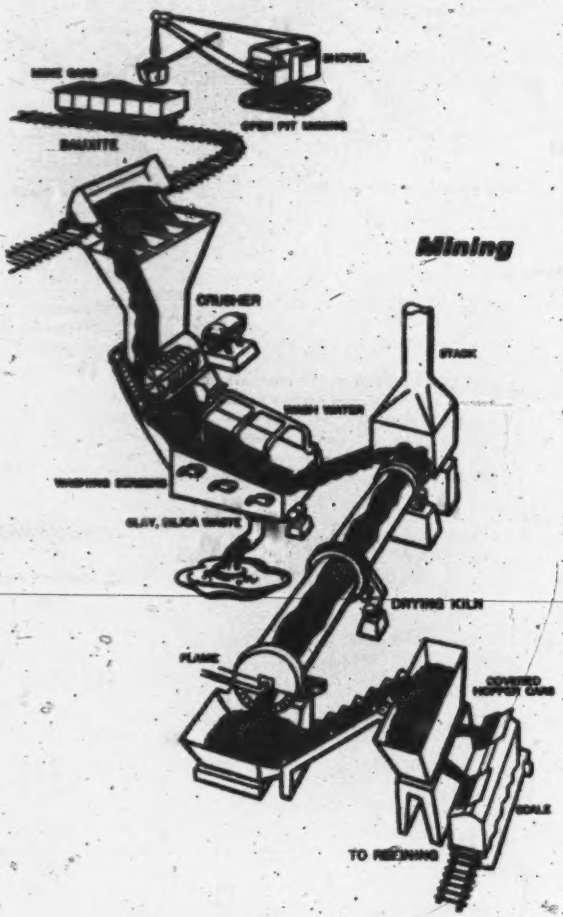
The new Warrick, Ind., smelter began limited production in June. Completion of the plant will be de

Snug fit of new interlocking design assures increased stability and ease of handling of handled aluminum ingot.

[fol. 4752]

ALCOA ▲ ALUMINUM

from mine to market

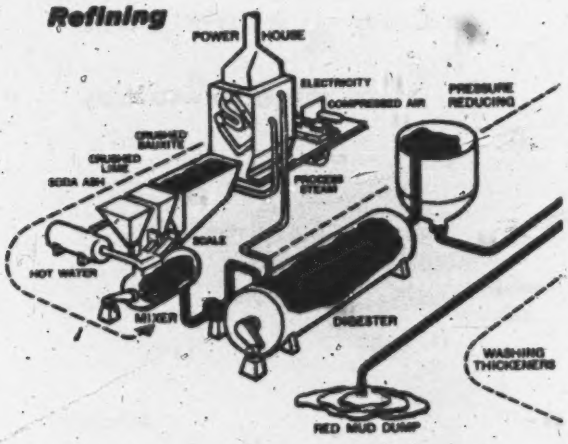


Bauxite, the ore most commonly used for the commercial production of aluminum, is found in large quantities in many parts of the world. Alcoa's major sources of bauxite are Suriname, the Dominican Republic, Jamaica (under development) and the State of Arkansas. Since bauxite usually occurs near the surface of the earth, it is mined with large power shovels. After being crushed and dried, it is shipped to refining plants for further processing.

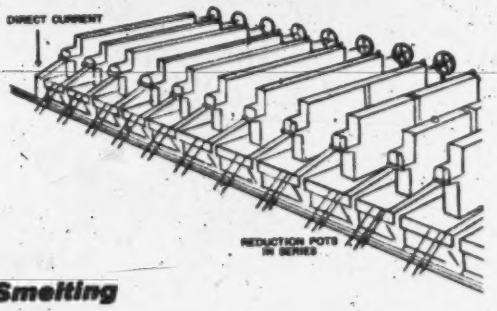
to Refining . . .

[fol. 4753]

Refining



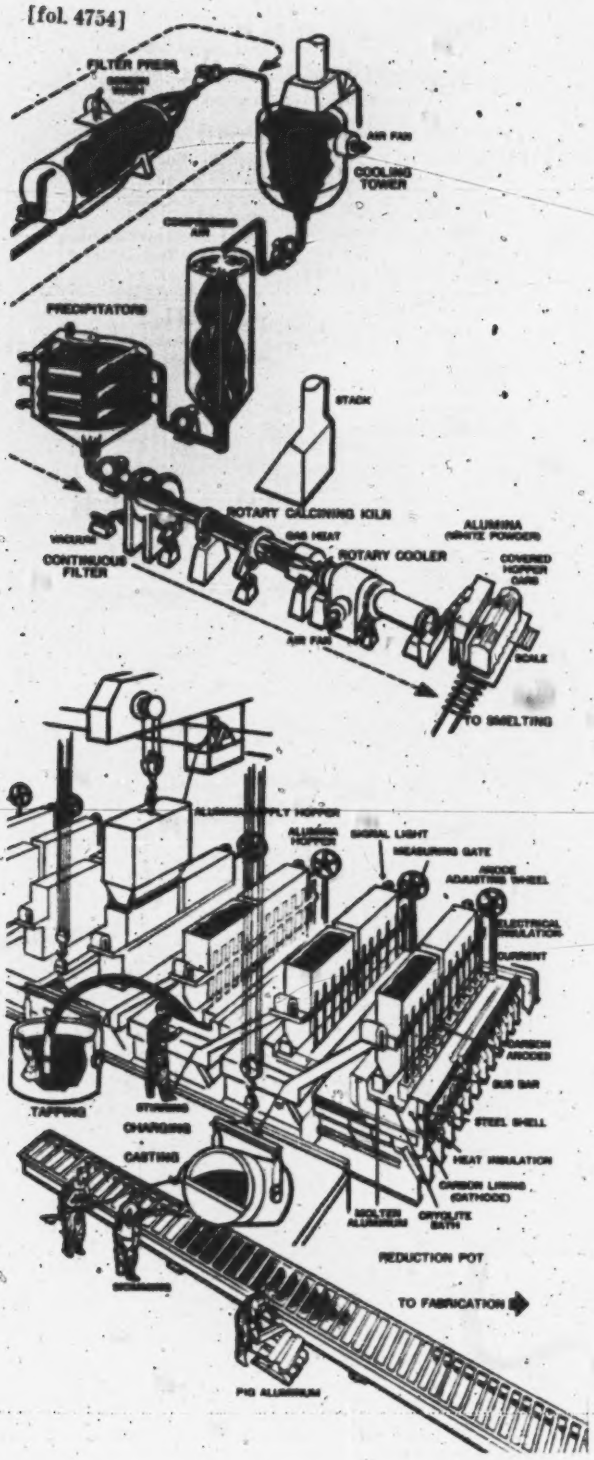
In the refining process, bauxite is mixed with a solution of caustic soda. When the mixture is heated under pressure, only the hydrated alumina (aluminum hydroxide) contained in the bauxite dissolves, while the solids and other impurities which remain are filtered out. The filtered solution is then cooled to produce a precipitate of hydrated alumina. This alumina, after being filtered from the solution and washed, is heated in revolving kilns to 1800°F. The resulting white powder—pure alumina—is then shipped to smelting plants, usually in railroad hopper cars.



Smelting

Metallic aluminum is produced by an electrolytic process that separates alumina into its component parts—oxygen and aluminum. In this process, pure alumina is dissolved in a bath of molten cryolite (sodium aluminum fluoride) in large electrolytic furnaces called reduction pots. By means of a carbon anode suspended in the bath, electric current is passed through the mixture, causing metallic aluminum to be deposited on the cathode, the carbon lining of the pot, where it settles to the bottom of the cell. The heat generated by the passage of electric current keeps the bath molten so that alumina can be added as necessary to make the process continuous. At intervals, aluminum is siphoned from the pots and the molten metal is transferred to holding furnaces for removal of impurities or alloying with other ingredients. It is then cast into ingots of various sizes for further fabrication.

[fol. 4754]


FILTER PRESS
AIR FAN
COOLING TOWER
PRECIPITATORS
STACK
ROTARY CALCINING KILN
GAS HEAT
ALUMINA (WHITE POWDER)
VACUUM
CONTINUOUS FILTER
ROTARY COOLER
COVERED HOPPER CARS
AIR FAN
SCALE
TO SMELTING
SIGNAL LIGHT
MEASURING GATE
ANODE ADJUSTING WHEEL
ELECTRICAL INSULATION
CURRENT
CARBON ANODES
BUS BAR
TAPPING
STEEL SHELL
CHARGING
HEAT INSULATION
CASTING
CARBON LINING (CATHODE)
MOLTEN ALUMINUM
CRYOLITE BATH
REDUCTION POT
TO FABRICATION
PIG ALUMINUM

[fol. 4755]

ALCOA

Operating Locations

RAW MATERIALS LOCATIONS

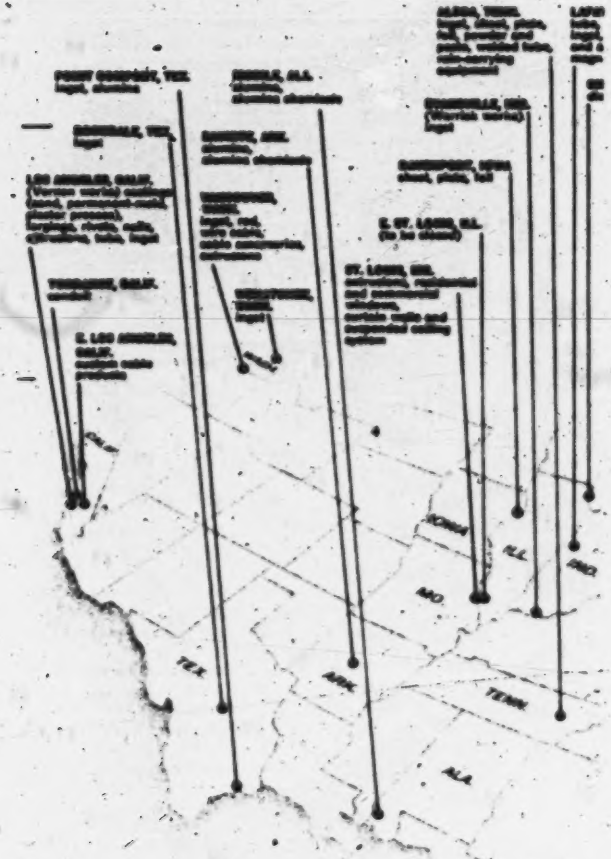
Bauxite, Arkansas
Cabo Rojo, Dominican Republic
Evansville, Indiana
(Warrick Works)
Houston, Texas
Jamaica
Moengo, Suriname
Paranam, Suriname
Point Comfort, Texas
Port of Spain, Trinidad, B.W.I.
(Bauxite Transfer Station)
Rockdale, Texas
Rockdale, Illinois
San Jose, Costa Rica
St. Martinville, Louisiana

RESEARCH LABORATORIES

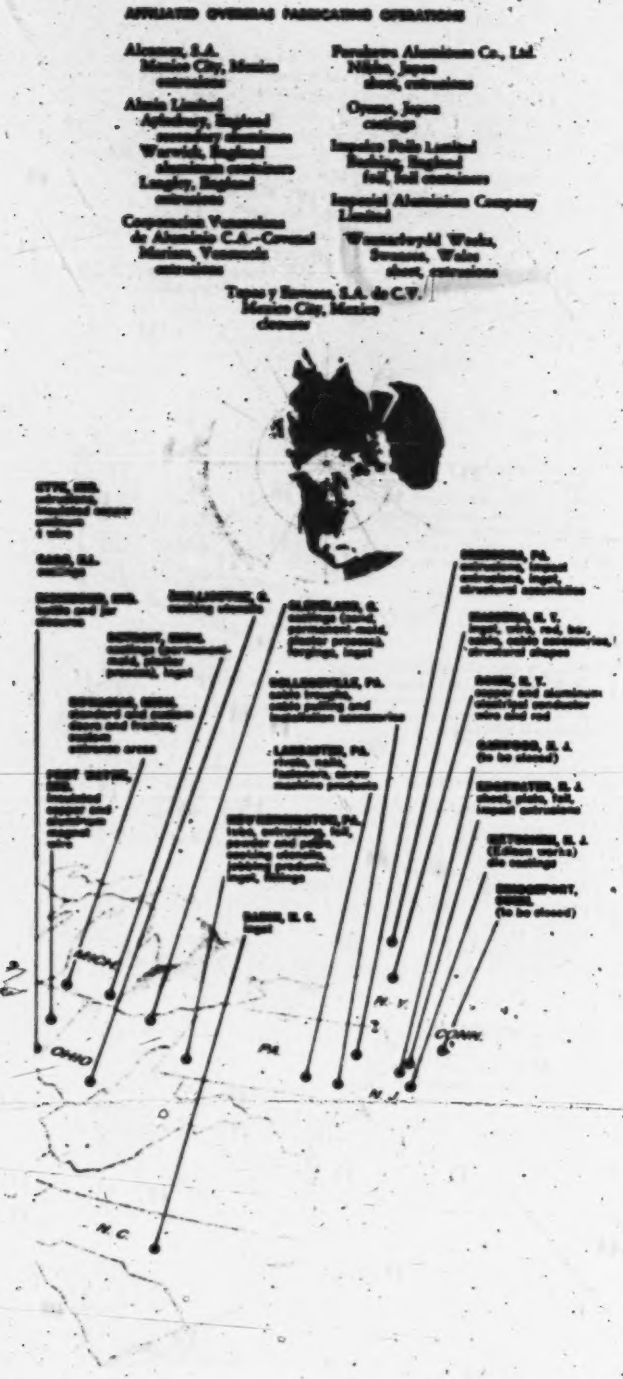
Chicago, Illinois
Cleveland, Ohio
East St. Louis, Illinois
Massena, New York
New Kensington, Pennsylvania
Rome, New York

REFINING LOCATIONS

Bauxite, Arkansas
Mobile, Alabama
Point Comfort, Texas



[fol. 4756]


AFFILIATED OVERSEAS FABRICATING OPERATIONS
Alcoaser, S.A.
Mexico City, Mexico
extrusions
Alcoa Limited
Aykeburn, Scotland
secondary aluminum
Warwick, England
aluminum containers
Langley, England
extrusions
Corporacion Venezolana
de Aluminio C.A.—Conesal
Maracay, Venezuela
extrusions
Furukawa Aluminum Co., Ltd.
Nikko, Japan
sheet, extrusions
Oyama, Japan
castings
Imperial Foils Limited
Rodbaston, England
foil, foil containers
Imperial Aluminium Company
Limited
Wrexham Lyd Works,
Swansea, Wales
sheet, extrusions
Tapa y Envases, S.A. de C.V.
Mexico City, Mexico
closures
OHIO
PA.
N. Y.
CONN.
N. J.
N. C.

[fol. 4757]

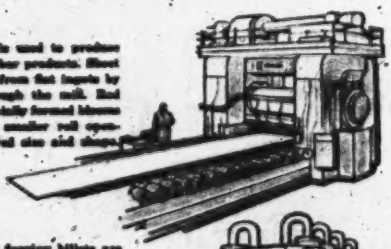
Fabricating

Aluminum has been called the world's most obliging metal, for it can be formed by every known metal-working process. The seven basic processes described here are simply the principal methods by which the majority of Alcoa's products are made. Alcoa uses many other fabricating processes.

Aluminum is readily joined by welding, brazing, riveting or soldering and is available in many different alloys suitable for a wide range of end uses. In addition, aluminum can be given an unusually wide variety of finishes. It can be painted, lacquered or colored permanently by an electrochemical process called anodizing. Because of its unique and valuable combination of advantages, aluminum has contributed greatly to man's progress and has become one of the most important metals of the 20th century.

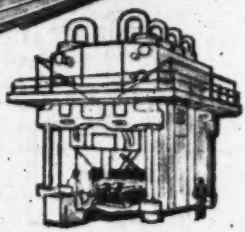
rolling

The rolling process is used to produce sheet, plate, rod and bar products. Sheet and plate are rolled from flat ingots by repeated passes through the mill. Rod and bar mills roll specially formed blooms through successively smaller roll openings to achieve desired size and shape.



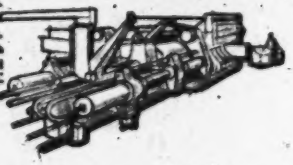
forging

Preheated aluminum forging billets are shaped either by forging hammers which pound the metal into prescribed shapes, or by forging presses which use pressures up to 50,000 tons.



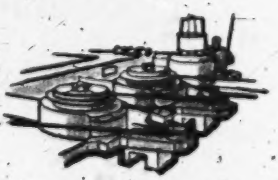
extruding

Because of its workability, aluminum is easily adapted to the extrusion process. Under pressure from a mechanical or hydraulic ram, ingot is forced through a die opening, taking the shape of the die. In impact extrusion, a cake-like slug of aluminum in a die is struck by a ram, causing the metal to flow back through the opening left between the die wall and the ram. The resulting hollow product assumes the shape of the opening.



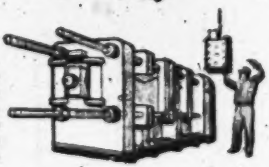
wire drawing

Because of its ductility, aluminum can readily be drawn into products ranging from bar to extremely fine wire. In this operation, aluminum stock is drawn through a series of metal dies which reduce the diameter and produce the desired shape.



casting

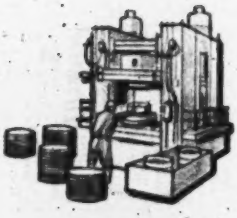
The casting process involves the solidification of molten metal in a mold having the shape of the finished product. In the sand, plaster and permanent-mold processes, aluminum is fed by gravity into the mold cavity. Aluminum die castings are made by forcing molten aluminum into a mold under pressure.



[fol. 4758]

deep drawing

Aluminum cooking utensils and many other types of containers are made by forcing a circular sheet of aluminum into a die under pressure from a hydraulic ram. Several preliminary draws may be made before the final shape and dimensions are achieved.



machining

One of the chief characteristics of aluminum and its alloys is the ease with which it can be machined. Castings, forgings, and many other products are regularly machined to their final shape and dimensions. This ease of workability makes possible high-speed production of screw machine products.

Basic Characteristics of Aluminum

Aluminum weighs only about one-third as much as copper or steel.

Aluminum is strong in alloy form.

Aluminum is highly resistant to corrosion.

Aluminum is an excellent conductor of electricity.

Aluminum transmits heat rapidly.

Aluminum reflects both light and radiant heat.

Aluminum can be safely used with foods and medicine.

Aluminum is nonmagnetic.

Aluminum can be given a wider variety of finishes than any other metal.

Aluminum does not readily absorb neutrons.

Aluminum can be formed by all known metal-working processes.

[fol. 4759]

To purchase Alcoa products, contact the Alcoa sales office nearest you for the name of a distributor or jobber who can best satisfy your requirements. Also check the Yellow Pages of your telephone directory under the word "Aluminum."

ALCOA SALES OFFICES

Akron 8, Ohio	506 Akron Savings & Loan Building
Albany 10, N. Y.	235 Lark Street
Allentown, Pa.	1152 Hamilton Street
Atlanta 9, Ga.	Alcoa Building, 1615 Peachtree Street
Baltimore 2, Md.	1007 Commercial Credit Building
Birmingham 13, Ala.	P. O. Box 74344
Boise, Idaho	1230 Vista Avenue
Boston 16, Mass.	20 Providence Street, Park Square
Bridgeport 1, Conn.	Atlantic Street
Buffalo (Tonawanda), N. Y.	3427 Sheridan Drive
Charlotte 2, N. C.	1000 Wachovia Bank Building
Chattanooga 2, Tenn.	1205 Volunteer Building
Chicago 11, Ill.	520 North Michigan Avenue
Cincinnati 6, Ohio	Alcoa Building, 2331 Victory Parkway
Cleveland 15, Ohio	1450 Terminal Tower
Columbus 15, Ohio	290 Bryden Building
Dallas 1, Texas	1900 Fidelity Union Tower
Davenport, Iowa	601 Brady Street
Dayton 3, Ohio	307 Northtown Arcade
Denver 4, Colo.	105 Fillmore Street
Des Moines 12, Iowa	3620 Ingersoll Avenue
Detroit 2, Mich.	610 New Center Building
Flint 2, Mich.	310 Mott Foundation Building
Fort Wayne, Ind.	2934 South Calhoun Street Building
Garden City, N. Y.	1001 Franklin Avenue
Grand Rapids 2, Mich.	812 Michigan National Bank Building
Hartford 5, Conn.	1049 Asylum Avenue
Houston 2, Texas	1310 Texas Eastern Building
Indianapolis 7, Ind.	2959 North Meridian Street
Jackson, Mich.	310 National Bank Building
Kansas City 5, Mo.	2300 Power & Light Building
Lafayette, Ind.	P. O. Box 300
Lima, Ohio	901 National Bank Building
Little Rock, Ark.	414 Tulsahi Street
Los Angeles 17, Calif.	1145 Wilshire Boulevard
Louisville 2, Ky.	1132 Starks Building
Lubbock, Texas	305 Field Building
Memphis 17, Tenn.	4515 Poplar Avenue
Miami (Hialeah), Fla.	490 Hialeah Drive Building
Milwaukee 3, Wis.	3040 West Wisconsin Avenue
Minneapolis 34, Minn.	4010 West 65th Street
Nashville 12, Tenn.	233 Wilson-Sutro Building
Newark 2, N. J.	744 Broad Street
New Orleans 12, La.	1225 Whitney Building
New York 17, N. Y.	230 Park Avenue
Oakland 8, Calif.	1081 46th Street
Oklahoma City 3, Okla.	111 N. W. 23rd Street
Omaha 2, Nebr.	746 Omaha National Bank Building
Peoria, Ill.	614 Commercial Bank Building
Philadelphia 2, Pa.	1800 Two Penn Center Plaza
Phoenix 4, Ariz.	702 First National Bank Building
Pittsburgh 20, Pa.	875 Greentree Road
Portland 4, Ore.	1115 U. S. National Bank Building
Providence 3, R. I.	2305 Industrial Bank Building
Richmond 30, Va.	900 North Thompson Street
Rochester 18, N. Y.	Rolfe Building
St. Louis 8, Mo.	10th Floor, Continental Building
San Diego 3, Calif.	2942 Fifth Avenue
San Francisco 4, Calif.	2300 Equitable Life Building
Seattle 1, Wash.	1411 Fourth Avenue Building
South Bend 1, Ind.	805 I.M.S. Building
Spokane 1, Wash.	610 Fidelity Building
Springfield 3, Mass.	500 Tuttell-Watters Building
Syracuse 1, N. Y.	731 Junius Street
Tampa 9, Fla.	4302 Henderson Boulevard
Toledo 2, Ohio	330 W. Woodruff Avenue
Washington 6, D. C.	1200 Ring Building
White Plains, N. Y.	100 South Broadway
Wichita 2, Kan.	1010 Central Building
Wilmington 1, Del.	825 Bank of Delaware Building
Worcester 8, Mass.	22 Pleasant Street
York, Pa.	205 Manufacturers Building
Youngstown 3, Ohio	537 Ohio Edison Building
Alcoa International, Inc.	230 Park Avenue, New York 17, N. Y.
Lima, Peru	Apartado 371
London W. 1, England	3 Portman Street

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA
GENERAL OFFICES, 1501 ALCOA BUILDING
PITTSBURGH 19, PENNSYLVANIA

[fol. 4760]

ferred until market demand warrants the additional production.

Work progressed as scheduled on the Tuckertown Dam near Alcoa's Badin, N. C., smelter. The new dam, which will provide the fourth Alcoa hydroelectric installation on the Yadkin River, is expected to be completed by May, 1962. The Tuckertown Development is part of a general program to modernize and expand the smelting facility.

A program involving the addition of furnaces and casting facilities for production of various types of commercial ingot at smelting locations was carried out during the year, and the term "pig" was abandoned as a designation for primary aluminum products.

A new interlocking design was developed for the popular 50-pound ingot. This new design has a superior surface appearance and offers increased shipping stability and ease of handling for bundled ingot.

Brokopondo Project

The Brokopondo hydroelectric and smelting plant development of Suriname Aluminum Company in Suriname progressed on schedule during 1960. The new 45-mile road from the head of navigation of the Suriname River at Paranam to the dam site at Afobakka is open to traffic. The first bridge across the Suriname River, located just below the future dam, was also completed.

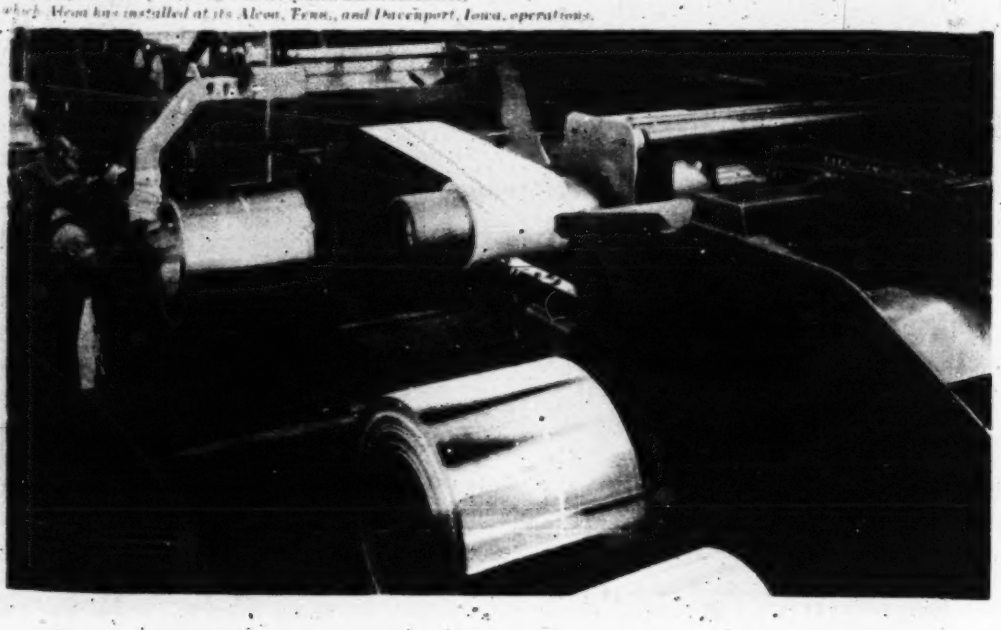
Construction of the dam itself started in August. The construction camp was enlarged to house 1,200 personnel, and permanent staff housing was built at Paranam, Jo and the dam site. A testing laboratory, office, shops and other essential service facilities near the dam were also completed during the year. Base warehouses and storage tanks were erected at the smelter site but construction of the smelter itself will be timed to match the completion of the hydroelectric development.

Fabricating

A continuing program of improvement and modernization in the fabricating plants resulted in several major changes in equipment, the decision to close two operating facilities and the start-up of one new facility.

The Bridgeport, Conn., foundry, primarily designed during World War II to produce a line of castings for the aircraft industry which are no longer needed in large quantities, will close by mid-1961. The balance of Bridgeport's casting business will be transferred to Alcoa's other foundries at Cleveland, Detroit and Los Angeles, and to the new Edison works near Metuchen.

New equipment for producing enamel-coated aluminum sheet, which Alcoa has installed at its Alcoa, Texas, and Davenport, Iowa, operations.



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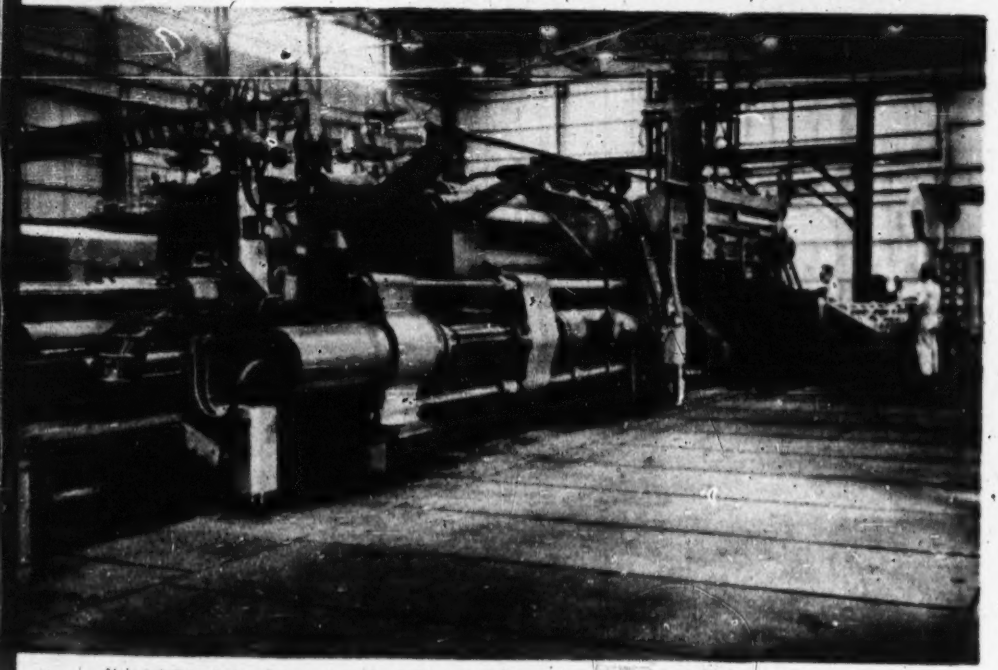


New 5,000-ton extrusion press at Alcoa's Vernon, Calif., works. This press will fabricate large shapes for the architectural, aircraft and missile industries.

N. J., which began operations in the fourth quarter.

The Edison works replaces the Garwood, N. J., works, a smaller die casting plant that has been operated by Alcoa since 1928. Edison works, now equipped with die casting equipment of the latest design, offers greatly improved working conditions and provides space for expansion that was not available at Garwood. The new facility is located within commuting distance of the Garwood works and has allowed the company to retain the highly skilled personnel employed at the old location. Edison works will also be producing permanent-mold castings by mid 1961.

To meet the rising demand for enamel coated aluminum sheet, Alcoa began early in the year to increase its capacity to produce the new product. Construction was begun on two coating lines at the Davenport, Iowa, sheet and plate mill during the first quarter and both lines were placed in operation by the end of the year. The lines are equipped to coat sheet continuously in widths up to 48 inches.

In mid year, the company began a two year expansion and modernization of its two sheet mills at Davenport, Iowa, and Alcoa, Tenn., at a cost in excess of $18 million. Both mills have been expanded and updated regularly, but the new 1960-62 program is designed to make them even more efficient producers. Many of the additions and improvements will be aimed at improving the company's ability to roll light gages of sheet in large volume at high speeds. Demand for this product line has remained at record levels and an increasing potential is seen for it in building products, appliances, packaging and automotive applications.

[fol. 4762]

At the Richmond, Ind., works, a third major expansion in less than three years will provide additional capacity for the production of closures. The popularity of screw-on caps for baby food jars has had a significant part in this growth. Existing facilities at Richmond will also be modernized as part of this expansion.

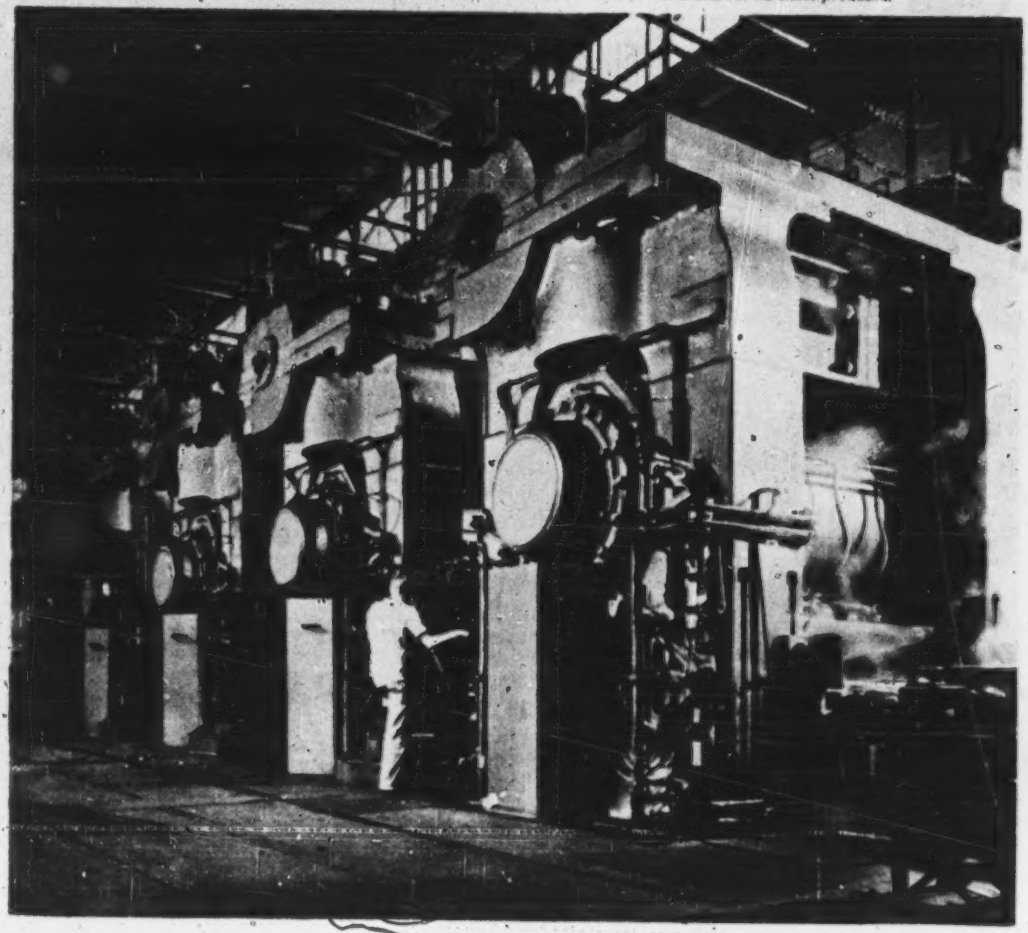
New equipment installations during the year included additional foil-paper and foil-wax laminators at Davenport, Iowa; a 44-inch, four stand tandem cold sheet mill at Alcoa, Tenn., and a 5,200-ton extrusion press at Vernon, Calif., works. Installation of a new 4,000-ton extrusion press is under way at Cressona, Pa.

Alcoa has equipped all foil mills with ultrasonic welding equipment. The ultrasonic weld fastens the ends of foil strips automatically, permitting a continuous coiling operation at considerable cost savings.

Alcoa Steamship Company, Inc.

In October, Alcoa Steamship Company, Inc., discontinued passenger service offered by the line's three passenger vessels because it was no longer economical. A limited passenger service will continue throughout the Caribbean area in freight ships and ore carriers.

Huge rolling mills, such as this one at Alcoa, Tenn., are undergoing improvement and modernization as demand increases for new and varied sheet products.



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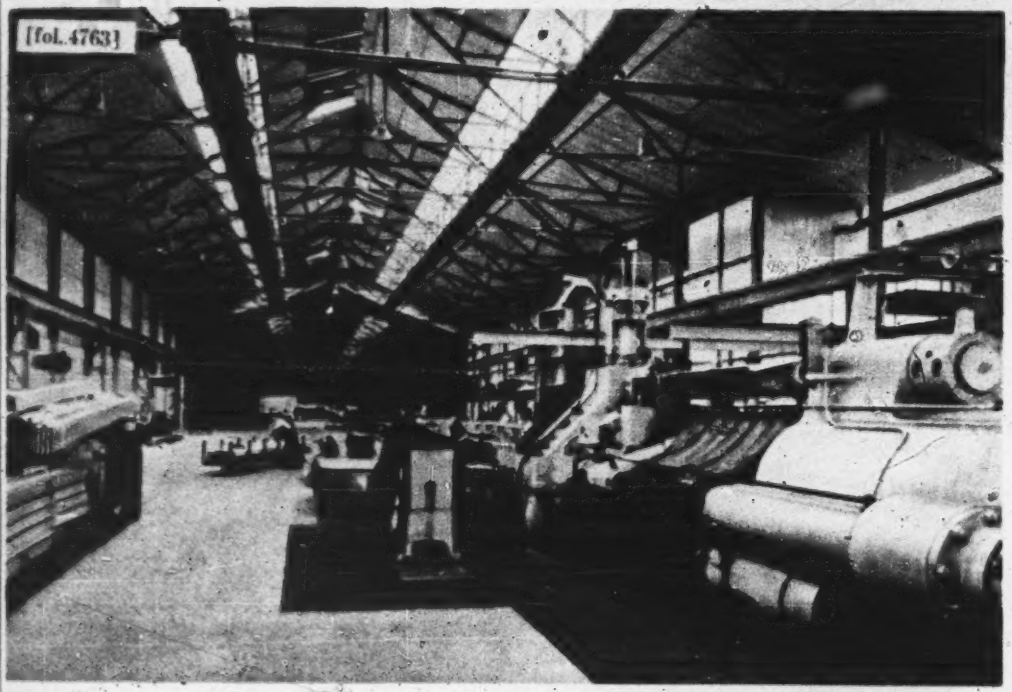


Interior view of extrusion mill at Southern Forge Limited, one of the companies in England jointly acquired by Alcoa and Imperial Chemical Industries Limited during 1960.

FOREIGN ACTIVITIES

The company's foreign interests continued to grow during the year. Two acquisitions were made by Imperial Aluminium Company Limited, a British affiliate in which Alcoa owns a 49 per cent interest. Impalco, as that company is called, in February acquired Invicta Foil and Chewright & Nicholls Foil Limited, a small foil manufacturing and converting company which has been renamed Impalco Foils Limited. On April 1, Impalco also purchased the aluminum rigid foil container facilities of The Prestige Group, a British affiliate of Ekco Products Company.

On May 4, Alcoa and Imperial Chemical Industries Limited, known as ICI, each acquired a 50 per cent share of a group of United Kingdom companies known as the Associated Light Metal Industries, or Almin Limited. The key company in the group is International Alloys Limited, the largest secondary smelter in the United Kingdom. The group also includes several aluminum fabricating concerns.

The company's Japanese affiliate, Furukawa Aluminum Co., Ltd., is continuing expansion of its operations with the technical assistance of Alcoa, and is increasing its investment in other fabricating operations in Japan.

Sales of the company's products in overseas markets doubled during 1960 as compared to 1950. Vigorous programs are being formulated to define and achieve further penetration of these markets.

ORGANIZATION CHANGES

Robert B. McKee, formerly vice president in charge of direct selling and distribution, was elected vice president in charge of sales on February 1, 1960. On this same date, Frederick J. Close, formerly vice president in charge of sales development and industry sales, was elected to the newly established post of vice president and general sales manager.

On April 21, John S. Harrison, formerly general manager, personnel, was elected vice president in charge of personnel and industrial relations.

On September 15, 1960, three major changes were made in Alcoa's executive management. Frank L. Magee, Alcoa president since 1957, was elected chairman of the board and will continue as the company's

[fol. 4764]

chief executive officer. Lawrence Litchfield, Jr., executive vice president and member of the board of directors, was named president. I. W. Wilson, chairman of the board since 1957, was named chairman of the company's finance committee.

At a meeting of the board of directors held on December 15, the following management changes were made:

H. C. Erskine, formerly vice president in charge of production, was elected executive vice president.

John D. Harper, formerly assistant general production manager, was elected vice president in charge of smelting and fabricating.

George W. Streepey, formerly assistant general production manager, was elected vice president in charge of raw materials and refining.

Edward B. Wilber, formerly vice president and treasurer, resigned as treasurer and continues as vice president in charge of finance.

Matt. W. Stanley, formerly assistant treasurer, was elected treasurer.

Deceased

The directors and officers of Aluminum Company of America report with deep regret the deaths of two former directors.

Mr. George J. Stanley died on September 7, 1960. He had been a member of the board of directors since 1939. Mr. Stanley served as vice president of Alcoa from 1931 until his retirement from this post in 1947.

Mr. George C. Allen died on October 10, 1960. Mr. Allen was a member of the board of directors from 1926 to 1936.

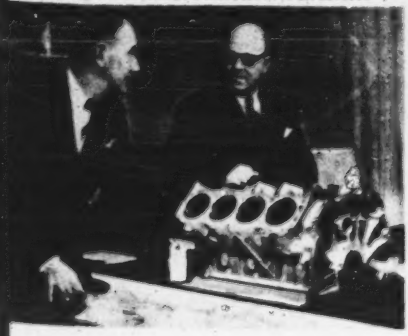
HONORS

Roy A. Hunt, chairman of the executive committee of Alcoa, received an honorary Doctor of Humane Letters degree from Grove City College on June 6, 1959. On April 5, 1960, Mr. Hunt received the Distinguished Alumni Award from Shadyside Academy in Pittsburgh, Pa. The Pennsylvania Society presented

(left to right) William K. Davenport, I. W. Wilson, Edward B. Wilber, Matt. W. Stanley

(left to right) H. C. Erskine, George W. Streepey, John D. Harper, John S. Harrison

(left to right) Frederick J. Close, Robert B. McKee



[fol. 4765]

Mr. Hunt its annual Gold Medal Award for Distinguished Achievement on December 10, 1960.

John D. Harper, vice president in charge of smelting and fabricating, was cited with an award by the Austin, Tex., Headliners Club on January 30, 1960 for helping to bring industry to Central Texas.

The Alcoa News, Alcoa's employee magazine, received a Freedoms Foundation Award in February, 1960, for articles furthering "a better understanding of the American Way of Life" during 1959.

O. C. McCreery, assistant to the president, was given the Annual Alumni Award for Outstanding Achievements by the University of Minnesota on May 7, 1960.

Leon E. Hickman, executive vice president of Alcoa, received a Doctor of Laws Degree from West Virginia Wesleyan College on May 24, 1960.

Jay M. Sharp, manager of general advertising, was elected chairman of the board of directors of the Association of Industrial Advertisers in June, 1960.

In September, Alcoa was named among the 20 companies rated "Best Managed" by 171 corporation presidents in a panel sponsored by *Dun's Review and Modern Industry* magazine.

M. M. Anderson, executive vice president of Alcoa, was re-elected president of The Aluminum Association, principal trade organization of the industry.

PERSONNEL AND INDUSTRIAL RELATIONS

Throughout 1960, the company continued its efforts to help its people make their fullest contribution to the enterprise and derive the maximum satisfaction from their positions.

Management Development and Employee Education

Pittsburgh conferences of the Management Development Program were continued during 1960, bringing small groups of key management personnel together to review the company's problems and progress and to improve their individual effectiveness as managers for present and future responsibilities. Two hundred seventy management people have participated in this program in the past several years.

All levels of supervision have cooperated to improve employee understanding of the company's competitive problems and of the need to do the best possible job. Supervisory training programs for these objectives were conducted at plant locations. Courses in creative thinking were given at works locations and in the headquarters offices.

Approximately 300 trade apprentices were in training at 18 works locations during 1960. Graduated apprentices during the year numbered 75 and 12 previous graduates advanced to supervisory positions. An additional 700 men received technical training.

In order to seek out the best of 1960's college graduates, Alcoa's college recruiting staff with assistance from other company representatives visited 144 college campuses. From approximately 5,000 applicants who were interviewed and screened on campus and at company locations, 350 outstanding young men were selected for presently needed sales, technical and operating requirements and to provide a continuing source of future managers.

Employee Benefits

The Employees' Group Insurance Plan provides sickness and accident benefits and hospital and surgical insurance for active employees of Alcoa and their dependents as well as life insurance for active and retired employees. Effective August 1, 1960, the plan was revised to provide hospital expense and surgical operation insurance to employees retired on pension under the Employees' Retirement Plan, and their wives.

The Voluntary Life Insurance Plan, for which the employees pay, and which became effective in 1949, provides additional amounts of life insurance and non-occupational accidental death and dismemberment insurance at favorable rates. The plan provides that life insurance in reduced amounts may be continued following retirement. As of December 31, 1960, approximately 35,000 employees were insured for nearly $400,000,000 of life insurance.

Industrial Relations

During 1960, additional wage and fringe benefit adjustments were made effective under the terms of the labor agreements negotiated in late 1959 and early 1960. These labor agreements expire on July 31, 1962. During the year there were no major strikes or work stoppages. Encouraging progress was made in the area of constructive employee and union relations with particular emphasis on assuring better understanding of the company's competitive situation and productivity requirements.

FINANCIAL REVIEW OF 1960

Net Income and Gross Revenues

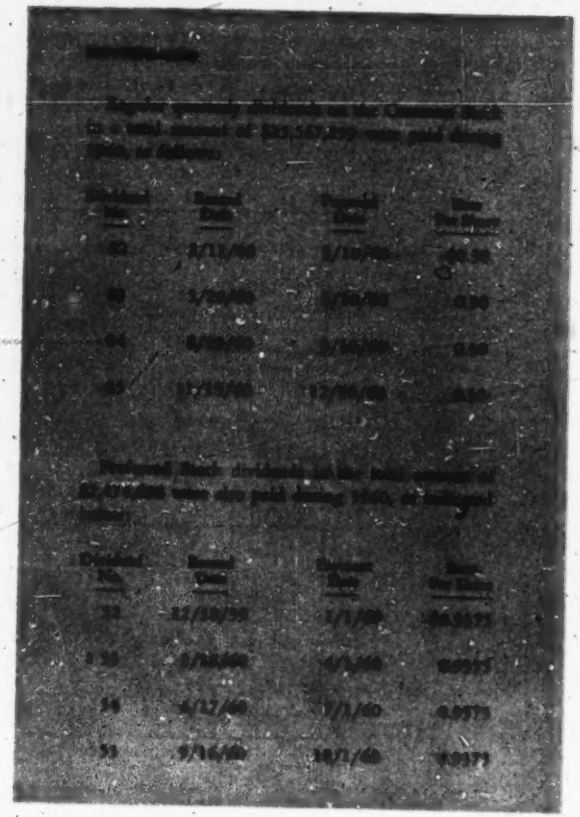
Although net sales, operating revenues and other income, aggregating $869,780,176 in 1960, exceeded the $864,967,722 of gross revenues in 1959, net income decreased from $55,570,854 to $40,044,103. The 1960 amounts include operations of Rea Magnet Wire Company, Inc. and Cupples Products Corporation, which were acquired in January 1960. Based on the number of shares of common stock outstanding at the end of each year, net income was $1.76 per share in 1960 as against $2.52 per share in 1959.

Income before taxes in 1960 was $47,144,105, or 5.4 per cent of gross revenues as compared with $90,570,854, which amounted to 10.5 per cent of gross revenues in 1959, indicating the effect of a continuing erosion of prices on fabricated and mill products that prevailed throughout the industry during 1960. Although Alcoa announced price increases effective August 1, 1960 on certain fabricated and mill products, the general price trend prevented the full realization of such increases, which, if obtainable, would have substantially mitigated the effect of contractual increases in labor costs that became effective on that date. An additional factor that adversely affected the amount of income before taxes was the payment of $9,477,520 to a selling subsidiary of a Canadian corporation in return for the cancellation of a substantial portion of Alcoa's obligation to purchase primary aluminum under a purchase contract consummated in 1953. This contract is more fully described in Note D to the Consolidated Financial Statement appearing in the company's 1959 Annual Report. The company's remaining maximum obligation to acquire metal under such purchase contract amounted to approximately $8,300,000 as of December 31, 1960.

Selling, general administrative and other expenses increased in 1960, partly as a result of the inclusion of the acquired subsidiaries, increased research and development and expanded sales activities.

The effective income tax rate in 1960 was substantially lower than the comparable rate in 1959, principally because of a substantial decline in the profits on domestic manufacturing operations, without a corresponding decline in profits on foreign mining and other operations that incur lower income tax rates. Other matters which affected the income tax rate were allowable percentage depletion; restoration to income of a reserve for molds and dies no longer required and income which was subject only to a capital gains tax. Also, Alcoa elected to file a consolidated Federal Income Tax return for 1960 whereas separate tax returns were filed by the company and each of its consolidated subsidiaries for a number of previous years.

The amount of the reserve for future taxes on income applicable to 1960 has been restored to income. This reserve, which had been provided in prior years, applied to taxes that were deferred principally because the company elected to amortize the cost of assets covered by certificates of necessity for tax purposes at accelerated rates while depreciating the same cost for book purposes at normal rates.



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Capital Expenditures

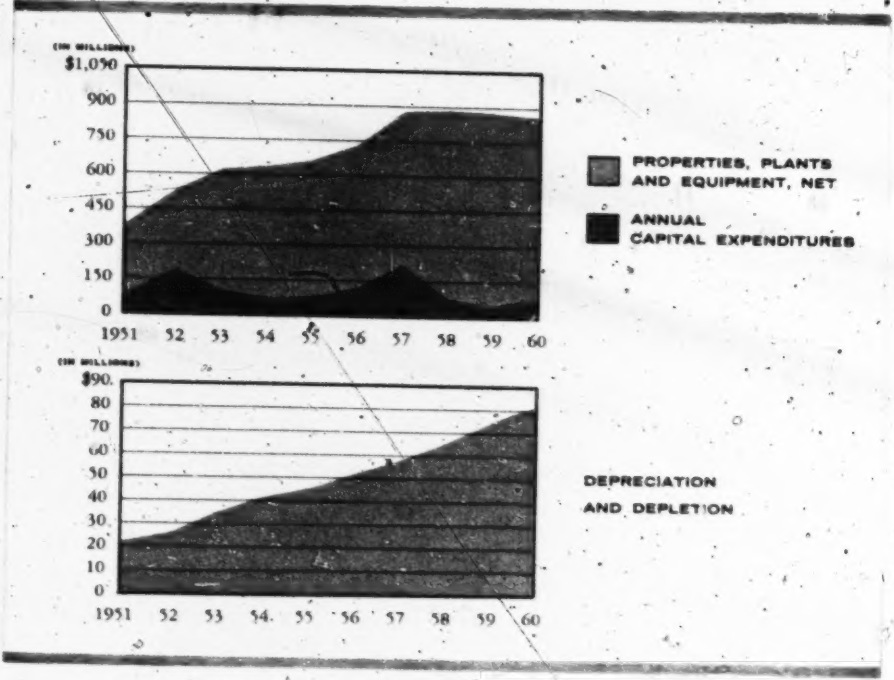
A total of $80,341,301 was invested in properties, plants and equipment during 1960. Major emphasis was placed on capital improvements directed toward reducing costs, improving quality, and acquiring facilities for the production of new products. Substantial sums were expended to continue the Brokopondo Project; complete the new die-casting plant at Edison, N. J.; finish the first potline at the Warrick, Ind., smelter; continue the hydroelectric project and smelter modernization at Tuckertown, N. C., and Badin, N. C., respectively; construct a new chemical plant at Bauxite, Ark.; and initiate the expansion of sheet-rolling facilities at Alcoa, Tenn., and Davenport, Iowa.

At December 31, 1960, unexpended balances of authorized projects amounted to $171,491,000. It is estimated that approximately $73,000,000 will be expended during 1961. Major items in the proposed program include development of the Jamaican bauxite ore deposits; construction of a fluoride plant at Point Comfort, Tex.; continuation of the expansion of sheet-rolling facilities, and continuation of the Tuckertown and Brokopondo projects.

Debt

During 1960, total debt of the company increased from $437,726,095 to $447,885,439, the latter amount equivalent to 59 per cent of the shareholders' equity in the company at the end of the year, a slight reduction from the previous year-end amount. Long-term debt decreased $24,715,656, but this decrease was offset by short-term borrowings. Short-term debt increased during 1960 in an amount of $34,875,000 for the purpose of continuing the capital expenditure program initiated in 1960 and continuing in 1961. It is expected that short-term debt will be increased moderately during 1961.

As a result of open market transactions, the company acquired, and submitted to the trustee for cancellation, sufficient securities of its four outstanding debenture issues to satisfy all the mandatory sinking fund requirements for 1961 and $1,231,000 applicable to sinking fund requirements for 1962. In addi-



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tion, the annual installment of $2,500,000 due January 1, 1961 on the 2.55 per cent note was paid December 31, 1960.

The following table details the mandatory debt retirement schedule of outstanding long-term debt at December 31, 1960:

(In Thousands of Dollars Per Year)

Due:	Debentures 3⅛% 1964	3% 1979	4¼% 1982	3¼% 1983	Notes 2.55% 1967	3% 1973	Annual Total
1961	None	None	None	None	None	.....	.....
1962	$10,000	$ 2,948	$ 5,171	$ 5,200	$ 2,500	.....	$ 25,819
1963	10,000	4,150	5,200	5,200	2,500	.....	27,050
1964	12,500	4,150	5,200	5,200	2,500	.....	29,550
1965/67	.....	4,150	5,200	5,200	2,500	.....	17,050
1968	.....	4,150	5,200	5,200	.....	.....	14,550
1969/73	.....	4,150	5,200	5,200	.....	$12,000	26,550
1974/78	.....	4,150	5,200	5,200	.....	.....	14,550
1979	.....	4,550	5,200	5,200	.....	.....	14,950
1980/81	.....	.....	5,200	5,200	.....	.....	10,400
1982	.....	.....	5,400	5,200	.....	.....	10,600
1983	.....	.....	.....	5,400	.....	.....	5,400
Long-Term Debt	$32,500	$73 98	$109,371	$114,600	$15,000	$60,000	$405,369

The above table does not include miscellaneous long-term debt, principally of subsidiaries, in the amount of $7,641,439, which is payable in varying amounts over a period of approximately 15 years.

DISTRIBUTION OF 1960 GROSS REVENUE DOLLAR

42.40% $368,786,696
Cost of Materials, Services, etc.

41.37% $359,771,693
Wages, Salaries and Employee Benefits

9.22% $80,194,803
Depreciation and Depletion

2.41% $20,982,879 Taxes*

3.23% $28,124,616
Dividends

1.37% $11,919,489
Earnings Reinvested in the Business

100% $869,780,176
Gross Revenues

**Although taxes are only 2.41% of money taken in, they represent 34.38% of earnings before taxes.*

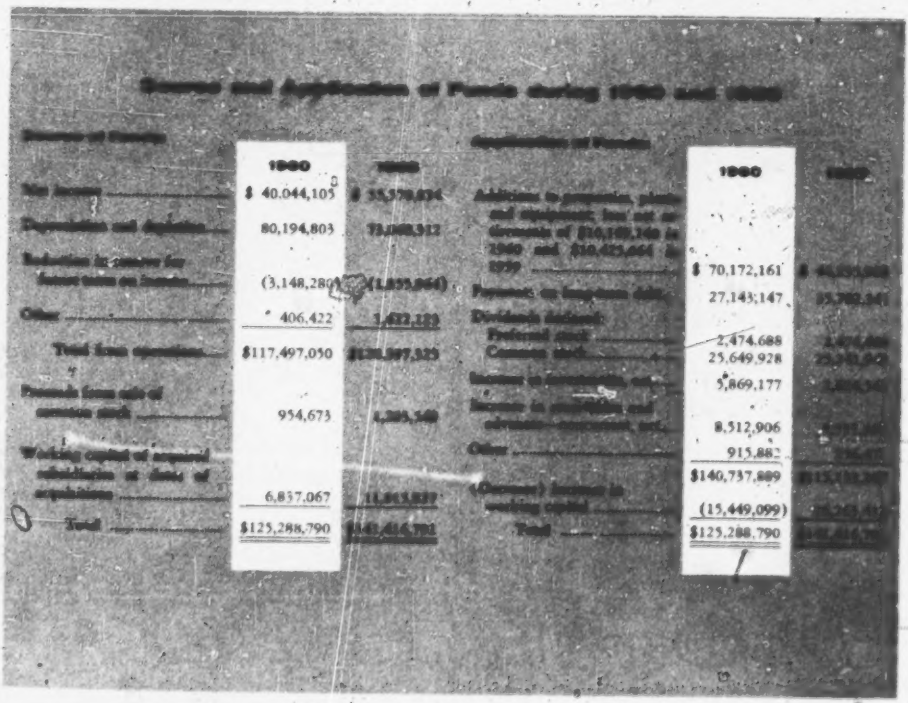
Employees' Stock Option Plan

At the annual shareholders' meeting on April 17, 1952, the current equivalent of 1,956,292 shares of the common stock of the company were reserved for purposes of the Employees' Stock Option Plan by action of the shareholders. At December 31, 1960, 322,258 shares remained reserved for the granting of future options.

The following table details certain information with respect to shares covered by options during 1960:

Covered by unexercised options at beginning of year		515,874
Purchased during the year	30,875	
Covered by options cancelled during the year	925	
Covered by options expired during the year	1,450	33,250
Covered by unexercised options at end of year		482,624

All unexercised options are presently exercisable except the options covering 217,200 shares granted in 1959, which become exercisable two years from the date they were granted, or upon such earlier date when the optionee either attains age sixty-five or dies while in the employ of the company.



CONSOLIDATED BALANC

ASSETS

	December 31	
	1960	1959
Current Assets:		
Cash	$ 40,731,973	$ 44,337,462
United States Treasury Bills, at cost	16,723	10,782,387
Marketable securities, at cost	—	7,397,865
Accounts and notes receivable:		
Customers, less allowances: 1960, $3,147,141; 1959, $2,662,212	108,284,180	112,168,028
Other	6,902,357	4,741,078
Inventories (Note B)	259,997,082	224,025,511
Prepaid insurance and taxes	5,169,387	5,209,561
Total Current Assets	**421,101,702**	**408,661,892**
Investments, at cost:		
Subsidiaries not consolidated	2,812,224	3,128,880
Other	34,707,542	28,521,709
Total Investments	**37,519,766**	**31,650,589**
Other Assets and Deferred Charges:		
Indemnity and surety deposits	1,106,939	1,097,226
Receivables and advances—noncurrent	32,075,003	23,562,097
Deferred exploration and mining expenses	4,206,119	4,060,631
Other deferred charges	8,504,351	8,868,265
Total Other Assets and Deferred Charges	**45,892,412**	**37,588,219**
Properties, Plants and Equipment, at cost:		
Land and land rights, including mines	65,567,764	59,646,533
Structures, machinery and equipment	1,558,727,238	1,489,486,655
	1,624,295,002	1,549,133,188
Less, accumulated allowances for amortization, depletion and depreciation	797,266,193	731,220,015
	827,028,809	817,913,173
Construction work in progress	41,174,438	53,067,350
Patents and other intangible assets, less amortization	1,417,021	1,454,136
Total Properties, Plants and Equipment	**869,620,268**	**872,434,659**
	$1,374,134,148	**$1,350,335,359**

The appended notes are an integral part of the financial statements.

[fol. 4771] 1620

CE SHEETS *December 31, 1960 and 1959*

LIABILITIES

	December 31	
	1960	1959
Current Liabilities:		
Notes payable: banks, $34,000,000; other, $875,000	$ 34,875,000	$ —
Accounts payable	28,167,379	28,778,662
Dividends on preferred and common stock	7,631,494	7,548,825
Accrued salaries, wages, vacation allowance and other compensation	21,757,780	22,731,634
Provision for taxes, including taxes on income, less, in 1959, $9,752,771 of United States tax anticipation notes	9,493,032	21,279,547
Other current liabilities	14,558,629	7,582,348
Long-term debt due within one year	768,837	1,442,226
Total Current Liabilities	117,252,151	89,363,242
Long-Term Debt, less amount due within one year (Note C)	412,241,602	436,283,869
Deferred Credits, Reserves and Noncurrent Liabilities	6,686,219	9,764,984
Reserve for Future Taxes on Income	78,744,005	81,892,285
	614,923,977	617,304,380

SHAREHOLDERS' EQUITY

Capital Stock:		
Serial Preferred Stock, par value $100 per share: Authorized 1,000,000 shares; $3.75 Cumulative Preferred Stock, redeemable at $100 per share; Authorized 660,000 shares; issued 659,909 shares	65,990,900	65,990,900
Common Stock, par value $1.00 per share: Authorized 50,000,000 shares; Issued: 1960, 21,313,857 shares; 1959, 21,038,293 shares	21,313,857	21,038,293
Additional Capital	44,044,790	42,558,078
Retained Earnings	627,860,624	603,443,708
Total Shareholders' Equity	759,210,171	733,030,979
	$1,374,134,148	$1,350,335,359

STATEMENT OF *Consolidated Income and Retained Earnings*

For the years ended December 31, 1960 and 1959

	1960	1959
Net sales and operating revenues	$ 861,211,372	$ 858,460,213
Income from securities and investments	2,221,562	2,942,240
Gain on sales of capital assets and investments	3,022,531	474,584
Other income	3,324,311	3,090,685
Gross revenues	869,780,176	864,967,722
Cost of goods sold and operating expenses	590,154,919	562,941,391
Selling, general administrative and other expenses	122,048,668	107,683,161
Provision for depreciation and depletion	80,194,803	73,060,312
Interest expense	16,354,802	17,014,853
Taxes, not including social security and United States and foreign taxes on income	13,882,879	13,697,151
Total costs and expenses	822,636,071	774,396,868
Income before United States and foreign taxes on income	47,144,105	90,570,854
Provision for United States and foreign taxes on income:		
Current	10,248,280	36,855,964
Less: Reduction in reserve for future taxes on income	(3,148,280)	(1,855,964)
	7,100,000	35,000,000
Net income for the year	40,044,105	55,570,854
Retained earnings, beginning of year	603,443,708	565,112,199
Addition resulting from acquisitions of subsidiaries (Note A)	12,497,427	10,477,286
	655,985,240	631,160,339
Dividends declared:		
On preferred stock—$3.75 per share	2,474,688	2,474,688
On common stock—$1.20 per share	25,649,928	25,241,943
	28,124,616	27,716,631
Retained earnings, end of year	$ 627,860,624	$ 603,443,708

STATEMENT OF *Consolidated Additional Capital*

For the years ended December 31, 1960 and 1959

	1960	1959
Additional capital, beginning of year	$ 42,558,078	$ 35,392,800
Addition resulting from acquisitions of subsidiaries (Note A)	562,914	5,999,830
Excess of amounts received over the aggregate par value of common stock issued under Employees' Stock Option Plan	923,798	1,165,448
Additional capital, end of year	$ 44,044,790	$ 42,558,078

The appended notes are an integral part of the financial statements.

EN-YEAR SUMMARY *Aluminum Company of America and consolidated subsidiaries*

ar ended December 31,	1960	1959	1958	1957	1956	1955	1954	1953	1952	1951
rnings										
Gross Revenues	$869,780,176	$864,967,722	$758,143,787	$875,461,218	$869,785,315	$848,745,207	$713,004,925	$711,073,898	$584,005,750	$539,613,017
Cost of Materials, Services, etc.	368,786,696	352,189,001	313,601,940	332,229,358	307,704,742	320,561,827	279,403,298	268,885,592	218,860,371	193,770,755
Wages, Salaries and Employee Benefits	359,771,693	335,450,404	291,784,036	326,978,229	323,902,506	294,726,544	264,236,167	271,657,895	230,218,277	199,107,427
Depreciation and Depletion	80,194,893	73,060,312	65,659,603	57,658,506	50,770,834	45,114,035	40,653,031	34,047,688	26,087,475	21,657,123
Taxes	20,982,879	48,697,151	44,212,978	83,026,664	97,786,200	100,741,993	66,837,274	76,007,508	61,477,139	85,227,418
Net Income	40,044,105	55,570,854	42,885,230	75,568,461	89,621,033	87,600,808	61,875,155	60,495,215	47,362,488	39,852,294
Preferred Stock Dividends	2,474,688	2,474,688	2,474,689	2,474,689	2,474,690	2,474,691	2,474,692	2,474,694	2,474,694	2,474,694
Common Stock Dividends	25,649,928	25,241,943	24,767,339	24,728,326	24,642,644	21,376,494	16,058,638	15,720,917	14,682,042	13,449,516
nancial Position										
Working Capital	303,849,551	319,298,650	293,035,238	187,786,303	189,630,821	224,558,263	182,698,781	89,750,069	98,635,365	68,397,626
Properties, Plants and Equipment, Net	869,620,268	872,434,659	892,378,343	884,227,504	744,655,938	664,993,115	640,865,349	621,102,591	545,337,283	379,397,615
Investments and Other Assets, Net	76,725,959	59,473,824	48,173,013	42,389,527	31,898,547	25,199,889	32,829,608	36,407,289	78,033,939	36,790,518
Long-Term Debt	412,241,602	436,283,869	462,697,480	358,919,526	273,281,901	308,372,943	336,350,713	294,704,024	325,940,671	123,570,223
Future Income Taxes	78,744,005	81,892,285	83,748,249	84,934,615	71,832,224	51,242,931	33,769,919	17,231,644	4,747,035	566,456
Shareholders' Equity	759,210,171	733,030,979	687,140,865	670,531,193	621,071,201	555,135,395	486,273,106	435,304,281	391,318,881	360,649,080
er Data										
Per Share of Common Stock										
Net Income	1.76	2.52	1.96	3.55	4.24	4.18	2.95	2.95	2.29	1.91
Dividends Declared	1.20	1.20	1.20	1.20	1.20	1.05	.80	.80	.75	.69
Taxes	.98	2.31	2.14	4.03	4.76	4.94	3.32	3.86	3.14	4.36
Equity	32.52	31.71	30.09	29.34	27.01	24.00	20.90	18.76	16.61	15.06
Number of Shareholders										
Preferred Stock	3,764	3,892	3,911	4,010	4,093	4,228	4,282	4,478	4,553	4,628
Common Stock	26,129	25,355	23,715	23,295	20,499	16,029	11,625	10,784	9,901	9,558
pital Expenditures	80,341,301	54,660,992	81,599,867	207,500,256	139,310,818	79,521,316	67,151,034	119,407,886	198,338,289	79,710,625
verage Number of Employees	48,692	47,391	44,281	54,640	58,486	56,774	54,652	58,376	52,120	49,320

share amounts have been adjusted where applicable to give effect to stock split-ups in 1953 and 1955.
are based on the number of shares outstanding at the end of the year.

The stock exchange ticker tape symbol for the common and preferred stock of Aluminum Company of America is AA.

AUDITORS' REPORT

TO THE SHAREHOLDERS AND
BOARD OF DIRECTORS,
ALUMINUM COMPANY OF AMERICA:

We have examined the consolidated balance sheet of Aluminum Company of America and consolidated subsidiary companies as of December 31, 1960, and the related statements of consolidated income and retained earnings and additional capital for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying consolidated financial statements present fairly the financial position of Aluminum Company of America and consolidated subsidiary companies at December 31, 1960, and the results of their operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

LYBRAND, ROSS BROS. & MONTGOMERY

Pittsburgh, Pa.
February 1, 1961

REGISTRARS

COMMON STOCK
Pittsburgh: Pittsburgh National Bank
New York: Morgan Guaranty Trust Company of New York

PREFERRED STOCK
Pittsburgh: Pittsburgh National Bank
New York: Bankers Trust Company

STOCK TRANSFER AGENTS

COMMON STOCK
Pittsburgh: Mellon National Bank & Trust Company
New York: Bankers Trust Company

PREFERRED STOCK
Pittsburgh: Mellon National Bank & Trust Company
New York: First National City Trust Company

Aluminum Company of America is incorporated in the Commonwealth of Pennsylvania.

COMMON STOCK of Aluminum Company of America is listed on the New York Stock Exchange.

PREFERRED STOCK of Aluminum Company of America is admitted to trading on the American Stock Exchange.

NOTES

to consolidated financial statements

NOTE A. On January 19, 1960, 180,480 shares of Alcoa common stock were issued to Res Magnet Wire Company, Inc. for the assets of that company and Alcoa assumed the obligations of Res. On January 23, 1960, 64,209 shares of Alcoa common stock were issued to the shareholders of Cupples Products Corporation in exchange for all of the outstanding shares of that company. These acquisitions were treated as poolings of interests for accounting purposes as was the acquisition of Rome Cable Corporation in 1959.

NOTE B. Inventories are carried at the lower of cost or market, with cost being determined for substantially all inventories under the last-in first-out method. The classification of the inventories follows:

	December 31	
	1960	1959
Finished goods	$ 71,232,430	$ 65,969,312
Work in process	138,260,447	108,541,898
Bauxite and alumina	23,342,917	22,485,614
Purchased raw materials	15,354,551	15,059,350
Operating supplies	11,786,737	11,969,337
	$259,997,082	$224,025,511

NOTE C. Long-term debt comprises:

	December 31	
	1960	1959
Sinking fund debentures:		
3½%, due February 1, 1964	$ 32,500,000	$ 40,223,000
5%, due June 1, 1979	75,898,000	78,722,000
4¼%, due January 1, 1982	109,371,000	115,142,000
3⅛%, due April 1, 1985	114,600,000	119,422,000
Notes payable:		
2.35%, due January 1, 1967	15,000,000	17,500,000
3%, due December 1, 1975	60,000,000	60,000,000
	405,369,000	431,009,000
Miscellaneous, principally debt of subsidiaries	7,641,439	6,717,095
Total long-term debt	413,010,439	437,726,095
Less, amount due within one year included in current liabilities	768,837	1,442,226
	$412,241,602	$436,283,869

NOTE D. Costs of retirement plans charged to income amounted to approximately $12.3 million for 1960 and $10.5 million for 1959. The actuarially estimated past service cost of the plans not funded at December 31, 1960, was $12.7 million.

NOTE E. During 1960, the United States Government brought suit against Alcoa claiming that the acquisition of Rome Cable Corporation in 1959 for a consideration of 355,226 shares of Alcoa common stock violated Section Seven of the Clayton Act. There is no monetary liability asserted in connection with this case, but if the Government is successful, the likely relief would be a requirement that Alcoa divest itself of Rome. Alcoa is vigorously defending against this action.

NOTE F. Reference is made to the section of this Annual Report titled "Financial Review of 1960" for information with respect to capital expenditures, commitments, long-term debt and employees' stock option plan.

Wholly Owned Subsidiaries

ALCOA BUILDING PRODUCTS, INC.
Sells aluminum residential building products.

ALCOA EXPLORATION COMPANY
Conducts bauxite mining operations in the Dominican Republic.

ALCOA GENERATING CORPORATION
Owns the power plant which furnishes power to the Warrick works near Evansville, Indiana.

ALCOA INTERNATIONAL, INC.
Sells aluminum products in foreign markets, holds stock of a partially owned company and wholly owned subsidiary company, and owns ships used for transporting bauxite from Suriname, Trinidad and the Dominican Republic to the United States.

ALCOA INTERNATIONAL (U.K.), LIMITED
Solicits orders in the United Kingdom and Europe for all those Alcoa products sold by Alcoa International, Inc.

ALCOA MINERALS INC.
Inactive.

ALCOA MINERALS OF JAMAICA, INC.
Holds and is developing bauxite reserves in Jamaica.

ALCOA OF COSTA RICA, INC.
Holds bauxite concessions in Costa Rica.

ALCOA PROPERTIES, INC.
Owns coal properties in Indiana and Kentucky, to supply fuel for power generation at the Warrick works, near Evansville, Indiana, and at a possible future smelter near Sturgis, Kentucky.

ALCOA SECURITIES CORPORATION
Holds stock of certain partially owned affiliated companies, and other securities.

ALCOA SERVICE CORPORATION
Renders building services, and owns certain sales office buildings and other real estate.

ALCOA STEAMSHIP COMPANY, INC.
Owns, charters and operates ships transporting bauxite from Suriname, Trinidad and the Dominican Republic to the United States, and offers commercial service between United States East Coast and Gulf Coast ports and the Caribbean.

ALTON AND SOUTHERN RAILROAD
Owns and operates a belt line and terminal railroad in the vicinity of the East St. Louis, Illinois, works.

ALUMINIO ALCOA (VENEZUELA) S.A.
Holds capital stock of partially owned affiliated companies in Venezuela.

BAUXITE & NORTHERN RAILWAY COMPANY
Owns and operates a railroad in the vicinity of the Bauxite, Arkansas, works.

CEDARS RAPIDS TRANSMISSION COMPANY, LIMITED
Owns and operates electric transmission lines in Canada, transmitting electric energy for use at the Massena, New York, works.

COLUMBIA RIVER ORCHARDS COMPANY
Operates fruit orchards owned by Alcoa in the vicinity of the Wenatchee, Washington, works.

COMPANIA MINERA NUEVO LEON, S.A.
Explores for fluorspar in Mexico.

CUPPLES PRODUCTS CORPORATION
Fabricates, sells, and installs aluminum architectural products.

LAVACA PIPE LINE COMPANY
Owns and operates gas pipe lines to transport natural gas to the Point Comfort, Texas, works.

LID-ORE STEAMSHIP COMPANY, INC.
Owns and operates ships transporting bauxite from Suriname, Trinidad and the Dominican Republic to the United States.

LONG SAULT, INC.
Owns and operates electric transmission lines and a water distribution system at the Massena, New York, works.

MASSENA TERMINAL RAILROAD COMPANY, THE
Owns and operates a railroad in the vicinity of the Massena, New York, works.

MANTAHALA POWER AND LIGHT COMPANY
Owns and operates hydroelectric power plants and an electric utility system in western North Carolina.

PLEASANT HILLS WATER COMPANY
Sells water in the town of Riverdale, Iowa, near the Davenport, Iowa, works.

POINT COMFORT & NORTHERN RAILWAY COMPANY
Owns and operates a railroad in the vicinity of the Point Comfort, Texas, works.

POINT COMFORT WATER COMPANY
Furnishes water for the Point Comfort, Texas, works.

POST-MART, INC.
Sells a variety of household products.

REA MAGNET WIRE COMPANY, INC.
Manufactures and sells the smaller sizes of magnet wire, a product which is used in coil windings, transformers, motors and other electrical and electronic equipment.

ROCKDALE, SANDOW & SOUTHERN RAILROAD COMPANY
Owns and operates a railroad in the vicinity of the Rockdale, Texas, works.

ROME CABLE CORPORATION
Manufactures and sells various aluminum and copper products for the electrical industry.

SURINAME ALUMINUM COMPANY
Mines bauxite on lands held under concession from the Suriname government; and is constructing hydroelectric power and smelting facilities in Suriname.

SURINAME TRANSPORT COMPANY, N.V.
Owns floating equipment used for mine dredging and ship towing in Suriname.

TAPOCO, INC.
Owns and operates the Tallassee Project, a federally licensed hydroelectric development consisting of four power plants in North Carolina and Tennessee, to furnish power to the Alcoa, Tennessee, works.

WEAR-EVER ALUMINUM, INC.
Sells Wear-Ever aluminum cooking utensils, Kensington giftware, Cutco cutlery, Westmoreland sterling and Alcoa Wrap.

WEAR-EVER INTERNATIONAL, INC.
Sells Wear-Ever aluminum cooking utensils and Cutco cutlery in Latin America.

YADKIN, INC.
Owns and operates the Yadkin Project, a federally licensed hydroelectric development consisting of four power plants (three in operation and one under construction) in North Carolina, to furnish power to the Badin, North Carolina, works.

[fol. 4777]

1960 ALCOA ANNUAL REPORT

ALUMINUM COMPANY OF AMERICA

1501 Alcoa Building, Pittsburgh 19, Pa.

[fol. 4778] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 50

The Electrical Applications of Aluminum in the Building Industry

Prepared for The Aluminum Company of America, New Kensington, Pennsylvania by The Firm of Edward E. Ashley

Consulting Engineers
10 East 40th Street, New York 16, N. Y.

[fol. 4479] The Firm of Edward E. Ashley
Consulting Engineers
10 East 40th Street
New York 16, N. Y.

July 18, 1957.

Re: Aluminum Report, Job No. 5-567
Aluminum Company of America,
New Kensington, Pennsylvania.

Attention: Messrs. Harry L. Smith, Jr., Vice President and Robert R. Cope, Head, Electrical Section, Development Division

Gentlemen:

In accordance with our letter of proposal of August 30, 1955, and your subsequent authority, dated October 17, 1955, we have prepared the accompanying report entitled "The Electrical Applications of Aluminum in the Building Industry."

The scope of the content of this Report is considerably broader and more general than originally anticipated. This development came about as a natural growth as we proceeded with our investigations.

Instead of being able to confine ourselves to a comparative study of several electrical aspects in a single office building, we found that a long chain of inter-related material had to be explored and hence it will be found the report covers the application of aluminum to virtually all areas of electrical use throughout the building industry as a whole.

Our electrical contractor survey on the use of aluminum (Section 12 of this report) was not originally anticipated, nevertheless we felt that such an addition to our survey and studies would endow the report with a valuable practicality and an important analyses of the extent of current interest in the application of aluminum. The exceptional response to this survey indicates and verifies a deep interest in aluminum electrical applications among contractors. Evidence of a more universal interest is the desire of a leading architectural magazine to publish an article based on this survey.

Although we have made no mention of it in this report,

we have developed preliminary proposals for an Aluminum [fol. 4780] Educational and Training program for Electrical Contractors and Electricians and have succeeded in interesting Local #3 of the International Brotherhood of Electrical Workers. If the Aluminum Company of America, either alone or with other aluminum producers, can decide on the extent to which they wish to back such a program, the Union has indicated that they will make their facilities available for such instruction. We feel that this is an opportunity that should be strongly exploited, since we have found that a good deal of the resistance to the electrical use of aluminum is due, in a large degree, to misinformation or lack of information among Contractors and Engineers and the inadequacy in skill among electricians and journeymen in the application of aluminum for electrical installations.

Very truly yours, The Firm of Edward E. Ashley, Consulting Engineers, Edward E. Ashley.

EEA:hk

[fol. 4781] Introduction

This report is a general review of the principal electrical uses of aluminum in the building industry. Each of the twelve sections composing this report is an integral article dealing with a particular area. It is believed that these articles can be read with interest and profit by electrical contractors and consulting engineers.

In general, an attempt has been made to indicate the present status of the use aluminum in each area, to review the best recommended techniques for its utilization, and to evaluate the relative economic factors. A small amount of historical material, descriptions of existing installations, and a few hazarded forecasts help round out and coalesce the various sections.

Section No. 1 is both a general introduction to the aluminum field and a summary of the information and conclusions developed in the report. Sections 2 through 11 deal with the use of aluminum in the various electrical areas. The largest sections have been devoted to wire and cable, busways, and conduit, since these are the principal electrical items in most commercial and industrial structures. Other sections deal with switchgear, armored cables, sheet metal enclosures,

lighting fixtures, cast fittings and enclosures, and reactors, transformers and machines. The material in these sections has been derived from an extensive perusal of the consider- [fol. 4782] able literature in this field, from the catalogs and publications of the aluminum and electrical equipment companies, from commercial and governmental statistical publications, and from interviews with engineers, contractors and manufacturers.

To round out the report with a determination of the actual practical status of aluminum in electrical building construction, questionnaires were submitted to 400 leading electrical contractors. The response to this survey was unusually good and indicates a tremendous interest in the electrical application of aluminum. The data obtained have been tabulated and analyzed in Section No. 12.

This report confirms that aluminum can successfully be used in most of the areas hitherto dominated by copper and in many of the applications previously reserved for ferrous and other metals. For some important products, such as large busways, aluminum is now the more economical material. In others, such as transformers, the use of aluminum is practical, but not yet economical.

For many years, the electrical industry has been largely dominated by a single metal—copper. Production of copper over the years has been uneven; and in times of crisis, the metal would be in short supply or even disappear completely from the commercial market. Price fluctuations, when not controlled by the government, are violent and have an unsettling influence on the planning of future costruction.

Now, the electrical industry appears to be rapidly settling [fol. 4783] itself on a bi-metallic standard. It seems logical to suppose that the emergence of aluminum in a powerful competitive position will have a stabilizing influence on the price and quantity of copper, now that this metal no longer enjoys a monopolistic advantage. In the rapidly and continuously expanding industrial and commercial areas, an assured supply of conductor metal is a most welcome situation. For the security of the nation, this development is no less valuable.

The electrical manufacturing companies have to a large degree met the challenge and responsibility thrust upon them by the rise of aluminum in the electrical field. Many prob-

lems have been successfully and brilliantly solved by far-seeing programs of research and development. Aluminum designs have been developed for many products, some of them as yet uneconomical, but ready for production when future price changes or copper shortages alter the relative price picture.

It appears doubtful whether the consulting engineers and the electrical contractors are as cognizant of the present and future possibilities of aluminum in the electrical field. Yet their adequate knowledge of the uses and relative merits of aluminum electrical application and products is essential, if aluminum is to attain the wide utilization for which it is presently suitable, both from a practical and an economical viewpoint. It is hoped that this report will enlarge the electrical horizons of these engineers and contractors by providing a convenient compilation of pertinent information and comparative data on the electrical applications of aluminum in the building industry.

[fol. 4784] The Electrical Applications of Aluminum in the Building Industry

Table of Contents

Title

Section No.

1. General.
2. Conduit.
3. Wire and Cable.
4. Sheet Metal Enclosures.
5. Large Switch Enclosures.
6. Switchgear.
7. Busways.
8. Armored Cables.
9. Reactors, Transformers and Rotating Machines.
10. Lighting Fixtures.
11. Cast Fittings and Enclosures.
12. Present Status of Aluminum Electrical Use in the Building Industry, Based on Results of a Questionnaire Survey.

[fol. 4785] Section No. 1

General

The course of human history has been marked by a number of distinctive epochs which are identified by the characteristic material of the time, which man utilized to enlarge his capacities and which raised him above the level of his previous existence. Thus, we have the stone age, the bronze age, the iron age and the steel age. Now, in the latter half of the twentieth century, it appears we may be on the verge of a new and final era—the aluminum age.

There is good reason for this thesis. First of all, aluminum is undoubtedly the most versatile of all metals, being capable of functioning, thanks to its myriad of allied forms, in an almost unlimited number of applications which require such varied properties as electrical conductivity, lightness, strength, corrosion resistance, non-toxicity, heat conductivity, reflectivity, low emissivity, machinability, workability, weldability, ductility and other properties, either alone or in combination. Secondly, and probably of major future importance, is the fact that aluminum is the most common metallic element[1] in the earth's crust, being present to an extent of almost 8 per cent, about twice that of iron.[2]

[fol. 4786] 1. *Refining and Reduction of Aluminum Ore*

In its natural ore, bauxite, aluminum occurs in extremely intimate union with oxygen in the form of a hydrated oxide. The raw ore is first refined, usually at or near its place of origin. Refining is largely a chemical solution and precipitation process whose end result is relatively pure aluminum oxide (alumina) powder.

Because of the powerful chemical bonds uniting the aluminum metal with oxygen, an electrolytic reduction process is required to reduce the alumina to the pure aluminum metal. The basic process, invented in 1886, utilizes a reduction cell consisting of a carbon lined pot, a molten cryolite solution within which the alumina is dissolved and a carbon anode.

Extremely heavy, low-voltage electrical currents passing through the solution precipitate the aluminum metal to the

bottom of the pot and liberate oxygen at the anode. The oxygen consumes the carbon anode by uniting with it and escaping in the form of carbon dioxide.

2. *Electrical Energy Requirements*

The quantities of electrical energy required for aluminum production in modern pot-lines are relatively enormous and often require the entire output of conventionally sized power plants. The cost of this electrical energy is a very substantial portion of the total mill price of the aluminum ingots.[4]

[fol. 4787] Consequently, availability and cost of electrical energy largely govern the location of aluminum reduction plants. Thus, the major plants are usually located where huge water-power resources can be harnessed to supply vast amounts of energy at virtually unity load factor, since the reduction process is a continuous operation.

So important is this factor that it is feasible to transport alumina thousands of miles to refining plants utilizing plentiful and cheap electrical energy. A prime example is the vast, new Kitimat Works of the Aluminum Company of Canada. To this great industrial complex located in the wild frozen reaches of Northwest Canada, refined bauxite ore from such far-distant mining regions as Jamaica in the West Indies is shipped in freighters thousands of miles to be reduced, and then, in metallic form, shipped back thousands of additional miles to the major markets of Eastern Canada and the United States.

3. *Growth of Aluminum Use*

The growth of aluminum use is largely determined by the extent to which it can replace copper and iron. These two metals and aluminum are the great triumvirate of strategic industrial metals. Two principal groups of factors are involved, technological and economic.

In a technological sense, great progress is evident. Suitable electrical alloys have been developed to crowd copper out of a large portion of the bus conductor field and press with increasing potential on the rich building wire and cable industry. High strength, corrosion-resistant alloys give [fol. 4788] great promise as structural members and find

increasing application as building materials. In addition a large number of new and expanded uses are continuously developing. These range from the relatively recent and spectacular transformation of aluminum foil into a household staple to the development of a new all-automatic and vastly cheaper repeating rifle to replace the relatively heavy and expensive weapon hitherto the armed forces standard.

4. *Relative Price Behavior*

Economically, aluminum has in the period between the end of World War II and today improved its relative position to a greater extent than any of the other common metals. Fig. #1 indicates that from the government-fixed prices of World War II to the end of 1956 aluminum rose about 75 per cent, pig iron 150 per cent, and copper 200 per cent. A perusal of charts and figures prepared by "American Metal Market" indicates that aluminum enjoys similar advantages with respect to tin, lead and zinc.

Going back even farther, it is interesting to note that today's basic aluminum ingot price of about 26¢ per pound is approximately the same as it was in 1926, when the dollar was worth about two or three times as much as today. Thus, during that period, it can be said that the basic cost of aluminum has decreased in the same ratio.

On the other hand, the prices of iron and the other nonferrous metals have risen to levels more than twice as high as they were at that time. Moreover, while the price of

Job Title_____ Job No._____ Floor_____ Date_____

Trade_____ Calcs By_____ Sheet No._____ of_____

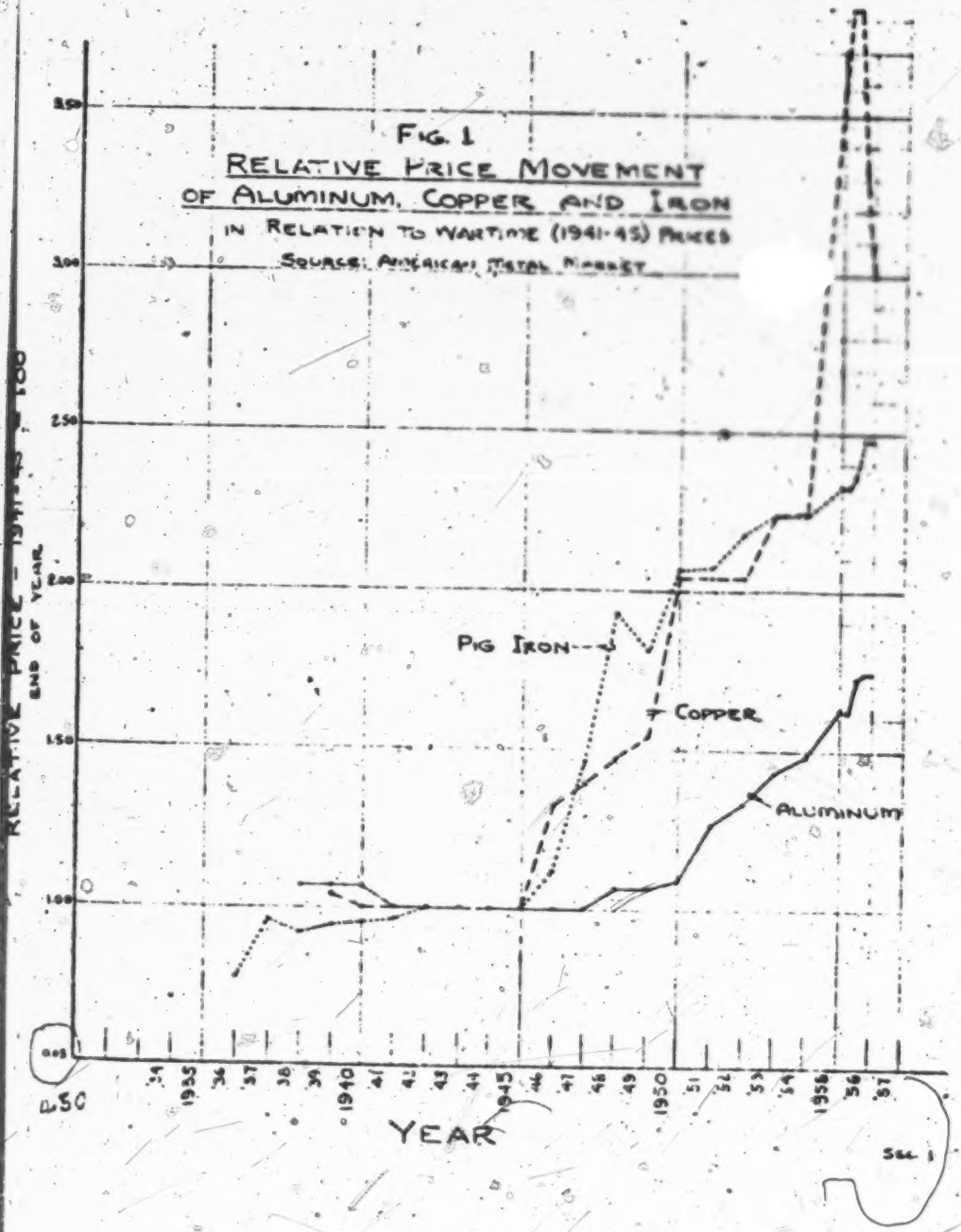
File [Check One]: Dftg Rm.____ General File____ Estimate File____ Other_____

Remarks_____

FIG. 1

RELATIVE PRICE MOVEMENT OF ALUMINUM, COPPER AND IRON IN RELATION TO WARTIME (1941-45) PRICES

SOURCE: AMERICAN METAL MARKET



USC

SEE 1

[fol. 4790] aluminum has maintained a rather steady rate of change, the price of other metals have been characterized by sudden changes of considerable magnitude, as can be noted on Fig. 1 and by studying the price history of the various metals in the statistics of the Bureau of Mines and "American Metal Market".

5. *Recent Increase in Aluminum Production*

These technological and economic factors have combined to generate a spectacular recent growth rate in aluminum production, a rate which promises to continue, if anything, at an even more accelerated pace.

A glance at Fig. 2 reveals the truly remarkable and continuing increase in production. Since the post-war dip of 1946, aluminum production has quadrupled, while copper, arch-rival of aluminum in the electrical field, has yet to re-attain its peak World War II production. Also notable is the fact that in 1954, aluminum production exceeded copper for the first time and appears likely to do so henceforth by ever greater margins.

6. *Comparison with Iron Production*

With respect to iron the story is, of course, different, since ferrous metals are still the basis of our economy, despite the promise and progress of aluminum. This is heavily underscored by the production figures tabulated below:

Job Title _____ Job No. _____ Floor _____ Date _____

Trade _____ Color By _____ Sheet No. _____ of _____

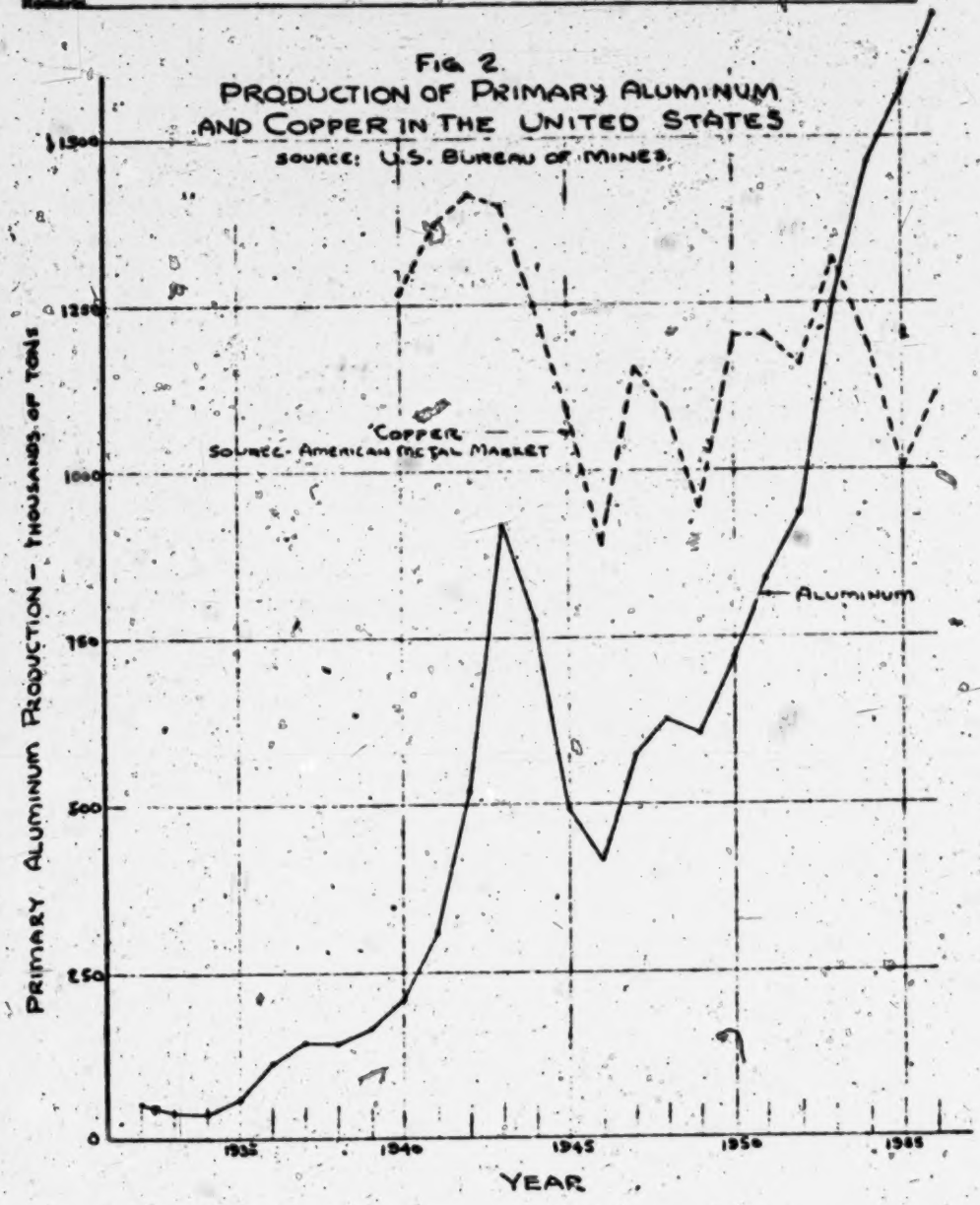
File (Check One) Dftg Rm. ____ General File ____ Estimate File ____ Other _____

Remarks _____

FIG 2

PRODUCTION OF PRIMARY ALUMINUM AND COPPER IN THE UNITED STATES

SOURCE: U.S. BUREAU OF MINES



[fol. 4792] Production—Millions of Tons of Primary Metal

	1946	1955
Aluminum	0.4 (100%)	1.6 (400%)
Pig Iron	45.6 (100%)	77.8 (170%)

Source: Annual Statistical Report, 1955. "American Metal Market."

Iron production has more or less kept pace with the general growth of the economy while aluminum has raced far ahead. There are indications that this pace may continue since progress is being made in the increased utilization of aluminum in automotive and railroad bodies, ship hulls and superstructures, containers and enclosures, household utensils and appliances and structural applications, all vast fields still dominated by the ferrous metals.

7. *Aluminum Production Capacity and Producers*

At any rate, the plans of the primary aluminum producers are definitely optimistic. Annual production capacity in the United States at the end of 1956 was somewhat more than 1¾ million tons. Installed capacity for the end of 1958 is expected to exceed 2½ million tons, an increase of about 40 per cent in two years.[5]

Moreover, while at one time, the Aluminum Company of America was the sole producer, there are now three more giants in the field—Kaiser Aluminum, Reynolds Aluminum and the Aluminum Company of Canada. In addition, several smaller companies in the United States and Canada are either producing or planning to produce primary aluminum.[6]

[fols. 4793-4794] 8. *Allocation of Aluminum Production*

Although aluminum production now considerably exceeds that of copper, a considerably smaller proportion of aluminum is devoted to electrical use. Over the past two years, semi-annual figures released by the Aluminum Association indicate that the major categories of wrought aluminum products have maintained relatively constant percentages, approximately as follows:

Building Materials	20%
Consumer Durable Goods	12%

Transportation	17%
Electrical	8%

The major portion of the 8 per cent devoted to electrical use undoubtedly is used in the manufacture of high voltage transmission cable, mostly for ACSR, which for many years has been the industry standard in this field. An increasing amount is lately finding its way into the fabrication of busbars for use in high amperage bus-ways and in switchboards and switchgear. The major manufacturers of busway recently have been quoting aluminum conductor busway at 20 per cent less than the equivalent copper conductor busway.

8. *Recent Price Behavior—Copper and Aluminum*

Since shortly after World War II, the relative cost of aluminum has been extremely favorable with respect to copper (see Fig. 1). At that time the price per pound of copper abruptly exceeded that of aluminum for the first time since the depression and has maintained the same rela- [fol. 4795] tive position ever since. Indeed, the price difference continued to increase rapidly until in 1956, copper reached an unheard of high of 46 cents per pound while aluminum was selling for 26 cents per pound.

However, since June, 1956, the price of copper was affected by an equally spectacular fall until today, March, 1957, it is selling at a base price of 32-34 cents per pound. Meanwhile, aluminum has continued at 26 cents per pound. This behavior is reflected by the curves in Fig. 3.

9. *Effect of Favorable Price Situation*

Needless to say, the suddenly magnified favorable price situation made aluminum immediately competitive with copper and extremely attractive to potential users, despite lack of experience in its use and certain technical difficulties, such as connections, which have since been largely solved. This favorable situation was and remains particularly true where relatively large amounts of conductors are required, as for example, bus bar and in the large circular mil cable sizes. It has also given added stimulus to

research and development efforts directed toward the replacement of copper in such products as motors, transformers, connectors, reactors, lamps, telephone frames, magnet wire and switchgear.

10. *Short Supply of Copper*

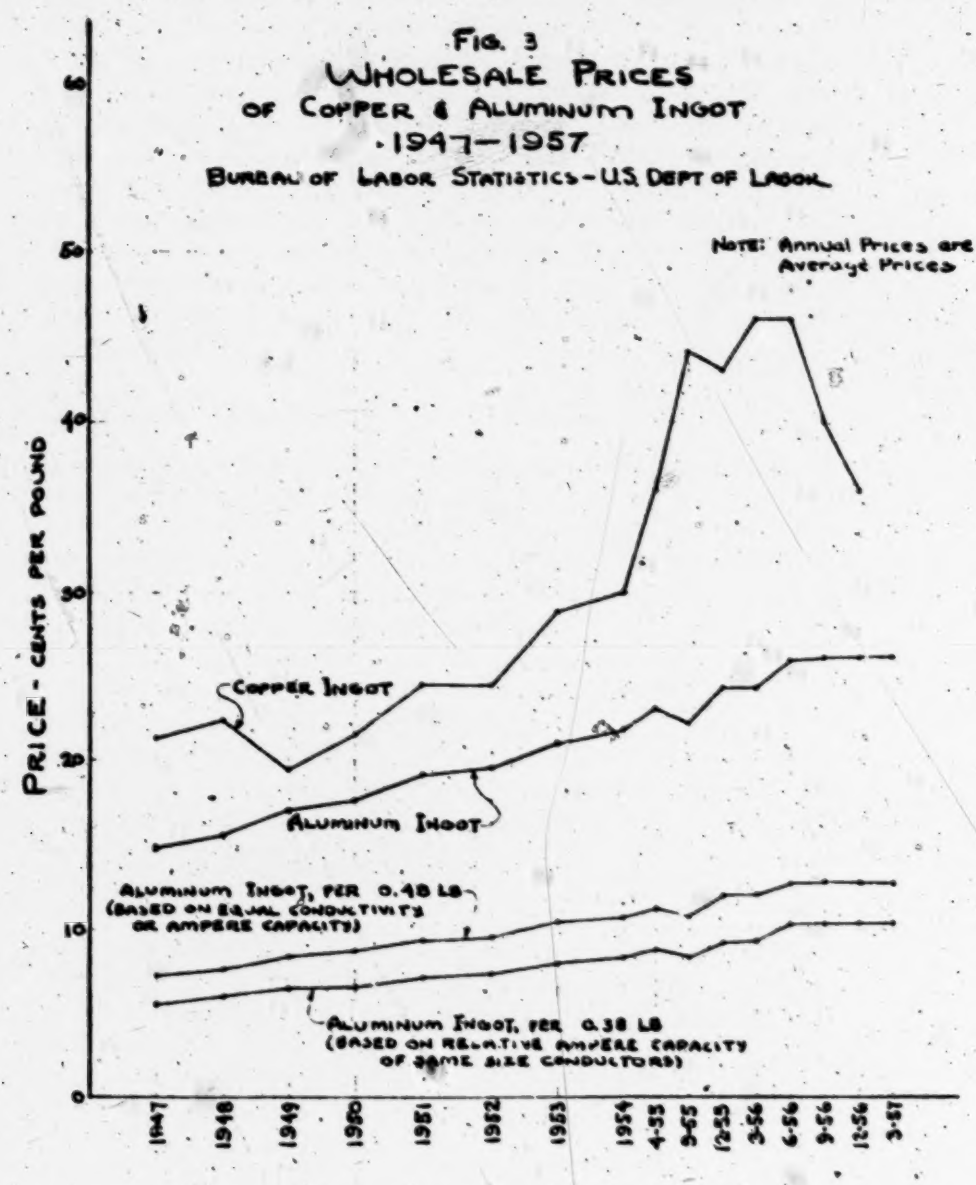
In addition to the impetus of existing price differentials, another

[fol. 4796]

Job Title Alum. Job No. Floor Date
Trade Elec Calcs By T. Sheet No. of
File (Check One): Dftg Rm. General File Estimate File Other
Remarks

FIG. 3
WHOLESALE PRICES
OF COPPER & ALUMINUM INGOT
1947–1957
BUREAU OF LABOR STATISTICS – U.S. DEPT OF LABOR

NOTE: Annual Prices are Averaged Prices



[fol. 4797] powerful factor in pushing aluminum into every phase of the electrical industry has been the potential shortage of copper. This potential has been realized all too completely in periods of emergency, when the government has found it necessary to seize and control all supplies of copper, making it largely or completely unavailable to many segments of the electrical industry.

As far back as the 1930's and before, forward-looking manufacturers were aware that copper was approaching a chronic condition of short supply, while aluminum, one of the most plentiful elements in the earth's crust was potentially capable of maintaining a practically unlimited rate of rising production. Consequently, considerable developmental work was done on a wide range of products, so that when the inevitable conditions of scarcity or competitive price arrived, these products were immediately or shortly available in the market.

11. *Present Aluminum Electrical Applications*

Thus, aluminum building cable is presently available in practically all sizes and insulations. Aluminum busway is outselling copper busway. Aluminum conductor reactors are available at lower prices than copper-reactors. Transformers, generators, and motors have been developed with aluminum windings. Incandescent lamp bases, after years of difficult development[6], are now standard in aluminum. Aluminum conduit is becoming increasingly competitive and finding increased use. A tremendous range of conduit fittings is available in aluminum at competitive prices. Switch-[fol. 4798] gears and switchboards employ aluminum bus bars and sometimes aluminum enclosures as well. Aluminum cable trays are replacing steel trays as standard equipment. Aluminum is being used in a host of additional applications and products such as appliances, connectors, armored cable, electronic tube chassis, induction motor rotors, high-voltage switches, high-voltage switchyard bus and structure, turbine-generator windings and cooling fans, and high-capacity bus enclosures.

12. *Aluminum Cost as Function of Current Capacity*

Aluminum is less expensive than copper on a weight or volume basis. It has a lower volume conductivity, 61 per cent as compared to 99 per cent for copper; but because of its low specific gravity (2.70 as compared to 8.89) for copper, it is more than twice as conductive as copper on a mass-conductivity basis. The lowest curve of Fig. 3 indicates the relative cost of aluminum as compared to copper on an equal-size basis. The curve is based on the fact that aluminum cables of medium range sizes (#4/0 to 500 MCM) have an ampere capacity about 80 per cent as great as a copper cable of the same size. On this basis, it can be seen that as of Dec. 1956 copper cost was 3½ times as much as aluminum.

The second curve from the bottom of Fig. 3 is a measure of relative metal cost for equal ampere capacities. As explained in Section 2 (Wire and Cable) of this report, cable [fol. 4799] capacity is more a function of diameter rather than area. Consequently, an increase of capacity from 80 per cent to 100 per cent requires a cable with an area not 125 per cent as great, but roughly 156 per cent (125 squared) as great. However, relative metal price of aluminum is still only about ⅓ to ⅔ that of copper.

Of course, this is far from the relative economics of purchased cable, since manufacturing costs will tend to equalize cable costs, the more so as insulations and coverings become thicker and more complex.

Other factors which tend to equalize aluminum and copper costs are connector costs, generally greater for aluminum, and increased feeder conduit sizes required for many aluminum cables of carrying capacities equal to those of copper cables.

13. *Relative Aluminum and Ferrous Metal Prices*

When compared with iron and steel, the picture is different. Aluminum is considerably more expensive on either a mass or volume basis. However, its much lighter weight (about 35 per cent of steel) enables aluminum to overcome some of this price differential, although its smaller strength generally requires greater thickness for sheet metal work.

As shown on Fig. 4, aluminum sheet costs about five times as much as sheet steel, pound for pound, but there is only a 2 to 1 price difference for the actual material used for a given application. A similar or better relation exists in the structural field, where aluminum switchgear structures have been built with the same size structural members.

[fol. 4800]

Job Title Alum. Job No. Floor Date 6-25-56
Trade Elec. Calcs By Sefton Sheet No. of
File (Check One): Dftg Rm. General File Estimate File Other
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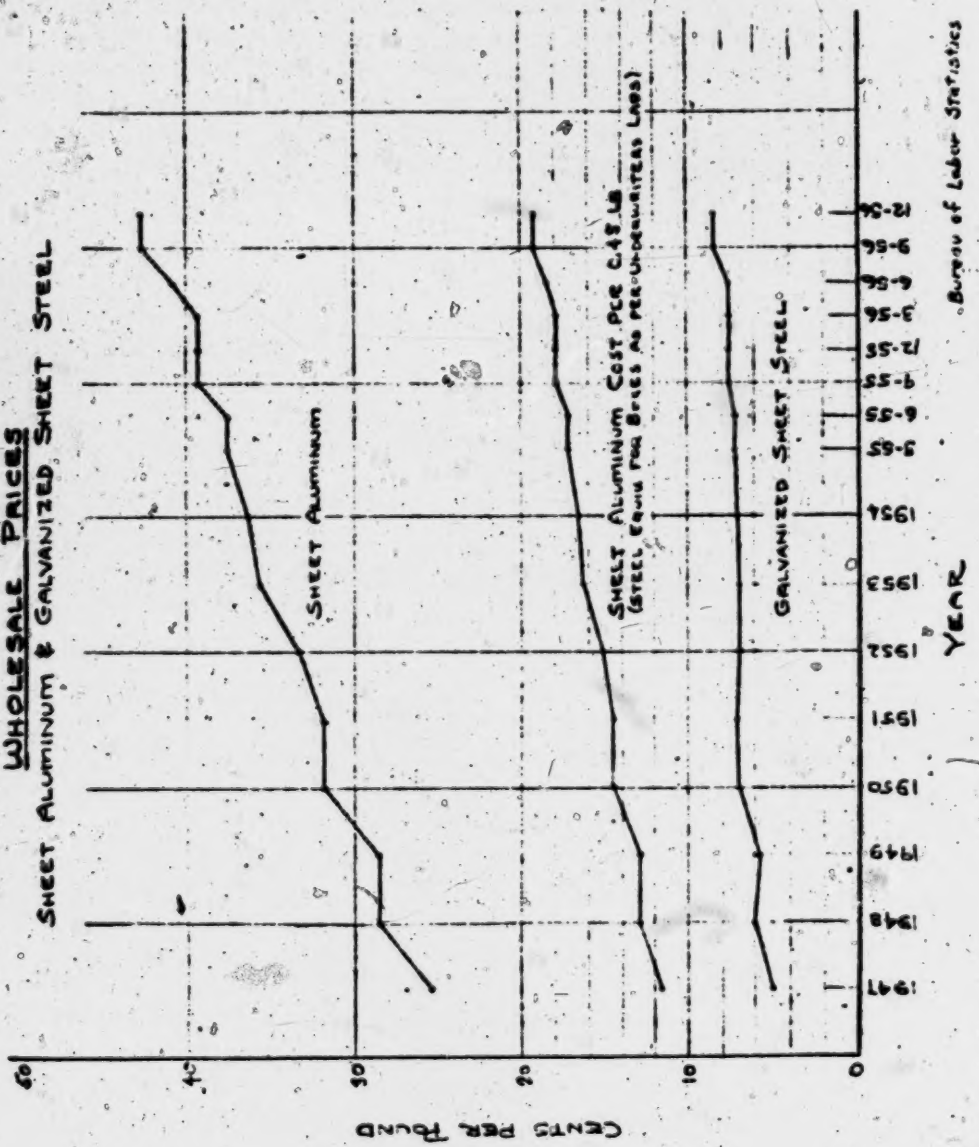
FIG. 4.

WHOLESALE PRICES

SHEET ALUMINUM & GALVANIZED SHEET STEEL



Bureau of Labor Statistics

[fol. 4801] 14. *Specific Strengths*

As a matter of fact, pound for pound, aluminum is not only the most conductive, but also the strongest of the common metals. Hard drawn aluminum of electrical conductivity grade is as strong as cold rolled steel, while the toughest of the wrought alloys of aluminum have specific tensile strengths (tensile ultimate strength divided by specific gravity) which exceed that of hard stainless steel. Below are typical values of specific tensile strengths for some metals and alloys:

Aluminum, 7075-T6	28.1
Aluminum, 2024-T4	24.6
Hard Stainless Steel, 302	22.7
Magnesium, Hard	21.3
Aluminum, Electrical Conductivity grade, Hard Drawn, EC-H19	10.0
Cold Rolled Steel, 1020	9.55
Copper, Hard Drawn	6.5
Aluminum, Electrical Conductivity grade, ¾ Hard, EC-H26	6.3
Aluminum, Electrical Conductivity grade, Annealed, EC-0	4.4
Copper, Annealed	3.6

15. *Aluminum Metallurgy*

It should be realized that when the term aluminum is used herein it is meant to apply broadly to the entire vast area of aluminum metals, particularly those in the electrical [fol. 4802] field. Pure aluminum metal by itself is of extremely little use. It is aluminum's versatile ability to combine with hundreds of combinations of different metals and produce hundreds of alloys of different properties tailored to specific uses that is its most valuable property. Aluminum is actually a system of metallurgy.

In its purest refined form aluminum has a conductivity of about 65 per cent, but is extremely weak and, of course, quite expensive to produce. The purest commercial form is electrical grade (EC) aluminum which has a minimum purity of 99.45 per cent and minimum conductivity of 61 per cent. EC aluminum is relatively weak in the annealed

state but can be heat-treated and cold-worked, as can most aluminum alloys, to attain required tensile strengths.

Aluminum is combined with many different alloying elements, but the principal ones are copper, manganese, silicon, magnesium, zinc and nickel. The properties of the various alloys derived therefrom are discussed in greater detail in the various sections of this report. In general, all the alloying elements add strength, but zinc alloys are the strongest, while nickel permits strength to be retained at high temperatures. Copper contributes good machinability, but lowers corrosion resistance. Silicon and magnesium are excellent for corrosion-resistance.

16. *Aluminum Properties*

In addition to the primary electrical property of excellent volume and weight conductivity and the important struc- [fol. 4803] tural property of high strength to weight ratio, aluminum and its alloys has other important characteristics which either reinforce or detract the suitability of aluminum for various electrical applications.

17. *Corrosion Resistance*

Resistance to atmospheric corrosion makes aluminum eminently suitable for outdoor applications such as fixtures, for conduit installations in areas where maintenance is infrequent, difficult or dangerous and for use as conduit and armored cable in plants, such as paper mills, with atmospheres highly corrosive to ferrous products.

However, the strong oxide formation which is responsible for aluminum's admirable immunity to atmospheric attack makes for connection difficulties which, although easily overcome, have been and still are the most potent deterrent to the general use of aluminum conductors.

18. *Galvanic Activity*

Aluminum's anodic position in the electrochemical or galvanic metal series makes its susceptible to destructive galvanic corrosion in the presence of strongly cathodic metals, such as copper. This tendency requires intelligent consideration and precautionary techniques when copper-alumi-

num joints are made in environments wherein such corrosion can take place.

[fol. 4804] 19. *Low Melting Temperature*

Relatively low melting temperature makes aluminum, particularly when alloyed with silicon, excellent for die-casting, a mass-production operation which enables aluminum fittings, condulets and connectors, as well as countless non-electrical items, to be produced competitively with ferrous equivalents which must be cast in sand or permanent molds.

20. *High Heat Conductivity and Emissivity*

High heat conductivity makes aluminum very suitable for enclosures. High reflectivity, an excellent property for aluminum insulating foil, is not good for electrical enclosures from which heat must generally escape. However, a dull coat of aluminum paint cures this trouble. However, high reflectivity (combined with good workability) makes aluminum ideal for lighting and heating reflectors.

21. *Non-Magnetic Property*

Energy losses within aluminum enclosures are further reduced by aluminum's non-magnetic property. This makes aluminum particularly applicable as enclosures for high current density members, especially for single phase enclosures.

22. *Non-Sparking Property*

The fact aluminum is non-sparking makes it a particularly valuable metal for use in hazardous locations. This property, combined with its light weight and castability, renders aluminum most suitable for explosion-proof fittings [fol. 4805] and enclosures, especially those of massive size.

23. *Good Workability*

Many cast and wrought alloys of aluminum have good formability and workability which reduces labor costs and makes aluminum useful for machined members.

24. *High Ductility*

Good ductility and relatively low strength in the annealed state permit aluminum to be easily drawn into wires and rods, to be extruded into myriads of cross-sectional shapes, to be deep drawn into cylindrical containers and to be spun to mathematical curvatures.

25. *Non-Toxicity*

Non-toxicity is hardly an electrical quality, but combined with aluminum's good heat-conductivity and workability it makes aluminum an excellent material for household utensils and electrically heated food containers.

26. *Appearance*

Good appearance is a highly subjective characteristic, but the silvery natural appearance of aluminum is attractive to many people and a not inconsiderable factor in its use and choice. In addition, aluminum is capable of taking on many unusual and colorful sheens and finishes by anodizing and dyeing processes.

[fol. 4806] 27. *Lightness*

Undoubtedly the popular characteristic quality of aluminum is its relative lightness—only 2.7 times the density of water, or roughly one-tenth pound per cubic inch. It would be difficult to select an application, outside of ballast material, wherein this property does not contribute favorably in such ways as decreased labor costs, lower shipping and handling costs, increased safety, and contingent economies realized in other materials (such as structural supports).

28. *Early Electrical Uses*

Aluminum has been used in electrical applications for over sixty years. The first application was bus bars in 1895.[3,8]—All-aluminum cable was used as far back as 1902. Steel-reinforced, aluminum transmission cable (ACSR) was first used in 1909.[7] Insulated aluminum cables were being manufactured in the 1920's.[9]

29. *Electrical Applications Today*

Before the end of World War II, electrical applications of aluminum were vitually unknown in the building industry, except for the use of aluminum bus bars for massive industrial installations, particularly in aluminum reduction plants. Today, the use of aluminum is extensive in all bus applications and gives promise of imminent breakthrough on various fronts in the cable field. This report is primarily concerned with reviewing the various factors in this trend and the present status of aluminum in the various areas of use. On the basis of the information in this report, study [fol. 4807] of the literature, conversations and conferences with manufacturers, engineers and contractors, and a poll of several hundred leading electrical contractors, the relative applicability of aluminum to various electrical products ranges from dominant to nil. The following list is an estimated appraisal of the relative favorable applications of aluminum, most favorable items are at the top of the list:

(1) High capacity low voltage buses.
(2) Transmission cable.
    (a) Long distance—(ACSR)
    (b) Urban use.
(3) Single Phase Enclosures (high capacity).
(4) Low Impedance Bus Risers—600 Amperes and over.
(5) Plug-in bus—600 amperes and over.
(6) Reactors
(7) Underground feeders in non-metalic duct (non-utility).
(8) High voltage switchyard bus structure.
(9) Outdoor Lighting Standards.
(10) Outdoor lighting fixtures.
(11) Switchgear and Switchboard bus.
(12) Armored power cable (larger sizes).
(13) Switch Enclosures (2,000 amperes and over)
(14) Large cables in conduit (over 200 amperes capacity)
(15) Cast Fittings (die cast)
[fol. 4808] (16) Cable Trays

(17) Medium size cables in conduit (#6 to #4/0)
(18) Conduit.
(19) Cast boxes (sand castings)
(20) Branch circuit Wiring.
(21) Interior lighting fixtures.
(22) General sheet metal enclosures.
(23) Power transformers.
(24) Distribution transformers.
(25) Signal wiring.
(26) Junction, outlet and pull boxes.

30. *Factors in Appraising Relative Favorable Use*

The above list should be considered only as a general guide. Economic application of aluminum depends on many factors other than material cost alone. Direct labor cost is the next most prominent consideration. However, true costs will also be affected by maintenance requirements, power losses and safety requirements. The extent to which these apply will, of course, vary for a particular installations. Thus, aluminum conduit, which at this time, is considerably costlier than steel, has been used in a recent feeder installation on the outer wall of a tall building because of maintenance and installation savings. Large switch enclosures are cheaper to purchase in steel, but magnetic power losses in the steel will more than offset the cost difference. On the other hand, cables of all kinds [fol. 4809] are cheaper in aluminum, but present new splicing problems, and for equal capacities often require larger conduit sizes.

In general, the first sixteen items will offer economic savings in aluminum, mostly on an initial cost basis, but also to varying degrees in labor, maintenance and other contingent costs. Among items (17) to (25), medium size cables in conduit can prove economical with the use of skillful labor. Likewise aluminum conduit for difficult installations. Branch circuit wiring (mostly #12 AWG wire size) has definite possibilities too little recognized at present. The remainder either await further technological development or at this time are too costly.

31. *Working with Aluminum*

A common disadvantage quoted by many experimenters and fabricators is the increased cost of working with aluminum. At the same time others will come forward with statements that labor costs are no greater and sometimes even less, or if they are greater, that reductions are expected as more experience is gained.

In general, it is our impression that the more optimistic views are held by those with greatest experience with aluminum, and that the greatest enthusiasm is manifested by those with the longest and most extensive records of working with aluminum.

It must be remembered that many aluminum joining and fabricating techniques are of relatively recent development and that most workers have little or no experience [fol. 4810] with these techniques. It is logical to expect continuing improvement and simplification in these methods on the one hand, and reductions in time and labor costs on the other in the face of increasing use and application.

Experience has shown that electricians easily learn how to splice and join aluminum by the various available methods from bolted to welded connections. The patent bugaboo of aluminum electrical connections has no longer a solid basis in reality. Likewise, with the proper tools and techniques, aluminum can be easily worked and fabricated in myriads of differing applications.

32. *Need for Educating Users and Workers*

Frequent conversations with various contractors and manufacturers reveal that many of them have what amounts to an ingrained reluctance to work with aluminum, although they have had little or no experience with aluminum. This stems from a natural conservative reaction to change in many cases, and in other cases to unfavorable experience resulting from using aluminum without sufficient knowledge of proper fabricating methods.

The passage of time will inevitably rectify this situation. However, considerable helpful impetus can result from properly directed and concentrated educational activity. On the one hand, this effort should be directed to teaching electricians and other skilled workers how to join,

fabricate, weld and work aluminum metals, so that labor inadequacy is no bar to economical utilization. On the [fol. 4811] other hand, the purchasers and users must be made more aware of the economic and other advantages of aluminum.

In particular, electrical contractors and consulting engineers should be made the targets of such educational and informative activities. Many contractors, because of ignorance or unfamiliarity, will unjustifiably increase cost estimates when aluminum conductors are specified. Consulting engineers, a most conservative breed, block the extension of aluminum use, often denying considerable savings to their clients, because of lack of information or because of the ingrained tendency to leave alone ancient specifications which have sufficed for countless previous jobs.

33. *Versatility of Aluminum*

Basically, aluminum is the most flexible of all metals and can be adapted to a tremendous variety of products and manufacturing processes. It can be drawn, bent, machined, forged, formed, spun and extruded. It can be riveted, brazed, flame-welded, arc-welded, flash-welded, resistance-welded and cold-welded. It can be painted, plated, specularized, brushed and anodized. It can be produced in a wide range of hardness, corrosion-resistance, machinability, ductility and strength.

However, this extreme versatility exacts a cost, and this cost is the need to be well-versed in the characteristics of the various aluminum alloys and in the techniques for their proper fabrication. The methods used with iron and steel [fol. 4812] or copper cannot be recklessly transferred to aluminum work. Aluminum is different, but it is not more difficult.

34. *Aluminum and the Future*

Aluminum is still in its vigorous, fast-growing youth, as indicated by the large annual increases which have occurred since World War II. New methods, new applications, improvements in existing techniques are being developed continuously. With the imminent exhaustion of long-mined copper and high grade iron resources in this country, alumi-

num looms as the metal of the future. To the entrepreneurs and manufacturers with the vision and initiative to accept and master the myriad applications of aluminum will go the rewards of the future.

[fol. 4813] References

(1) "How Aluminum is Made", publication of The Aluminum Association, New York, N. Y., February, 1954.

(2) "Practical Metallurgy For Engineers", by E. F. Houghton & Co., 1927.

(3) "Expanding Markets For Aluminum", publication of The Aluminum Association, New York, N. Y., April, 1955.

(4) "Aluminum—The Industry and the Four North American Producers", by the First Boston Corporation, January, 1951.

(5) Quarterly Press Releases and Data issued in 1956 by The Aluminum Association, New York, N. Y.

(6) "The New Look in Lamp Bases" by J. O. Geissbuhler, AIEE Proceedings of the Conference on the Electrical Utilization of Aluminum, March, 1955:—pp 99-102.

(7) "U.S. Aluminum Power and Lighting Wire Handbook", publication W-53-1 of The United States Rubber Co.

(8) "ALCOA—Aluminum Bus Conductors", publication No. ADZ of Aluminum Company of America.

(9) "Aluminum Conductor—What the Suppliers Say About It", "Electric Light and Power", February, 1952, pp 124-130.

(10) "Outside Aluminum Conduits", by J. P. Reynolds, "Electrical Construction and Maintenance", Nov., 1955.

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[fol. 4814] Section No. 3

Wire and Cable

The relative position of aluminum in the electrical sector of the economy will be determined in large measure by the extent to which aluminum is utilized as the conductor material in electrical wires and cables, still the dominant and characteristic electric material.

1. *Basic Advantages of Aluminum*

There are two basic significant factors today which are impelling aluminum to an ever larger portion of the electrical wire and cable market. Simply stated, these are as follows:

(a) Pound for pound, aluminum is more than twice as conductive as copper.

(b) The basic price per pound of aluminum during 1956 has been 55% to 65% that of copper. Now (March, 1957) after a precipitous drop in the price of copper, aluminum is at 80% of the copper price.

2. *Basic Advantages of Copper*

Opposed to these two great favorable factors are the two following disadvantages:

(a) The entrenched position of copper conductors.

[fol. 4815] (b) On a volumetric basis, the conductivity of copper is more than 1½ times as great as aluminum.

It is the interaction of these four general factors which explain the position of aluminum wires and cables today and which will determine that position tomorrow.

If choice were always made on the objective basis of a pure price comparison, it is safe to say that today aluminum conductors would be selected for most electrical installations, even though aluminum's lower volume conductivity, in many cases, requires larger conduit sizes and therefore higher conduit costs.

3. *Unfavorable Influences*

However it is the complex of influences arising from the long, practically exclusive use of copper for electrical wires and cables which in many cases offsets and brings to nought the apparent economic advantage of aluminum. These influences are exerted in many ways, both direct and indirect. A partial tabulation includes the following:

(a) Unwillingness on the part of many engineers, designers and contractors to take a chance on a new product (aluminum) as long as an old one (copper) performs satisfactorily.

(b) Resistance of electricians to learning the different handling and splicing techniques required for aluminum wires and cables.

(c) Inadvisability of introducing aluminum wires and cables in revisions of existing all-copper electrical installations.

[fol. 4816] (d) The fact that aluminum wires and cables are not yet such standard stock items as copper wires and cables.

(e) Unwillingness of suppliers to enlarge their inventory by duplicating their copper stock with additional stocks of aluminum wires and cables.

In general, the innate conservatism of engineers and designers will cause them to lose the economic benefits obtainable in many installations by using aluminum instead of copper. In many instances, such decisions are dictated by well-founded doubts concerning the ability of the electricians to make proper aluminum splices.

4. *Conductivity and Weight Comparison*

The fact that on a weight basis aluminum is greatly superior to copper as an electrical conductor comes as a surprise to many people who are automatically accustomed to regard copper as the standard of electrical conductivity and think of conductance only on an area basis.

Fig. 1 is a graphic illustration of the superior characteristics of aluminum on a weight basis. Although No. 4/0 aluminum conductor weighs about the same as No. 2 copper conductor, it is about 25% stronger (in the fully hard-drawn tempers), twice as conductive, has 1½ times the rated current capacity (type RH insulation) and will carry its rated current with less than 90% of the voltage drop of the copper conductor.

[fol. 4817]

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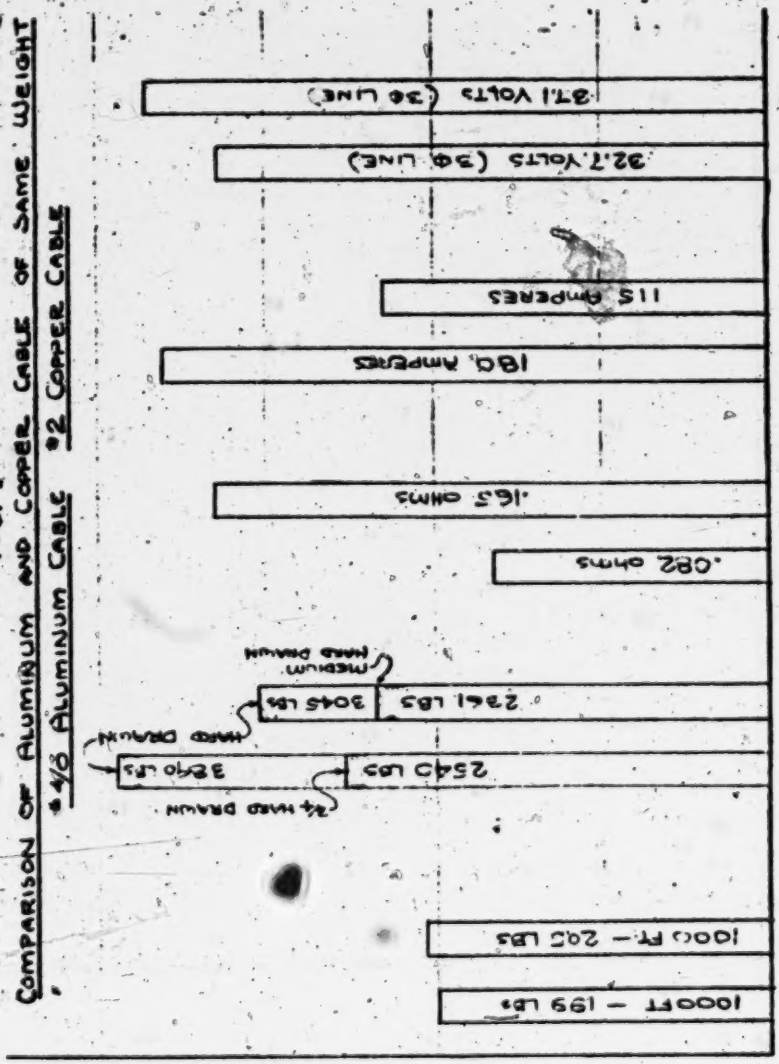
FIG. 1

COMPARISON OF ALUMINUM AND COPPER CABLE OF SAME WEIGHT

#4/0 ALUMINUM CABLE #2 COPPER CABLE



[fol. 4818] 5. *Weight-Size Rule*

A similar graph can be derived for other corresponding sizes of copper and aluminum wires. As a matter of fact, a curious empirical relationship is observed if one compares the American Wire Gage number sizes with the approximate per unit length weights of bare aluminum and copper cables. This is, that an aluminum cable weighs about the same (always somewhat less) as a copper wire five number sizes smaller, as shown in the following tabulation:

Table 1

Aluminum and Copper Conductor Sizes of Equivalent Weight

Copper		Aluminum	
Wire Size A.W.G.	Weight—lbs per 1,000 ft.	Wire Size A.W.G.	Weight—lbs per 1,000 ft.
2	202.9	4/0	198.6
3	162.5	3/0	157.5
4	128.9	2/0	124.9
5	102.2	1/0	98.1
6	81.0	1	78.5
7	64.3	2	62.3
8	50.1	3	49.4
9	40.4	4	39.2
11	24.9	6	24.6
13	15.7	8	15.2
15	9.8	10	9.5

[fol. 4819] This relationship arises because of the method of derivation of American wire Gage sizes whereby there is the same geometric ratio between the areas of any two adjacent wire sizes. This ratio works out to 1.261, which raised to the fifth power is 3.20 or very nearly the ratio of the densities of copper and electrical grade aluminum which is 3.32.

6. Conductivity-Size Rule

This geometric relationship of the American Standard Wire Gage sizes gives rise to another convenient rule relating the corresponding conductivities and current capacities of aluminum and copper wires. The area relationship of wires two gage numbers apart is 1.261 squared or 1.59. Now this value is practically the same as the conductivity ratio of copper to aluminum based on the International Conductivity Standard, which is 99% to 62% or 1.60. Consequently, the rule is that aluminum wire has the same

conductivity as copper wire two sizes smaller. Since voltage drop for the smaller size cables in conduit is principally due to resistance (for No. 4/0 wire, resistance is .0534 ohms per 1,000 ft. and the resistance becomes comparatively greater as the wires become smaller), a practical rule is that an aluminum cable has the same voltage drop as a copper cable two wire sizes smaller. See table 8 for a tabulation of actual voltage-drop values.

7. *Current Capacity—Size Rule*

There is finally another approximate empirical rule, this one relating to rated current capacities. This rule is similar [fol. 4820] to the voltage drop rule. It states that an aluminum wire has a rated current capacity approximately the same as a copper wire two wire gage sizes smaller. This rule arises from the method of deriving wire sizes and the ability of wires to carry a given electric current.

Current carrying ability is limited by temperature rise rather than voltage drop. The temperature rise of the wire depends on the ability of the wire to dissipate the energy or heat loss caused by the flow of current within the wire. And this ability is practically a direct function of the peripheral area of the conductor and therefore of the diameter of the conductor. In Fig. 2 it can be seen that the allowable current carrying capacities recommended by the National Electric Code are nearly a linear function of the conductor diameter.

For an insulated aluminum and copper wire of the same diameter, the temperature rise and therefore the energy dissipation of their respective rated currents will be the same.

$$P_{Al} R_{Al} = P_{cu} R_{cu}$$

If the conductivities of these wires are taken as 61% and 99% respectively, then

$$P_{Al} = \frac{61}{99} P_{cu}$$

$$I_{Al} = \frac{I_{cu}}{1.27} = .79 I_{cu}$$

[fol. 4821]

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FIG. 2 RELATIONSHIP OF AREA AND DIAMETER TO RATED CURRENTS

FOR CLASS B STRANDED CONDUCTORS

BASED ON NATIONAL ELECTRIC CODE VALUES FOR 600V. INSULATED ALUMINUM CABLE IN RACEWAY

[fol. 4822] Thus, from a consideration of conductivities and heat energy generation alone, we note that an aluminum conductor has about 79% the current carrying capacity of a copper conductor of the same size. Actually, this value of 79% is a minimum value for use in 60 cycle power circuits and is true for the smaller sizes of insulated cable. It is found that for the larger cables skin effect is more pronounced for copper because of its greater conductivity. E. E. McIlveen has determined experimental values of A.C./D.C. ratios of 1.13 for aluminum and 1.23 for copper in tests on 1,500,000 CM cables in iron conduit.[3] However, the difference is considerably less for the smaller sizes of cables and practically negligible for those in the American Wire Gage range. Actually, the National Electric Code allowable current-carrying capacities tend to be above 79% for the larger cables (250 MCM and above) and below this value for the smaller sizes in type RH insulated conductors. These ratios are shown on Fig. 3.

Now, the American Wire Gage sizes are so devised that any wire diameter is 89% the diameter of the next larger one. Therefore, a wire two sizes smaller will have a diameter about 79% of the larger wire diameter. Since the current carrying ability of aluminum wires is about 79% that of copper, then an aluminum wire should have the same current carrying capacity as a copper wire two A.W.G. sizes smaller. This relationship is closely reflected by the allowable current carrying capacities of aluminum and copper conductors of the latest edition (1956) of the [fol. 4823] National Electric Code.

These are compared below for conductors with type RH insulation:

Table 2

Copper		Aluminum	
A.W.G. Size	Rated Capacity	A.W.G. Size	Rated Capacity
14	15	12	15
12	20	10	25
10	30	8	40
8	45	6	50
6	65	4	65
4	85	2	90
		1	100
2	115	1/0	120
1	130	2/0	135
1/0	150	3/0	155
2/0	175	4/0	180
3/0	200	250 MCM	205
4/0	230	300 MCM	230
250 MCM	255	350 MCM	250
350 MCM	310	500 MCM	310
500 MCM	380	750 MCM	385

[fol. 4824] Comparative ampere load ranges are shown graphically contrasted in Fig. 3.

Consequently we may postulate as a general design rule that an aluminum conductor will in all cases provide equivalent or better current carrying capacity and voltage drop than a copper wire two A.W.G. sizes smaller. However, it would be wrong to design an installation on this basis, that is, with the idea of replacing a pre-chosen copper conductor. Aluminum should not be treated merely as a substitute for copper conductors, but rather as a valuable electrical component on whose properties electrical design should be based directly.

Thus, for a 35 ampere load, we would select a No. 8 copper wire or a No. 8 aluminum wire, *not* a #6 aluminum wire which the previous table indicates to be the approximate equivalent of No. 8 copper wire.

8. *Load-Price Comparison*

All the foregoing discussion of copper and aluminum conductor equivalents are of considerable academic interest and serve to vividly illustrate comparative electrical and physical properties. However, for the practical design engineer, presented with two alternatives of equivalent technical merit, the question is simply one of economics. How much does each installation cost? Or, in the case of

electrical conductors, what are the costs to carry a given load by copper conductors on the other?

[fol. 4825] Fig. 4 presents an answer to this question in the form of a direct list price (June, 1956) comparison of copper and aluminum conductors with type RH insulation to carry a given electrical load. Voltage drop has not been considered. In general, it will be the same for either copper or aluminum conductors, as previously explained and as shown in Table 3. No other costs have been considered. Handling costs should be about the same or favor aluminum because of its lighter weight. Splicing costs will be higher for aluminum. Installation (pulling) costs will tend to be equal, since the lighter weight of aluminum will tend to cancel out the effect of its larger size. To a considerable extent, the cost of splicing, which is discussed later in this article, will depend on the skill and familiarity of labor with proper aluminum splicing procedures. All in all, lumped labor and overhead costs should not vary greatly and, consequently, their difference will not be an important factor in an economic comparison. For all practical purposes, the comparative list price cost of the cables will be the prime determining economic factor.

9. *Types of Cable Installations*

Since the cost of conductors alone is being considered, it is obvious that the conclusions drawn from Fig 4 will apply only to feeder installations which do not use metallic conduit. Such installations will include the following:

[fol. 4826]

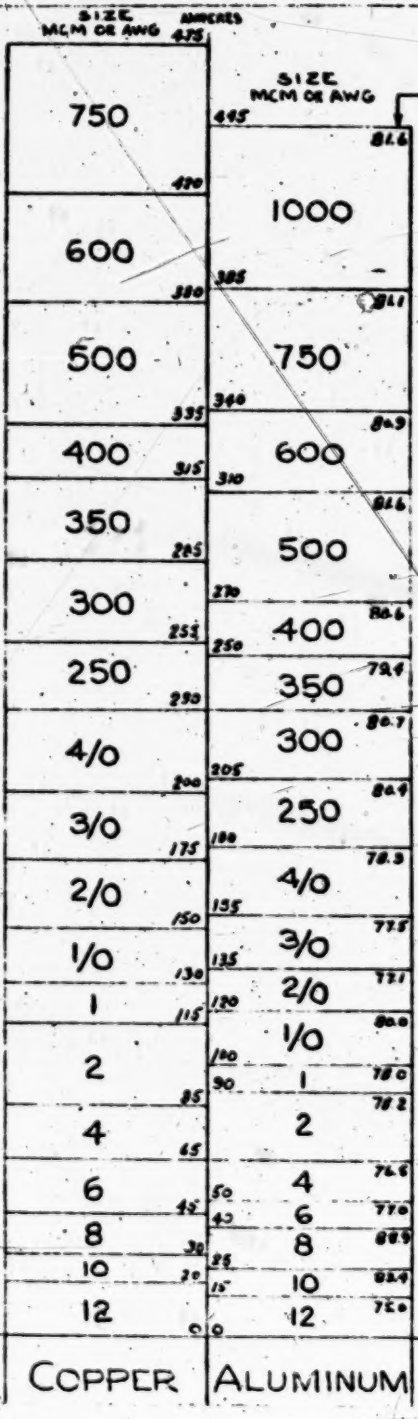


FIG. 3

COMPARATIVE CHART

1956 NATIONAL ELECTRIC CODE

ALLOWABLE CURRENT-CARRYING CAPACITIES

OF INSULATED CONDUCTORS

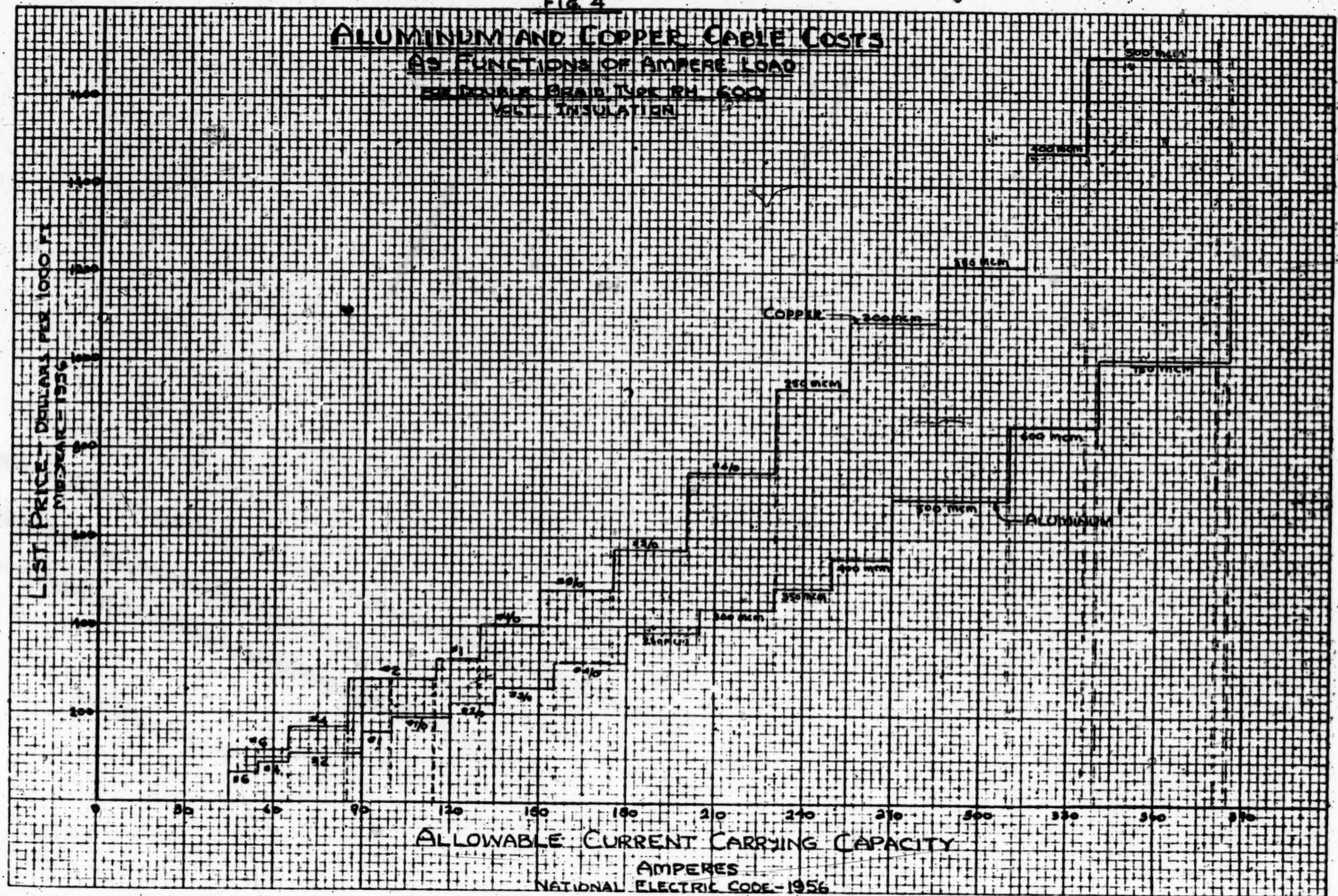
TYPE RH INSULATION

3 CONDUCTORS PER RACEWAY

[fol. 4827]

FIG. 4

ALUMINUM AND COPPER CABLE COSTS
AS FUNCTIONS OF AMPERE LOAD
FOR DOUBLE BRAID TYPE RH 600 VOLT INSULATION



(a) Open wiring. This would apply to wiring on insu-
[fol. 4828] lators, cleats, pole lines and racks. The cost of larger holding and clamp devices required will tend to be canceled out by the lighter weight of aluminum which requires fewer or less rugged supports.

(b) Wiring in fiber conduit. Such conduit is relatively inexpensive and is generally used in large standard sizes, usually 4-inch, for a large range of cable sizes. In general, costs for a fiber duct installation (less the cables) particularly if concrete-encased, would be about the same for either copper or aluminum cables.

10. *Cost Rates—Copper to Aluminum Cables*

The Copper to Aluminum cable cost ratios as a function of a range of given loads is shown tabulated below and plotted in Fig. 5.

Table 4

Ratio of Copper to Aluminum Cable List Price Costs Double Braid, Type RH, 600-volt Insulation for Various Ampere Loads.
(Based on National Electric Code—1956)
Mid-year 1956 Prices

Load Range In Amperes	Size of Cable		Coast Ratio
	Copper	Aluminum	
45– 50	No. 6 A.W.G.	No. 6 A.W.G.	1.80
50– 65	6	4	1.34
65– 85	4	2	1.51
85– 90	2	2	2.13
90–100	2	1	1.51

[fol. 4829]

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File (Check One): Dftg Rm:____ General File____ Estimate File____ Other_____

Remarks_____

FIG. 5

COST RATIO OF COPPER TO ALUMINUM CABLES

WITH DOUBLE BRAID TYPE RH INSULATION

BASED ON LIST PRICES OF JUNE 1956

[fol. 4830]

Job Title_____ Job No._____ Floor_____ Date_____

Trade_____ Calcs By_____ Sheet No._____ of_____

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TABLE 3

VOLTAGE DROP OF ALUMINUM & COPPER CONDUCTORS FOR EQUIVALENT ELECTRICAL LOADS

3 SINGLE CONDUCTORS IN STEEL CONDUIT, 80% P.F.

LOAD RANGE AMPERES	CABLE SIZE AWG OR MCM		PHASE TO PHASE VOLTAGE DROP VOLTS PER 10,000 AMP-FT		
	COPPER	ALUM	COPPER	ALUM	RATIO AL TO CU
40-45	8	6	12.7	12.6	1.0
45-50	6	6	7.9	12.6	1.6
50-65	6	4	7.9	7.9	1.0
65-85	4	2	5.1	5.1	1.0
85-90	2	2	3.4	5.1	1.5
90-100	2	1	3.4	3.9	1.15
100-115	2	1/0	3.4	3.4	1.0
115-120	1	1/0	2.8	3.4	1.2
120-130	1	2/0	2.8	2.8	1.0
130-135	1/0	2/0	2.3	2.8	1.2
135-150	1/0	3/0	2.3	2.3	1.0
150-155	2/0	3/0	1.9	2.3	1.2
155-175	2/0	4/0	1.9	1.9	1.0
175-180	3/0	4/0	1.6	1.9	1.2
180-200	3/0	250	1.6	1.7	1.0
200-205	4/0	250	1.4	1.7	1.2
205-230	4/0	300	1.4	1.5	1.1
230-250	250	350	1.26	1.3	1.0
250-255	250	400	1.26	1.24	1.0
255-270	300	400	1.13	1.24	1.1
270-285	300	500	1.13	1.08	0.95
285-310	350	500	1.04	1.08	1.0
310-335	400	600	0.97	0.98	1.0
335-340	500	600	0.88	0.98	1.1
340-380	500	750	0.88	0.89	1.0

[fol. 4831]

Load Range In Amperes	Size of Cable		Cost Ratio
	Copper	Aluminum	
100–115	2	1/0	1.24
115–120	1	1/0	1.69
120–130	1	2/0	1.44
130–135	1/0	2.0	1.78
135–150	1/0	3/0	1.55
150–155	2/0	3/0	1.86
155–165	2/0	4/0	1.51
165–180	3/0	4/0	1.81
180–200	3/0	250 MCM	1.50
200–205	4/0	250 MCM	1.95
205–230	4/0	300 MCM	1.70
230–250	250 MCM	350 MCM	1.93
250–255	250 MCM	400 MCM	1.69
255–270	300 MCM	400 MCM	1.97
270–285	300 MCM	500 MCM	1.58
285–310	350 MCM	500 MCM	1.76
310–335	400 MCM	600 MCM	1.61
335–340	500 MCM	600 MCM	1.98
340–380	500 MCM	750 MCM	1.68

[fol. 4832] From these data it can be seen that on a per ampere basis copper cable ranges generally from about 50% to 100% more expensive than aluminum cable. The irregularities in the curve are, of course, due to the necessary discontinuities in a range of wire sizes. However, a general trend can be noted. The economic advantage of aluminum appears to be a maximum in the range around 250 amperes and is less for smaller and larger loads, although larger loads in general appear to have higher cost ratios.

As might be expected, the price ratio curve is to a considerable extent a reflection of the weight ratio curve, which is shown plotted in Fig. 6. The favorable peak is not so marked for weight as for price, but it occurs at about the same range—in the area of 250 amperes. In general, copper cables with type RH insulation weigh about 40 to 80 per cent more than do aluminum cables of the same carrying capacities, the more favorable ratios being in the range of larger cables.

For a lighter insulation, such as type T (plastic) the ratio curve will approach more closely to the equal conductivity line. For heavier insulation, the reverse will occur.

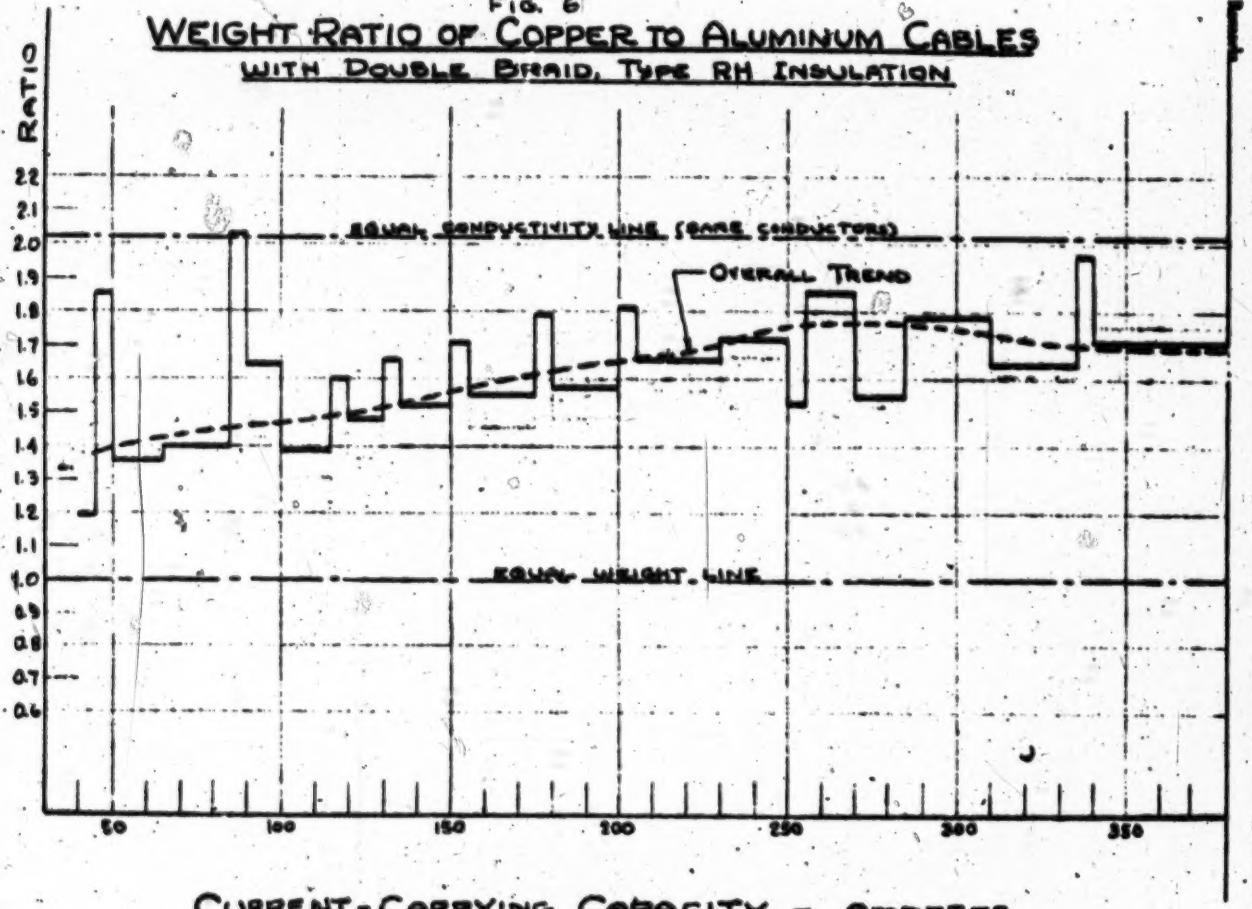
These price and weight tendencies are readily explained.

In the smallest sizes the favorable basic cost and weight of aluminum conductors are relatively small portions of the total cost and weight of the wires. In the largest sizes, there is a relatively greater circular mil per-ampere increase for aluminum than for copper, because the current

FIG. 6

WEIGHT RATIO OF COPPER TO ALUMINUM CABLES

WITH DOUBLE BRAID, TYPE RH INSULATION



CURRENT-CARRYING CAPACITY - AMPERES

NATIONAL ELECTRIC CODE - 1956

Job Title _____ Job No. _____ Page _____ Date _____

Made _____ Calc By _____ Sheet No. _____ of _____

File (Check One) Dlfg No. _____ General File _____ Estimate File _____ Other _____

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[fol. 4833]

1685

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[fol. 4834] capacity tends to increase directly as the cable diameter rather than the area and because of the greater increase of skin-effect in larger cables.

Figures 5 and 6 are for cables with 600-volt RH insulation and reflect a more favorable comparison than for cables with thicker insulations and more expensive protective coatings. However, significant savings will be realized with practically all types of cables (see section of this report on interlocked armor cable, for example) although the percentage savings will be lower for cables in which the cost of the basic conductor metal is a smaller part of the total cable cost.

11. *Overhead Distribution*

The economic advantage of aluminum as a cable conductor has only lately begun to affect the vast building construction field, but has been recognized for many years in overhead distribution lines where the use of aluminum cable is practically standard.

There are records of the use—aluminum conductors for transmission lines as long ago as the turn of the century on both East and West Coasts.[6] In the 1920's the use of steel reinforced aluminum cable for long span transmission lines began to be quite general and is now practically universal despite the fairly complicated double splices required by this cable.

[fol. 4835] The extended use of all-aluminum transmission cables, particularly in short span urban distribution, has become fairly standard with many utility companies during the past 10 years under the twin impacts of the copper shortage and the increasingly favorable economics of aluminum installations. Connector troubles have been largely solved, and connectors and connecting techniques continue to improve. A large proportion of the all-aluminum cables in this area are used for services.[8]

The economic advantage of bare all-aluminum cable over bare all-copper cable will, of course, be more marked than for insulated cable, wherein the larger aluminum cable is penalized by the cost of more insulation. In the distribution field comparative costs will tend to approach more closely equal carrying capacity costs. Another large savings at-

tributable to the lighter weight of aluminum conductors results from the need of fewer or less sturdy supporting towers and pole structures.

12. *Conduit Requirements*

In office and industrial buildings the usual cable installation is in conduit. Since for equivalent loads, aluminum cables will in most cases require conduit one size larger than a copper cable installation, the combined cost of cables and conduits must be considered in any comparative economic analysis.

Fig. 7 is a comparative chart showing conduit sizes required for copper and aluminum cables with type RH insulation for three and four conductors per conduit for loads from zero to values in the 300 and 400

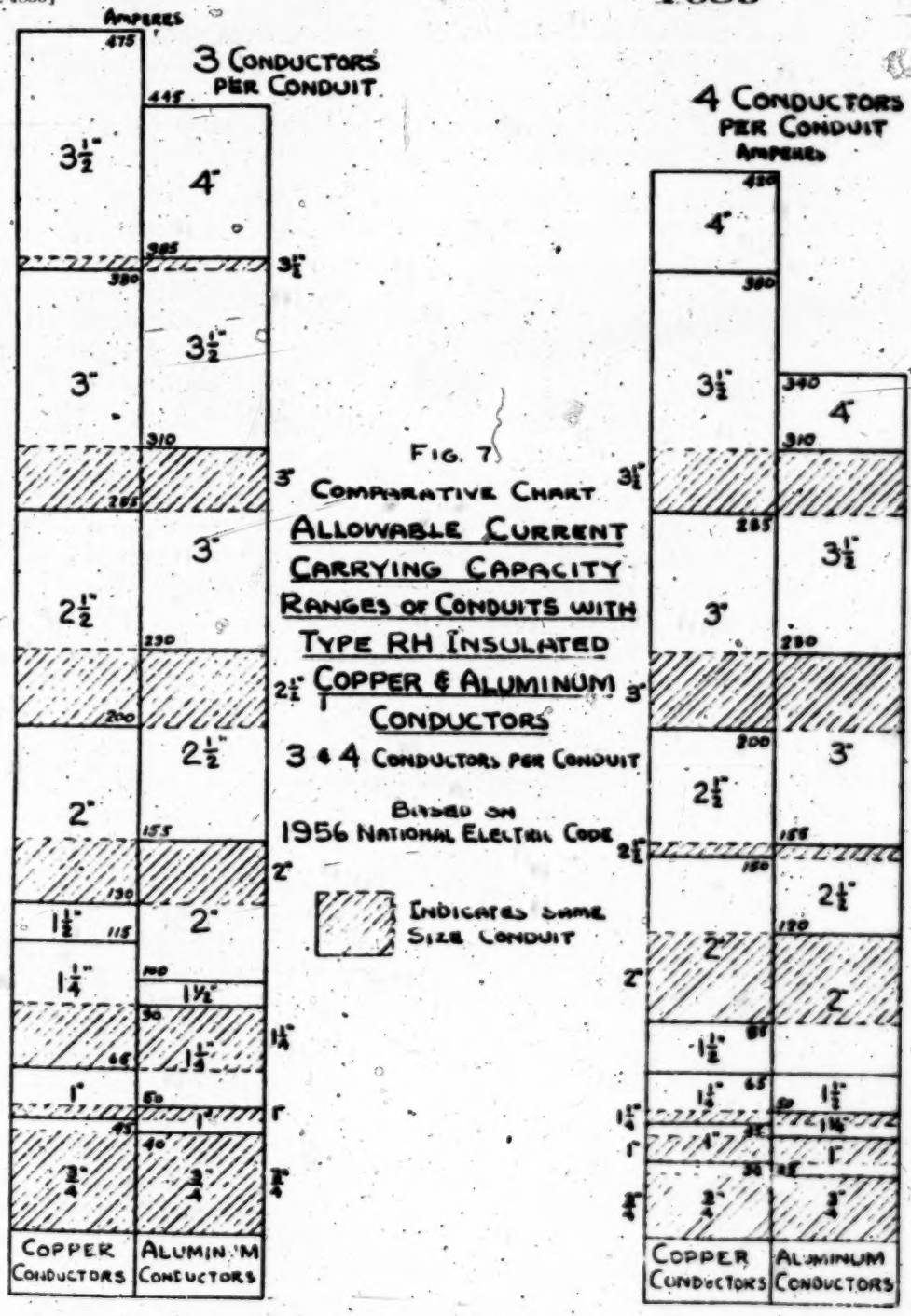

FIG. 7

COMPARATIVE CHART

ALLOWABLE CURRENT CARRYING CAPACITY RANGES OF CONDUITS WITH TYPE RH INSULATED COPPER & ALUMINUM CONDUCTORS

3 & 4 CONDUCTORS PER CONDUIT

BASED ON 1956 NATIONAL ELECTRIC CODE

INDICATES SAME SIZE CONDUIT

[fol. 4837] ampere range. The cross-hatched areas mark those load ranges within which no change of conduit size is required when using either aluminum or copper conductors. From an inspection and analysis of the two graphs the following pertinent facts and relationships emerge:

(a) In the greater portion of the load range, the use of aluminum conduit will require the next larger conduit size.

(b) However, in certain load ranges, the same conduits may be used for either aluminum or copper conductors. In the range from zero to 380 amperes (allowable carrying capacity for 500 MCM copper cable) these ranges are a considerable fraction of the total.

(b-1) 3 conductors per conduit: 140 amperes or 37%
(b-2) 4 conductors per conduit: 135 amperes or 36%

(c) In the shaded areas the use of aluminum wires and cables should be most advantageous, since they are not penalized by the additional costs of larger conduits.

(d) The favorable areas appear to be more concentrated in the lower portion of the total load range. In the zero to 50 ampere ranges, the following load percentages will be able to use the same size conduits with either aluminum or copper wires:

(d-1) 3 conductors per conduit: 90%
(d-2) 4 conductors per conduit: 80%

13. *Combined Cable and Conduit Costs*

Since the combined costs of cable and conduit must be compared when considering aluminum cables for the usual [fol. 4838] building installation, these costs have been determined for three type RH insulated conductors in conduit over the normal load range. The results for this type of feeder should be quite typical of the results which would be obtained for 4-conductor feeders and for other insulations, such as plastic and varnished cambric.

Table 5 on the following page compares material costs for power feeders over the 40-380 ampere range for aluminum and copper conductors based on January, 1957, prices. It should be noted that at this time (March, 1957) a 5 per cent decrease has occurred in the price of copper cables and a 3 per cent increase in the price of steel conduit. The

effect of these price changes will be to reduce the material cost ratio in favor of copper conductors by about 5 percentage points in the larger feeder sizes and progressively less for the others to about 2 or 3 percentage points for the smallest sizes. All in all, these changes will not alter appreciably the general trend, which is more clearly indicated by the plotted material cost curves of Fig. 8.

The tabulated and plotted data indicates that feeder costs show no consistently advantageous trend for either metal for loads of 200 amperes or less, although, even in this range, aluminum conductor feeders in most cases will cost less than the equivalent feeders with copper conductors. However, above the 200 ampere mark, aluminum conductor feeders in all cases are distinctly more economical by amounts ranging from 18

[Fol. 4839]

Job Title_____ Job No._____ Floor_____ Date_____

Trade_____ Calcs By_____ Sheet No._____ of_____

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TABLE 5

ELECTRICAL LOAD EQUIVALENTS

3 SINGLE CONDUCTOR TYPE RH, 600V CABLES IN CONDUIT

JAN. 1957

LOAD RANGE AMPERES	CABLE & CONDUIT SIZE CS		AS		WEIGHT POUNDS PER 100 FT.*			MATERIAL COST DOLLARS PER 100 FT.		
	COPPER CABLE # or MCM	STEEL COND. IN.	ALUMINUM CABLE # or MCM	STEEL COND. IN.	CS*	AS**	RATIO CS/AS	CS	AS	RATIO CS/AS
40-45	8	¾	6	1	135	175	0.75	42	51	0.82
45-50	6	1	6	1	194	175	1.11	64	51	1.25
50-65	6	1	4	1¼	194	231	0.84	64	68	0.94
65-85	4	1¼	2	1¼	262	245	1.07	88	75	1.17
85-90	2	1¼	2	1¼	289	245	1.18	107	75	1.43
90-100	2	1¼	1	1½	289	309	0.94	107	98	1.09
100-115	2	1¼	1/0	2	289	405	0.71	107	123	0.87
115-120	1	1½	1/0	2	362	405	0.89	150	123	1.22
120-130	1	1½	2/0	2	362	417	0.87	150	134	1.12
130-135	1/0	2	2/0	2	471	417	1.13	176	134	1.31
135-150	1/0	2	3/0	2	471	432	1.09	176	154	1.14
150-155	2/0	2	3/0	2	501	432	1.16	198	154	1.28
155-175	2/0	2	4/0	2½	501	641	0.78	198	199	0.99
175-180	3/0	2	4/0	2½	548	641	0.85	235	199	1.18
180-200	3/0	2	250	2½	548	665	0.82	235	220	1.07
200-205	4/0	2½	250	2½	777	665	1.17	311	220	1.41
205-230	4/0	2½	300	2½	777	686	1.13	311	238	1.31
230-250	250	2½	350	3	830	870	0.95	347	283	1.30
250-255	250	2½	400	3	830	888	0.93	347	305	1.20
255-270	300	2½	400	3	884	888	1.00	420	305	1.38
270-285	300	2½	500	3	884	926	0.95	420	348	1.21
285-310	350	3	500	3	1098	926	1.19	475	348	1.36
310-335	400	3	600	3½	1149	1116	1.03	520	441	1.18
335-340	500	3	600	3½	1251	1116	1.12	611	441	1.39
340-380	500	3	750	3½	1251	1149	1.09	611	490	1.25

* CS - COPPER CABLE, STEEL CONDUIT

** AS - ALUMINUM CABLE, STEEL CONDUIT

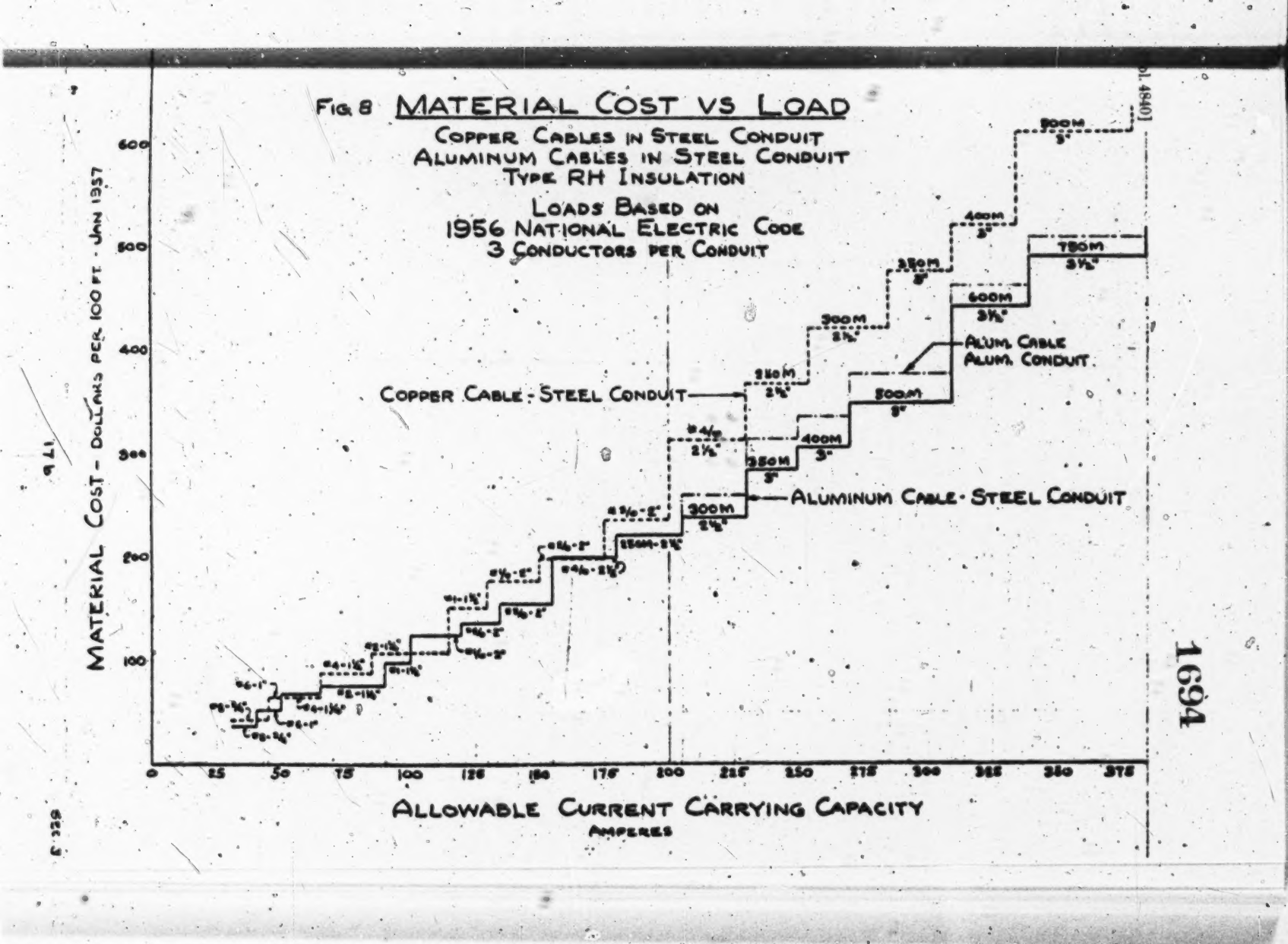
FIG. 8 MATERIAL COST VS LOAD
COPPER CABLES IN STEEL CONDUIT
ALUMINUM CABLES IN STEEL CONDUIT
TYPE RH INSULATION
LOADS BASED ON
1956 NATIONAL ELECTRIC CODE
3 CONDUCTORS PER CONDUIT
MATERIAL COST - DOLLARS PER 100 FT - JAN 1957
ALLOWABLE CURRENT CARRYING CAPACITY
AMPERES
COPPER CABLE - STEEL CONDUIT
ALUMINUM CABLE - STEEL CONDUIT
ALUM. CABLE
ALUM. CONDUIT
600M
500M
400M
350M
300M
250M
#4/0
#3/0
#2
#1
#1/0
#2/0
#3/0
#4/0
#250M
#300M
#350M
#400M
#500M
#600M
#750M
#900M
0
25
50
75
100
125
150
175
200
225
250
275
300
325
350
375
400
500
600

1694

[fol. 4841] to 39 per cent.

14. *Aluminum Cables in Aluminum Conduits*

The same treatment was applied to aluminum cables in aluminum conduits in a comparative analysis with copper cables and steel conduit. The resulting data and ratios are shown tabulated in table 6. Here again a similar but less favorable trend is noted. Here also, the recent price changes will lower the material cost ratios in favor of copper conductors in steel conduit, but not as much, since the price of aluminum conduit has not changed. The material cost ratios for aluminum cables in aluminum conduits have been plotted on Fig. 8 in the favorable range for loads above 200 amperes. These ratios indicate total material costs 11 to 29 percent (7 to 25 per cent as adjusted) greater for copper cables in steel conduits.

15. *Evaluating Labor Costs*

This favorable area has been isolated and expanded on Fig 9, and an attempt has been made to evaluate labor costs as well, so that the total cost picture may be obtained and a true evaluation of the total comparative economic picture determined. Only on the basis of total combined labor and material costs can an economic choice be made. Consequently such an evaluation has considerable practical value for the consulting engineer and electrical contractor.

16. *Conduit Installation Cost*

The problem of evaluating labor costs is a difficult one and

[fol. 4842]

Job Title _____ Job No. _____ Floor _____ Date _____

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TABLE 6

ELECTRICAL LOAD EQUIVALENTS

3 SINGLE CONDUCTOR TYPE RH, 600V. CABLES IN CONDUIT

LOAD RANGE AMPERES	CABLE & CONDUIT SIZE				WEIGHT POUNDS PER 100 FT			MATERIAL COST DOLLARS PER 100 FT (CCR 1956)		
	COPPER (CS) CABLE	STEEL COND.	ALUMINUM (AA) CABLE	COND.	*CS	*AA	RATIO CS TO AA	CS	AA	RATIO CS TO AA
40-45	8	¾	6	1	131	75	1.75	42	57	0.74
45-50	6	1	6	1	194	75	2.59	64	57	1.12
50-65	6	1	4	1¼	194	100	1.94	64	78	0.82
65-85	4	1¼	2	1¼	262	113	2.32	88	85	1.03
85-90	2	1¼	2	1¼	289	113	2.56	107	85	1.26
90-100	2	1¼	1	1½	289	146	1.98	107	110	0.97
100-115	2	1¼	1/0	2	289	187	1.55	107	139	0.77
115-120	1	1½	1/0	2	362	187	1.94	150	139	1.08
120-130	1	1½	2/0	2	362	199	1.82	150	149	1.01
130-135	1/0	2	2/0	2	471	199	2.37	176	149	1.18
135-150	1/0	2	3/0	2	471	214	2.20	176	160	1.10
150-155	2/0	2	3/0	2	501	214	2.34	198	160	1.24
155-175	2/0	2	4/0	2½	501	296	1.69	198	220	0.90
175-180	3/0	2	4/0	2½	548	296	1.85	235	220	1.07
180-200	3/0	2	250	2½	548	320	1.71	255	241	0.94
200-205	4/0	2½	250	2½	777	320	2.43	311	241	1.29
205-230	4/0	2½	300	2½	777	341	2.28	311	259	1.20
230-250	250	2½	350	3	830	419	1.98	367	312	1.17
250-255	250	2½	400	3	830	437	1.90	367	334	1.10
255-270	300	2½	400	3	884	437	2.02	420	334	1.26
270-285	300	2½	500	3	884	475	1.86	420	377	1.11
285-310	350	3	500	3	1098	475	2.31	475	377	1.26
310-335	400	3	600	3½	1149	573	2.00	520	461	1.13
335-340	500	3	600	3½	1251	573	2.18	611	461	1.32
340-380	500	3	750	3½	1251	606	2.06	611	509	1.20
380-390										

*CS - COPPER CABLE, STEEL COND. AA - ALUM CABLE, ALUM COND.

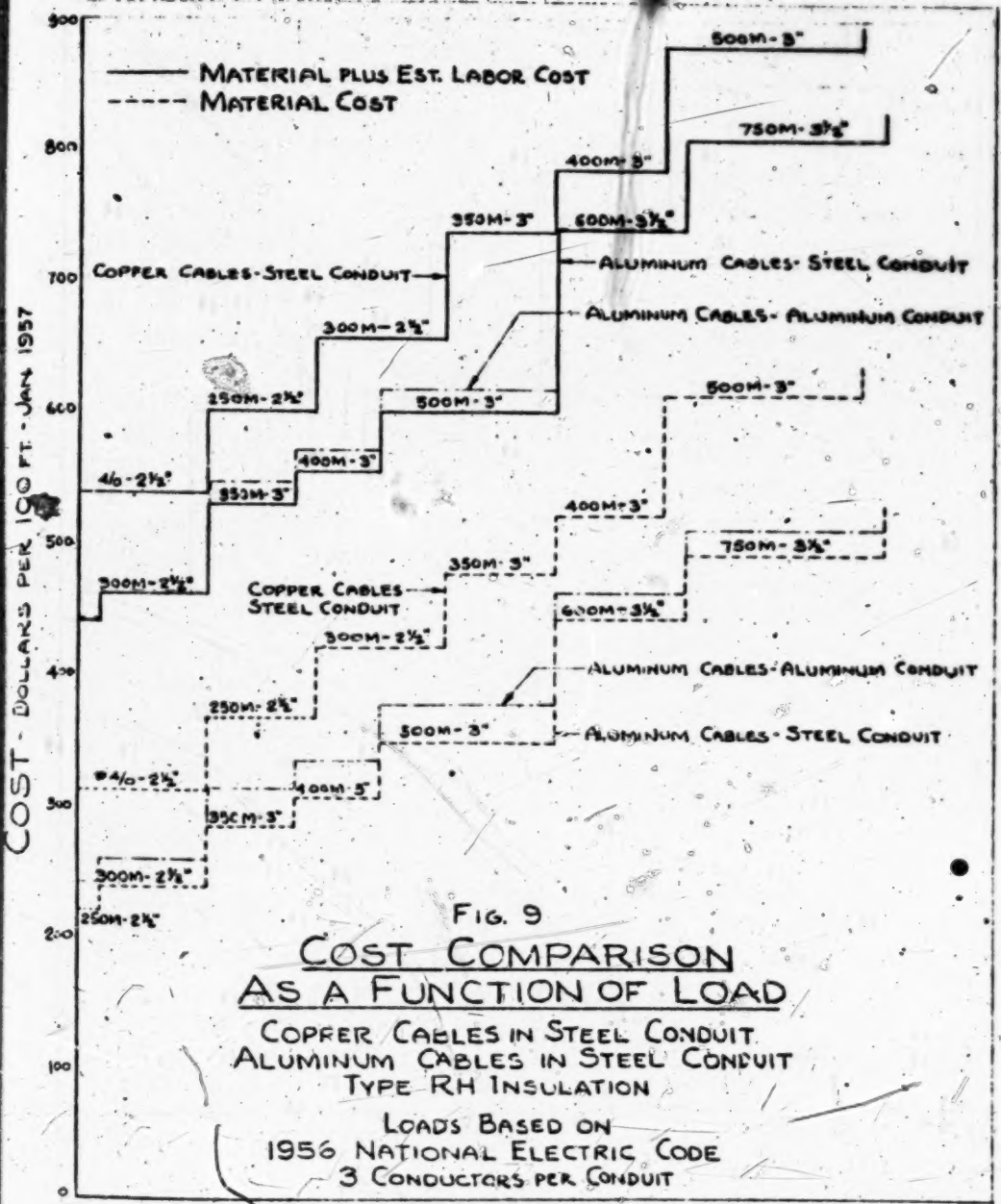

FIG. 9

COST COMPARISON AS A FUNCTION OF LOAD

COPPER CABLES IN STEEL CONDUIT
ALUMINUM CABLES IN STEEL CONDUIT
TYPE RH INSULATION

LOADS BASED ON
1956 NATIONAL ELECTRIC CODE
3 CONDUCTORS PER CONDUIT

FIG. 9 - ALLOWABLE CURRENT CAPACITY.

[fol. 4844] highly subjective, although it is the crux of a successful contractor's operations. In Section No. 1 of this report on "Conduit" the matter of comparative conduit costs has been discussed and the labor costs quoted by a reputable and experienced electrical contractor have been used to obtain total comparative costs of aluminum and steel conduit costs. The same labor costs have been utilized in this analysis as well.

17. *Cable Installation Costs*

Cable installation costs are even more involved and subjective than conduit costs, since, along with varying working conditions, there are additional variables such as different cable-pulling lengths and varying numbers of cables per pull. To attempt to obtain an average for the almost infinite number and variety of pulling situations would hardly be possible or worthwhile. Various sources and authorities [9,10] have developed labor cost data and curves on this subject. These, however, must be applied with great care to any particular set of circumstances. Estimates on a cost per foot basis obtained from a number of contractors show considerable variation among themselves and with published data. Yet, such is the diversity of conditions that all of them could be right.

Consequently, it was decided that the most sensible course was to obtain comparative costs for the installation of aluminum and copper cables under identical conditions from a single experienced and reliable contractor. These conditions were simply a straight pull of 3 conductors into [fol. 4845] 100 feet of conduit. Connection costs were not evaluated, since with modern connectors and techniques these costs should not be too different and would, in any event, have small effect on the overall costs.

For pulling aluminum and copper cables of the same size, quoted labor costs were 6 to 15 per cent greater for copper cables ranging from No. 4 to 750 MCM sizes with the larger savings in the larger sizes. It is believed that this is a conservative estimate. Other contractors with aluminum cable experience have indicated greater relative savings. Further investigation is required in this area to obtain more reliable and accurate comparative labor cost data.

With relatively small labor cost differentials for the same sizes, cable pulling costs per ampere turn out to be generally higher for aluminum for some sizes and lower for others. The following is a partial tabulation of relative pulling costs for equivalent capacity cables:

Cable Size		Pulling Cost	
Copper	Aluminum	Copper	Aluminum
250 MCM	350 MCM	1.00	0.95
300 MCM	400 MCM	1.00	0.94
350 MCM	500 MCM	1.00	0.925
400 MCM	600 MCM	1.00	1.02
500 MCM	750 MCM	1.00	1.13

[fol. 4846] This particular contractor considers it 13 per cent more expensive to install 750 MCM aluminum cable as compared to 500 MCM copper cable. Another contractor who was queried indicated that the cost would be about the same in view of the considerably lighter weight of the aluminum conductors. On Fig. 6 it can be seen that the copper cables weight 71 percent more.

18. *Overall Material and Labor Costs*

At any rate, considering it better to err on the conservative side, these labor cost figures were added to the material cost prices and the total cost indices were obtained for copper cables in steel conduit, aluminum cables in steel conduit, and aluminum cables in aluminum conduit. These values are tabulated in table 7 under the respective column headings CS, AS and AA. The total costs for each of these three alternatives have been plotted on the upper portion of Fig. 9

These curves indicate that the inclusion of labor costs will in most cases cut the economic margin favoring an aluminum cable installation, except for those load ranges where larger conduit is not required to house the aluminum cables. Within these ranges the total overall savings for aluminum will increase, although the overall savings percentage will decrease.

19. *Aluminum Conduit Economies*

Another interesting observation is that the use of aluminum conduit adds little or nothing to the overall cost. As a matter of fact for the

TABLE 7

COMPARATIVE COSTS - JAN 1957
ELECTRICAL LOAD EQUIVALENTS
THREE SINGLE CONDUCTOR TYPE RH CABLES IN CONDUIT

LOAD RANGE AMPERES	CABLE & CONDUIT SIZE: COPPER CABLE AWG MCM	COPPER CONDUIT IN.	ALUM. CABLE MCM	ALUM. CONDUIT IN.	RELATIVE MATERIAL COST: CS	AS	AA	RELATIVE LABOR COST: CS	AS	AA	RELATIVE MATERIAL PLUS LABOR COST: CS	AS	AA
200-205	4/0	2½	250	2½	1.00	0.71	0.77	1.00	0.97	0.88	1.00	0.82	0.82
205-230	4/0	2½	300	2½	1.00	0.77	0.83	1.00	0.98	0.90	1.00	0.86	0.86
230-250	250	2½	350	3	1.00	0.77	0.85	1.00	1.06	1.00	1.00	0.88	0.91
250-255	250	2½	400	3	1.00	0.83	0.91	1.00	1.06	1.01	1.00	0.92	0.95
255-270	300	2½	400	3	1.00	0.75	0.80	1.00	1.05	1.00	1.00	0.84	0.87
270-285	300	2½	500	3	1.00	0.83	0.90	1.00	1.06	1.01	1.00	0.91	0.94
285-310	350	3	500	3	1.00	0.73	0.79	1.00	0.96	0.92	1.00	0.81	0.84
310-335	400	3	600	3½	1.00	0.85	0.89	1.00	1.13	1.06	1.00	0.94	0.94
335-340	500	3	600	3½	1.00	0.72	0.75	1.00	1.11	1.04	1.00	0.84	0.84
340-380	500	3	750	3½	1.00	0.80	0.83	1.00	1.19	1.11	1.00	0.92	0.92

CS — COPPER CONDUCTORS, STEEL CONDUIT
AS — ALUMINUM CONDUCTORS, STEEL CONDUIT
AA — ALUMINUM CONDUCTORS, ALUMINUM CONDUIT

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[Ed. 4847]
Job No. Page Date
Job Title
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File (Card, Corp. Eng. Rec., General File, Estimate File, Other)
Remarks

[fol. 4848] contractors who have indicated greater labor savings than those used in this analysis, the use of aluminum conduit in this favorable range should actually lower overall costs.

The savings realized by the use of aluminum conduit is not only in the direct labor required to handle and work on the conduit, but also in the labor and material savings resulting from the reduced support requirements. The latter economy would be especially significant for large horizontally or vertically supported conduit banks. The overall weight savings of an all-aluminum installation over a copper cable-steel conduit installation, or even an aluminum cable-steel conduit installation, is generally better than two to one as can be seen by the data in table 5. In table 4, it will be noted that no particular weight advantage is gained by using aluminum cables in steel conduit. The basic reason is that the weight of the conduit is the major portion of a cable-conduit installation, ranging from about 55 to 80 per cent of the total weight of the installation, even for copper cables.

A more graphic picture of the comparative weight relationship is provided by Fig. 10, wherein overall weight for a 3-cable feeder is plotted as a function of load for all-aluminum and copper-steel cable and conduit installations. A similar curve for aluminum cables and steel conduit would generally follow the copper-steel curve.

For a more thorough discussion of estimated labor savings by the use of aluminum conduit, see Section No. 2 and 12 of this report.

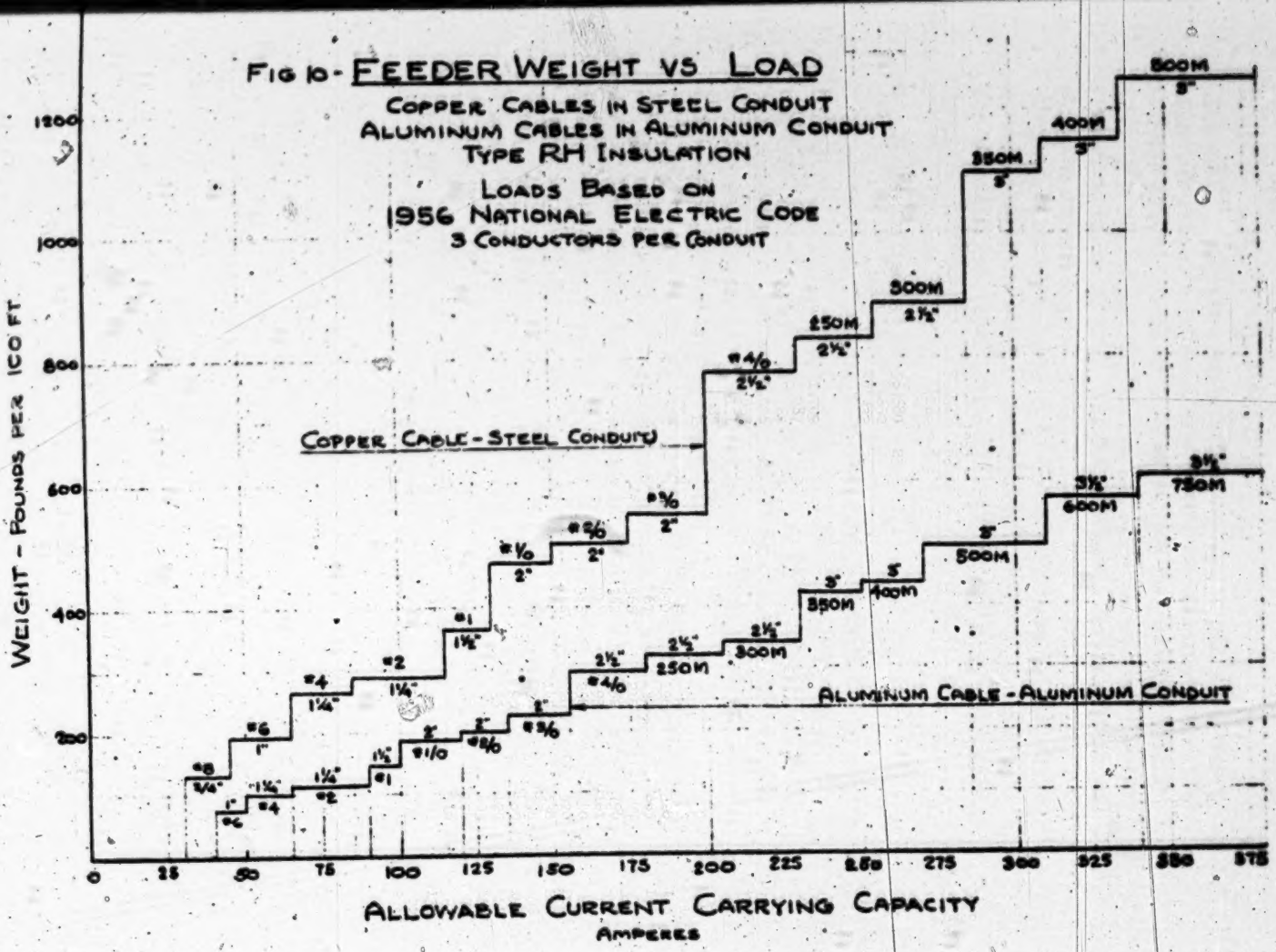
FIG 10 - FEEDER WEIGHT VS LOAD
COPPER CABLES IN STEEL CONDUIT
ALUMINUM CABLES IN ALUMINUM CONDUIT
TYPE RH INSULATION
LOADS BASED ON
1956 NATIONAL ELECTRIC CODE
3 CONDUCTORS PER CONDUIT
WEIGHT - POUNDS PER 100 FT
1200
1000
800
600
400
200
0
25
50
75
100
125
150
175
200
225
250
275
300
325
350
375
ALLOWABLE CURRENT CARRYING CAPACITY
AMPERES
COPPER CABLE - STEEL CONDUIT
ALUMINUM CABLE - ALUMINUM CONDUIT
#8
3/4"
#6
1"
#4
1 1/4"
#2
1 1/4"
#1
1 1/2"
#1/0
2"
#2/0
2"
#3/0
2"
#4/0
2 1/2"
250M
2 1/2"
300M
2 1/2"
350M
3"
400M
3"
500M
3"
600M
3 1/2"
750M
3 1/2"
#6
1"
#4
1 1/4"
#2
1 1/4"
#1
1 1/2"
#1/0
2"
#2/0
2"
#3/0
2"
#4/0
2 1/2"
250M
2 1/2"
300M
2 1/2"
350M
3"
400M
3"
500M
3"
600M
3 1/2"
750M
3 1/2"

[fol. 4850] Relative material, labor and overall costs have been tabulated on table 6 for copper cables in steel conduits and aluminum cables in both steel and aluminum conduits, with all costs for the copper cable installation reduced to the reference index of 1.00. Again, it should be kept in mind that the recent copper price change will tend to raise the aluminum cable indices 2 to 4 points, but that there is strong reason to believe that greater labor cost economies are possible for both aluminum cables and aluminum conduits.

20. *Branch Circuit Wiring*

Electrical contractors and consulting engineers appear to believe almost dogmatically that aluminum is out of the question for the small size wires used for branch lighting and appliance circuits. This oddly fixed belief, amounting almost to unanimity, seems strange in view of the hard facts revealed in Figures 7 and 11.

In Fig. 7 we note that larger conduits are not required for 3-phase, 4-wire circuits using aluminum wires for loads up to 25 amperes. In Fig. 11 we see that at current prices, aluminum wires, size for size, in the common type RH and type TW insulations cost from about 60 to 80 per cent of their copper equivalents. Since for small loads under 15 amperes (the usual range for branch circuit wiring) an aluminum wire installation will not be penalized by larger wire or conduit requirements, this full price savings can be immediately applied to such an installation.

Job Title _____ Job No. _____ Floor _____ Date _____

Scale _____ Color By _____ Sheet No. _____ of _____

File [Check One] Dftg Rm. _____ General File _____ Estimate File _____ Other _____

Remarks _____

FIG. 11 - RELATIVE PRICES OF ALUMINUM AND COPPER BRANCH CIRCUIT WIRES MARCH 1957

[fol. 4852] Consequently, a copper wire installation must justify itself by factors other than purchase cost. These factors are as follows:

(a) Lower voltage drop.
(b) Greater current capacity.
(c) Easier splicing, resulting in lower labor coats and better connections.

21. *Branch Circuit Voltage Drop.*

Voltage-drop tables [111] indicate the following voltage drops per 1,000 amp-ft. for solid aluminum and copper wires, sizes 12 and 10 A.W.G. the size commonly employed in branch circuit wiring:

Wire Size	Copper	Aluminum
#12 A.W.G.	1.85	2.69
#10 A.W.G.	1.16	1.83

These are line-to-ground voltage drops and are for the multi-wire branch circuits consisting, in general, of 3 circuit wires with common neutral. If voltage drop be limited to a total of 1½ per cent from panel to fixture, the following table indicates the maximum lengths of multi-wire branch circuits for a 12-ampere load:

Table 8

Maximum Lengths of Multi-wire Branch Circuits to Limit Voltage Drop to 1½ per cent of Line Voltage

	Aluminum Wires		Copper Wires	
	120-V. Circuits	277-V. Circuit	120-V. Circuit	277-v. Ckt
#12 A.W.G. Wires	50′	115′	80′	185′
#10 A.W.G. Wires	80′	185′	130′	300′

[fol. 4853] Since probably over 90 per cent of branch circuit wires are size 12 A.W.G., the comparative properties of aluminum and copper wires in this size are of most importance. From table 7 we note that No. 12 aluminum wires are limited to 50 ft. by the load and voltage drop requirements as compared to 80 ft. for copper wire for 120 volt circuits. However, the permissible circuit length changes to 115 ft. for 277 volt circuits.

Ordinarily, branch circuits will not exceed the latter distance from their panel. Consequently, it is not expected that voltage drop will prove to be a limitation to the use of

aluminum # 12 A.W.G. wire for these higher voltage circuits, which are achieving ever wider use throughout this country, particularly in office and industrial buildings. Nowadays, practically all office buildings of any size utilize 277/480 volt distribution and lighting systems, as do most large industrial buildings. For these structures, aluminum branch circuit wiring should prove particularly applicable and economical.

22. *Current Capacity*

The 1956 National Electric Code sets the allowable current carrying capacity of aluminum wires with the common building types of insulation (code rubber, heat-resistant rubber and thermoplastic insulations) at 15 amperes. Previously, this allowable load was greater, and undoubtedly aluminum wire at its allowable 15 amperes will run cooler than will copper at its allowable 20 amperes, since the fully [fol. 4854] loaded aluminum wire will generate less heat energy.

To what extent is this load limitation detrimental? For some appliance branch circuits where a full 20-ampere capacity is desirable, the application of No. 12 A.W.G. aluminum wires will be definitely limited.

However, a properly designed appliance branch circuits should in practically all cases be able to use aluminum wires. Fifteen ampere circuits for appliances may be permitted twice the maximum voltage drop of lighting circuits without appreciably impairing their effectiveness. For larger loads, #10 A.W.G. aluminum wire with 25-ampere circuit breakers or fuses can be used. It should be noted that an important municipal code, such as the Electrical Code of the City of New York, limits appliance branch circuit protective devices to 25 amperes,[12] thus utilizing the full allowable current-carrying capacity of No. 10 A.W.G. aluminum wires for this application.

High-voltage (277-V.) lighting circuits, particularly in office buildings, will generally carry fewer amperes than 120-volt circuits. Actual loads are in practice limited by control requirements and code limitations on the maximum number of fluorescent lamp auxiliaries.[12] Consequently, fifteen ampere circuits are eminently suitable for this ap-

plication and #12 A.W.G. aluminum wires will generally operate well within their recommended voltage-drop and current-carrying limitations.

[fol. 4855] 23. *Branch Circuit Splicing*

Branch circuit splicing is the great "bete noire" of aluminum wire application in this field. Countless contractors and consulting engineers shudder at the very thought. Even the connector manufacturers, who have, most laudably, pioneered and developed connectors and lugs for the larger wire and cable sizes, appear for the most part to have kept away from a thorough investigation in this area. Actually, the present reality at this time is far different from the horrendous picture imagined by most contractors and engineers.

The original source of these fearful ideas lay in the admitted inadequacies of aluminum building wire in the early years of its development. In 1947 when aluminum branch wiring was installed in ALCOA's great rolling mill in Davenport, Iowa, there were considerable complaints from the electricians because of the brittleness of the hard drawn wire and its tendency to break off at the ends. When aluminum branch circuit wires were installed in the ALCOA building in Pittsburgh five years later, these complaints had largely vanished.

The reasons were two-fold—(1) The mechanical properties of the wires had been greatly improved so that greater flexibility was combined with adequate strength. (2) Greater pains and efforts were expended to teach the electricians the proper handling and splicing methods for small, as well as large, aluminum wires.

[fol. 4856] 24. *Bendability of Aluminum Wire*

Even today, considerable trouble will be encountered if one attempts to treat aluminum wire as if it were copper wire. Aluminum wire in the common commercial tempers is adequately flexible for end connections. It can be bent back and forth many times before breaking, as any one can ascertain. However, it will break long before standard annealed copper wire. This breakage appears to be aggravated by the tendency of aluminum to bend in a smaller

radius than copper. The sharper bending increases the stress concentration and leads to more rapid rupture.

25. *"Notch Sensitivity"*

Breaking will also be greatly hastened by notches or nicks on the stressed area. This so-called "notch effect" or "notch sensitivity" is a complex function of the mechanical properties of a material. It appears to derive from the combination of relative compressive, tensile and yield strengths. In general, rupture during bending is more likely to occur in materials with yield strengths close to their ultimate tensile strengths. In this respect standard annealed copper is supreme since it has no well-defined yield point, but yields gradually from about 6,000 psi to its ultimate strength of 32-34,000 psi attaining a total elongation before rupture of 40-60 per cent.[13]

Aluminum in the fully annealed state yields a total elon- [fol. 4857] gation of 23 per cent.[14] However, the elongation is considerably reduced as the hardness of the temper is increased until a minimum of 1.5-2.0 per cent is reached in the fully hard-drawn condition, where notch sensitivity is greatest.

In the three-quarter hard and intermediate tempers, which are commonly used for building wires, an effective compromise appears to have been reached between strength and end-breakage tendency.[1] However, the tendency is still here and the intelligent contractor and workman will exercise simple and effective handling and installation methods to minimize it. Experience and common sense recommendations are as follows:[15,16]

(a) Heavy or sharp objects should never be thrown or piled on aluminum wire coils.

(b) Insulation should be stripped off the ends by "paring-off" instead of "ringing" the wire. The latter method is much more liable to nick the conductor.

(c) Wire ends should be twisted and bent as little and as few times as possible while making the splice.

(d) Use round-nose pliers whenever bending the end of the bare wire into a loop or hook.

These simple precautions have eliminated the problem of end-breakage in recent aluminum wire installations.

[fol. 4858] 26. *Splicing Methods for Aluminum Branch Circuit Wires*

All the above precautions and operations are preliminary to the actual splicing of the wires. This has been and can be accomplished in a number of ways which include the following general methods:

(a) *Soldering.*[12] This can be readily done with modern solders and fluxes which eliminate the troublesome oxide film. However, the flux residue is corrosive and must be wiped away carefully. Also, the quality of the connection will depend to a great degree on the skill and conscientiousness of the electrician. As a result, this method is not generally used.

(b) *Welding.* This method has provided excellent pigtail connections. A battery-operated portable welder fuses the twisted wire ends into a solid connection within a carbon electrode cup.[15] An excellent electrical joint results, but this method, which was used in the early portion of the branch circuit wiring installation in the ALCOA building is somewhat inconvenient because of the heavy portable equipment, and the additional preparation required by the pigtails.

(c) *Compression Sleeves.* A close fitting sleeve, usually of aluminum is placed around the 2, 3 or 4 ends of the wires to be spliced together. Then a compression tool applies either an indent or circumferential squeeze which brings the wires together into a close, almost cold-welded union.

[fol. 4859] (d) *Bolted Connections.* This is generally a split-bolt connector of tin-plated copper alloy material. A spacer is often employed on tap-offs or two-wire splices.[17] It is the simplest and easiest to apply and is achieving wider use for both aluminum to aluminum and aluminum to copper splices.

For all the above splicing methods, indeed for all splicing, whether copper or aluminum is involved, the joined surfaces should first be thoroughly cleaned, generally by abrasive rubbing or scratch-brushing. In the case of the compression and bolted connections the persistent oxide

coating of the aluminum conductor must be scratch-removed through a coating of compound which will prevent oxide reformation on the abraded aluminum surface. This is most important, particularly for split-bolt connectors, and will usually spell the difference between a good and bad splice.

27. ALCOA Building Branch Circuit Wiring Installation

The most notable example of an aluminum branch-circuit wiring installation in recent years is the ALCOA building in Pittsburgh, home office of the Aluminum Company of America. After initial use of the carbon-electric welding method, all small wire splices in junction and outlet boxes were made with common split-bolt connectors. This method has been fully justified by four years of service and is at present the splicing method used when system or maintenance changes are required.

[fol. 4860] The actual technique used by the electricians consists of paring-off the end insulation as described above, cleaning the wire ends with abrasive cloth dipped in ALCOA No. 2 joint compound, and then inserting the ends into the split bolt connector and tightening it. Practically, the only additional labor is the extra motion to dip the abrasive cloth into the joint compound.

Some additional observations are illuminating and will tend to dispel the almost mystic and fearful haze surrounding this subject. Although all branch circuit wiring is No. 12 A.W.G. aluminum, the fixture leads are copper, usually No. 16 A.W.G. These, however, are treated the same as the aluminum wires. The most common joint consists of 2 or 3 No. 12 aluminum wires and a copper fixture wire held together by a split bolt connector. No separators or spacers are used. Even more surprising, it was noted that the split bolt connectors were the bare copper alloy type recommended only for copper wire connections, rather than the tin-coated connector with spacer recommended for aluminum or mixed wire joints by the manufacturer.

When queried, the chief maintenance engineer indicated that this type of connection had proved itself in use and, consequently, he saw no sense in going to more expensive and cumbersome connections.

Why this is so may be readily deduced from a considera-

tion of the properties and behavior of aluminum wire in this particular environment. In the first place, the branch circuit wiring is generally lightly loaded and the entire [fol. 4861] building is air-conditioned, consequently, there are no large heat-cycling extremes to progressively destroy copper to aluminum connections. The splices are able to "breathe" readily within their elastic limits without causing plastic deformation of the aluminum wires. Secondly, corrosion between the two metals does not exist because the two necessary elements—moisture and electrolyte—are not present.

28. *Another Pigtail Splice*

Another way of making pigtail splices, used in the great Canadian Kitimat installation, is to apply individual indented symmetrical and asymmetrical aluminum terminal lugs to the ends of each wire and then bolt the group together.[19] A very compact joint is obtained, but the labor cost is considerably higher.

29. *Screw Terminal Connections*

A few words should be added about the connection of aluminum No. 12 and 14 A.W.G. wires to screw terminals. This can readily be done either by indenting an aluminum terminal lug to the end of the wire or by forming the end of the wire into a neat closed circular loop with the aid of round-nosed pliers.[19] In the both cases, scratch brushing under compound of the end connections precedes the actual screw-tightening of the wire end to the copper terminal, which is also scratch-brushed under compound.

[fol. 4862] 30. *Cold-Pressure Butt Welding of Wires*

A very interesting method, recently developed, for joining solid electrical wires is by means of cold-pressure butt welding.[36,37,38,39] This technique is extremely versatile since it can be applied with equal facility not only to aluminum wires, but also to copper wires and to the joining of either metal to the other.

The union of the wires is effected by buttwelding the two ends by the application of great pressure under carefully

controlled conditions. This operation is accomplished in less than half a minute in a specially designed tool which accurately cuts and squares the ends of the wires and then butts them together to effect a weld of the same cross-section as the wires being joined.

The resulting union is a true weld in the sense that a homogeneous crystalline structure results with physical qualities unimpaired. Indeed, an aluminum joint because of the cold work is stronger than the unaffected members on each side. Furthermore, so perfectly are the wires joined that the weld is scarcely visible once the easily removable weld flash is cut away. The joined section of wire may be flexed and twisted to a considerable degree without failure.

Presently available are light portable hand tools which are capable of welding aluminum wires in a wide range of sizes. Commercial A.W.G. sizes Nos. 18 to 8 may all be welded with a single tool equipped with cutter and interchangeable dies. Because of its early development and [fol. 4863] because the nature of the operation requires carefully machined dies and precise operation, this tool is still relatively expensive. However, the manufacturers expect to reduce the cost with further development and quantity production.

The possibility exists of developing relatively simple plyer-like tools for use on only a single size of wire of the more popular sizes. The most obvious would be No. 12 A.W.G. size, which in large commercial buildings will constitute about 95% of the total wire footage.

A deterrent to present use of this technique in general building wiring is that butt-welding can necessarily be applied to only two wires. For uniting three or more wires at a common joint a lap-weld must be used and this type of cold-pressure weld is not as satisfactory as butt-welding, because of the labor of scratch-brushing the individual wires and the danger of surface contamination which will produce a defective weld. Until an effective and inexpensive way is developed for making multiple wire joints, it is improbable that cold-pressure joining will make much headway in the electrical construction trade, even with aluminum wiring.

31. *Branch Circuit Wiring—Conclusions*

Thus, it is seen that the splicing of aluminum branch circuit wiring by a variety of techniques is readily learned and applied, and has been proved by many years' use in existing installations. It is doubtful if the use of aluminum branch [fol. 4864] circuit wiring should result in appreciably increased labor costs, if properly trained electricians are employed. Moreover, any small increase would tend to be reduced by the easier handling inherent in the lighter aluminum wire.

Consequently, there is reason to believe that appreciable savings, equal to the material cost difference of aluminum and copper No. 12 A.W.G. wires, can result from a properly executed aluminum branch circuit wiring installation.

A further look at the relative wire prices of Fig. 10 indicates possible material cost savings of 29 per cent for No. 12 A.W.G. type RH wire and 33 per cent for No. 12 A.W.G. type TW wire. As expected, thermoplastic insulated aluminum wire with its less expensive insulation shows a relatively greater saving. Somewhat surprising is the relatively high price of No. 10 A.W.G. type RH aluminum wire, which is 81 per cent of the copper wire price compared to about 60 per cent when thermoplastic insulation is used. This may be largely explained by the fact that No. 10 RH wire has 50 per cent greater insulation thickness than No. 12 RH wire (3/64 inch vs 2/64 inch) whereas Nos. 12 and 10 thermoplastic insulated wire have the same insulation thickness (2/64 inch).

32. *EC Aluminum*

Aluminum wire and building cables are drawn from almost pure aluminum, which is commercially designated as EC aluminum. Minimum percentage of aluminum is 99.45% [fol. 4865] and minimum electrical conductivity is 61% of the international annealed copper standard. At the present time, information from the Aluminum Company of America indicates that actual purity and conductivity are generally about 99.65% and 63% respectively.

In its annealed state EC aluminum is designated EC-0 and is remarkably ductile with low tensile strengths—about

4,000 psi yield strength and 12,000 psi ultimate strength. After a complete handdrawn wire-forming operation; the hardness and strength of the aluminum has greatly increased and its ductility has decreased. Ultimate tensile strength is about 27,000 psi and yield strength is about 24,000 psi. This fully hard-drawn state is designated EC-H19.

Since this temper is too brittle to be readily used for building wire applications, it is necessary to partially anneal the wire in order to improve its handling ability, particularly its bendability, and to decrease its brittle breaking tendency.

Most aluminum building wire and cable is presently manufactured in the three-quarter hard temper, (EC-H26) or the intermediate temper (EC-H24). The former has a tensile strength ranging from 17,000 to 22,000 psi and the latter from 15,000 to 20,000 psi. Yield strengths run about 2,000 psi less than ultimate strengths.

33. *Aluminum Wire and Cable Pulling*

A recent poll of electrical contractors with aluminum cable experience indicated that well over half considered [fol. 4866] it unnecessary to take additional precautions when pulling aluminum cables because of their smaller tensile strength. (See Section 12 of this report). However, over one-third maintained that additional precautions were necessary.

The question arises, why this contradictory division of opinion? A consideration of the stress-strain curves of aluminum and copper provides an explanation. Fully annealed copper appears to reach its elastic limit at about 5,000 psi but can then stretch on and on (40-60%) to about 34,000 psi before rupturing.[12,3] Three-quarter hard aluminum departs from a linear stress-strain relationship at about 10-11,000 psi, but will yield after this point only a small fraction of the elongation of copper before rupturing at its ultimate strength of 17-22,000 psi.

34. *Recommended Pulling Stress*

Actually at the maximum recommended pulling stress for annealed copper wires, 10,000 psi, copper wire will have stretched about five times as far as aluminum wire, most of it inelastic deformation.[3] Consequently, the same allowable pulling stress appears to be satisfactory for aluminum wires and cables. As a matter of fact, at the huge Kitimat power plant and aluminum reduction installation of the Aluminum Company of Canada, an all-aluminum wire and cable installation, the maximum recommended pulling tensions were based on a stress of 10,000 psi.[19] Wire temper was three-quarter hard.

[fol. 4867] Thus, electrical contractors may safely stretch copper wires and cables well past their elastic limit, indeed; although it is inadvisable, they may even exceed considerably the recommended maximum pulling stress of 10,000 psi, without rupture. This latitude is absent in aluminum conductors. Contractors accustomed to the "give" in copper under excessive pulling stress will discover to their dismay that excessive over-stressing will rupture the aluminum conductor at a fraction of the stretch which copper can safely absorb.

The obvious solution is to pull aluminum cables without exceeding the recommended maximum stress, which is the same as that for copper cables. If this common limitation is observed, no additional pulling precautions need be taken, a fact confirmed by the majority of contractors with aluminum cable pulling experience.

35. *Aluminum Cable Joints—Non-technical Aspects*

The joining, splicing and connecting of aluminum cables is undoubtedly the most controversial and pivotal aspect of aluminum cable installations despite the fact that the problem of making swift, economical and reliable connections between aluminum cables and between aluminum and copper cables has been solved.

Since the purely technical difficulties have been solved, the only ones that remain are the human ones, and these are often far more formidable. The basic trouble is that aluminum cable connections are new and that they are different

[fol. 4868] from copper cable connections, which are entrenched with the familiarity of three-quarters of a century of electrical experience.

36. *Early Application*

Actually, aluminum cable connections are nearly as old as copper connections, but only on outside distribution lines. Long before ACSR cables became the virtual standard for transmission lines, all-aluminum cables were introduced and used successfully. The first known use of all-aluminum cable was in 1899,[20] and there are existing installations which date from shortly thereafter. Aluminum splices on these old lines and on the newer ones, through years of service, have proved their reliability, under electrical, corrosive and mechanical conditions which are generally far more extreme than any likely to be encountered in the usual office or industrial building. Consequently, it is, in reality, somewhat surprising that aluminum splices should be a significant deterrent to the increased use of insulated aluminum cables, or that it should seemingly be regarded by some contractors and engineers as a new and somewhat fearful problem.

37. *Factors in Attitude to Aluminum Cable Joints*

Some reasons for this situation can be pointed out. For one thing, many contractors who work on electrical building installations, never do transmission line work and consequently have been totally unacquainted with any kind of aluminum cable. This is especially true in large urban centers where the largest insulated cable installations occur. [fol. 4869] For another, while suitably engineered connections have been developed for aluminum transmission lines, such connections were until relatively recently not readily available for insulated aluminum building cables. As a matter of fact, the major development of insulated aluminum cable connectors has undoubtedly taken place in the past decade.

Finally, aluminum cable connections are in some respects different. They require some re-thinking by installers. They require, in general, different connectors and altered techniques. In short, aluminum cables cannot be joined as if

they were copper cables. They have different electrical, chemical and mechanical characteristics which require a properly designed connector and installing procedure.

38. *Good Electrical Connection—Requirements*

The basic definition of a good electrical connection is the same for aluminum and copper cables—a durable joint of 100 per cent or more conductivity.

The first requirement is an adequate area of good metal-to-metal contact. Many articles have been written pointing out that an aluminum cable joint requires a greater contact area than a copper cable joint. This requirement arises from the fact that an aluminum cable will have about 80 per cent of the current capacity of the same size copper cable, whereas its area conductivity is about 61 per cent of [fol. 4870] the copper cable. Consequently, to achieve the same relative conductivity an aluminum splice should have a contact area about one-third greater than the same size copper cable splice.

39. *Eliminating the Oxide Coating*

To achieve intimate contact of the joint members, the joint surfaces must be clean. In the case of aluminum the attainment of this condition is complicated by the tenaciousness and excellent insulation property of its oxide coating. This is the factor which introduces the major differences between aluminum cable and copper cable splices. Because the oxide coating reforms so rapidly, aluminum cable connections must be cleaned and made in the presence of an inhibiting grease or compound, whose principal function is to keep the oxygen of the air away from the newly uncoated metal surface and also to prevent gradual oxide reformation during the period of use.

Many suitable compounds are available. Some of the commoner ones are No-Ox-Id, Burndy Penetrox "A", ALCOA Joint Compound No. 2, or even ordinary vaseline. For all bolted and compression joints, it is advisable to first apply the compound and then thoroughly clean the cable ends with a soft wire brush through the compound, forcing it between the strands as much as possible.[2]

40. *Union of Aluminum Cable Strands at Joints Required*

An additional problem now arises. This results from the combined effect of aluminum's persistent oxide coating and [fol. 4871] the stranded construction of practically all electrical cables No. 8 A.W.G. size and larger. Within a stranded aluminum cable, each individual strand acts in effect like a separate insulated wire. This is fine as long as no splice occurs, since internal losses and skin effect are reduced. However, at a joint or splice, it is necessary to break down this insulating coating on all strands and unite them as closely as possible into a homogeneous conducting medium. Otherwise, the surface conductors will tend to carry most of the current, and both joint and cable will be operating at decreased efficiency, higher temperature and greater power loss.[2,21]

A good electrical connection of aluminum cables must attain as closely as possible complete electrical union of all strands. The three principal types of joints, welded, bolted and compression types, if properly designed, and installed, will provide the desired joint characteristics.

41. *Welded Connections*

Good welded joints provide the most efficient and reliable electrical connection. This is the only type of aluminum cable connection which does not require the use of compound, although the joint must be thoroughly cleaned. Generally this type of connection is confined to the joining of terminal connectors to cable ends. Helium-Arc electric welders are usually employed, the inert gas shielding the joint from oxidation so that a flux is not required. First the ends of the strands are welded together. Then the [fol. 4872] now solid end is welded to the body of the connector. Although the heat of the welding operation anneals a portion of the end of the cable, the reduction in strength is usually not important, particularly since the pulling operation has already occurred.

42. *Compression Connections*

Compression joints permit a wide variety of connectors ranging from cable end connectors to multi-branch splices. They are readily applicable to small as well as large cables. Connector bulk is relatively small and neat looking. The powerful equipment required is easily portable even for the largest size presses, which are capable of joining 2,000 MCM cables.[17]

This type of joint appears to break down interstrand resistance by a combination of crushing the strands and abrading-off their oxide coatings.[1] The use of compound prevents the oxide from reforming. The Burndy Engineering Company recommends the use of a zinc dust impregnated compound—their Penetrox "A"—with their compression joints. It is maintained that the zinc granules are forced between the strands and pierce the oxide to form conducting bridges.[22,17] The hollow bodies of the connectors are factory-filled with this compound and sealed, so that field application of the paste is not required.

The Thomas and Betts Company places reliance for obtaining a high conductivity joint completely on the crushing and abrading action of its compressive dies. These pro- [fol. 4873] duce one or more hexagonal compressions or cri-ps on the body of the connector with such force that the cable strands and connector are squeezed into an almost homogeneous solid union. The Burndy compression connectors use either an indent-type or circular crimp. All of these connectors are in successful use in many aluminum cable installations.

Aluminum cable compression connectors generally are made of cast or tube aluminum, with the tube-type connectors coming into wider use today. Tin-plated copper alloy connectors are also available and are used sucessfully on either copper or aluminum cables. Recently, the Thomas and Betts Company have come out with a tin-coated tube-type aluminum connector which is Underwriters' Laboratories' approved for both copper and aluminum cables. This type of aluminum cable lug is cheaper than the tin-plated copper alloy lug, retains the advantage of not requiring surface scratch-brushing through compound for its bolted terminal connection and is basically more suitable

for aluminum cables, because it eliminates the long-run contact problems arising from cyclic differential expansion of two different metal bodies in intimate contact.

Aluminum body compression connectors appear to be an excellent solution to most of the aluminum building cable joining and splicing requirements. They are quite economical, although a considerable initial outlay is required for a range of presses and dies. They are easy to apply. No annealed weaknening of the adjacent cable occurs, as in [fol. 4874] welding. They are quite versatile in their application, being available for cable-terminal lugs, butt splices for mixed cable sizes and mixed copper to aluminum joints, and for various combinations of take-off splices.

43. *Bolted Connectors*

Bolted connectors are capable of an even wider variety of applications than compression connectors and are available in a bewildering variety of sizes and designs. Although they are used successfully on all types of aluminum cables, it is undoubtedly more difficult to obtain excellent electrical connections with this type of connector than with the compression type. One of the reasons is the complexity of the connector, which usually consists of at least two main bodies, one or more spacers and a number of bolts, nuts and washers. Another reason is the greater dependence necessarily placed on the electrician to properly apply the compound, scratch-clean the conductors and, secure the connector to the cables without omitting a spacer or neglecting to tighten a bolt. Consequently, the efficiency of bolted connections will be more variable than compression connections.

The advantages of bolted connections are that they can readily be taken apart without destroying the joint and that they do not require a large initial capital outlay for welding machines or compression devices and dies. A disadvantage is their greater bulk and weight.

[fol. 4875] Effective scratch brushing is undoubtedly more important for a bolted connector, since low initial contact resistance cannot be achieved by powerful crushing and abrasion, as is the case with compression connections. Overall connection area will be larger to obtain the same effective

contact surface. Bolts should be tightened securely in order to crush the contacting surfaces as closely together as possible. It is not believed that the cold flow which will result from large applied pressures will be harmful, since surface contact will be maintained by the spring action of the bolts to a point where more or less stationary equilibrium will be reached between the forces in the bolts and the resisting stress in the aluminum cables. Certainly the cold flow tendency will be less than in compression connectors where it is not considered a problem.

44. *Cold Flow*

Cold flow is another overworked term which has frightened many a prospective user of aluminum conductors. Sometimes the term "creep" is employed, although creep generally means the non-elastic strain of materials at elevated temperatures caused by stresses below the proportional limit. Creep rates even for the lower melting metals, such as aluminum, are extremely small at the usual joint temperatures and stresses.[23] As previously pointed out, connections will not work loose even under stresses beyond the yield point which cause large plastic deformation, since the stress will decrease to a point of equilibrium without [fol. 4876] the cable pulling away from the connector. Furthermore, a good connector usually has fine grooves or ridges on its inner surfaces to bite into the connector and prevent joint slippage upon any relaxation of pressure. Actually, the plastic flow property of aluminum is helpful in obtaining close, firm electrical contact.

45. *Effect of Temperature Cycling*

The principal villain in the cases where the development of poor connections is ascribed to the plastic flow property of aluminum is usually a poorly designed connector, unsuitable for the environment in which it is applied. It will be found that the joint is unable to breathe properly under the cyclic temperature changes to which it is subjected. These temperature variations arise generally from the daily electrical load characteristic and are reinforced by the daily ambient temperature cycle.

The worst conditions will occur with an improperly de-

signed steel-bolted, copper-body connector under wide extremes of temperature cycling. As the temperature goes up, the copper tends to press harder against the aluminum cable, since aluminum has a temperature-expansion coefficient about 36 per cent greater than copper. The stress within the aluminum copper and steel increases. Relative movement occurs which depends on the relative expansion coefficients, the elastic moduli and the strength of the steel bolts. Finally, at a high enough temperature, the stress in the aluminum will exceed its yield point and it will tend to [fol. 4877] extrude out of the joint. Upon subsequent cooling to the original temperature, the deformed joint will exhibit decreased contact pressure and higher resistance. This chain of events will cause progressively increasing joint temperatures and resistance in succeeding cycles until complete joint failure occurs.

46. *Combatting Heat Cycling Joint Deterioration*

However, copper body connectors have been and are used with no trouble if properly designed and properly installed in environments which do not exceed their inherent abilities. This has been strikingly demonstrated previously in this section in the discussion of branch circuit wiring connections. A particular connector may be perfectly good on a normally loaded feeder within the relatively mild temperatures encountered in a modern structure and it may fail disastrously and quickly if used on extra heavy duty, wide-temperature cycle applications, such as underground feeder networks. The designer and installer must apply common sense to a sound knowledge of joint characteristics. And this is true for copper as well as aluminum joints.

There are various ways to combat heat cycling deterioration of joints. One way is to use larger connector bodies and decreased contact pressures. A better way is to design the connector so that all parts will "breathe" under stress and strain variations. It is important that the steel bolts should not be too large or they will not have enough spring action or "give" to permit elastic expansion of the alumi- [fol. 4878] num and copper. The use of copper alloy bolts which have a larger spring constant (modulus of elasticity)

than steel and a larger temperature expansion coefficient will be a further help.

However, the best solution is the use of all-aluminum connectors, including aluminum bolts, for aluminum cable connections and also for aluminum-to-copper cable connections.[2,25] Good results have been attained with aluminum connectors using galvanized steel bolts.[22] The tendency nowadays, however, is to use the all-aluminum connector. Aluminum alloy bolts have strengths in the range of mild steel. The nuisance of thread seizing, a previous complaint, has been eliminated by hard-surfacing the threads with an Alumilite (heavy oxide) finish and dipping them in an antifriction compound such as No-Ox-Id.

47. *Galvanic Corrosion*

The use of all-aluminum bolted connectors not only effectively lays to rest the bogey of differential cyclic expansion, but also largely eliminates the danger of galvanic deterioration of the joint, even when copper and aluminum cables are joined. Galvanic or electrolytic corrosion of aluminum installations is another one of the fearful apprehensions which seem to haunt engineers and contractors with an intensity entirely disproportionate to the reality of the situation.

First of all, in the great majority of building installations galvanic corrosion, as well as chemical corrosion, will not even exist, since the necessary ingredient for galvanic cor- [fol. 4879] rosion, the simultaneous existence of moisture and electrolyte, will not be present in the joint environment. Secondly, if galvanic corrosion or the possibility of galvanic corrosion does occur, it can be easily and effectively combatted.

Galvanic corrosion occurs when metals of different electro-chemical potential form an electrolytic cell as part of a closed circuit. Under such conditions, the more anodic metal will deteriorate, its molecules being drawn into solution and then deposited as insoluble material in the joint and its vicinity. The farther apart in the electromotive series, the two metals are, the more intense will be the galvanic activity. Since copper and aluminum have over two

volts of d.c. potential between them, these two metals can easily form destructive electrolytic cells under the proper conditions. Since aluminum is anodic or less noble with respect to copper, aluminum will be the metal which undergoes progressive destruction of its material.

48. *Preventing Galvanic Corrosion*

There are various ways to prevent galvanic corrosion of aluminum-copper joints or to minimize it in the presence of conditions (i.e. moisture and electrolyte) more or less permissive to it.[26,27] These include the following:

(a) Sealing or painting the joint with an inert material. Both materials should be coated. If not, then the cathodic rather than the anodic material. Coating the anodic material only is, in fact, dangerous, since a tiny flaw will immediately lead to accelerated galvanic activity at the [fol. 4880] exposed anode material, which will be all the more intense the smaller the fault.

(b) Plating of one of the joint materials or both with a metal midway in the electromotive series between the joined metals. The plating will act as a buffer and reduce the electrolytic cell voltage and therefore the galvanic deterioration of the anode.

(c) Isolation of the reacting metal surfaces, usually by rubber taping the joint, thereby lengthening the liquid electrolytic path and increasing its resistance.

(d) The use of relatively large anodic areas as compared to the cathode material. Galvanic current density at the anode may in this way be decreased greatly, with the result that corrosive deterioration will be reduced to a negligible hazard. Thus, it is not desirable to tap off small aluminum wires from large copper conductors, because the high current density at the relatively small anode (if electrolysis occurs) will rapidly destroy the joint.

(e) In an aluminum-copper cable joint, the aluminum conductor should always be placed above the copper conductor, if possible. This will tend to keep copper salts from draining on to the aluminum conductor and will thus reduce the effect of electrolytic corrosion on the aluminum conductor.

Today there is less of a tendency to be frightened by galvanic corrosion of aluminum, since more is known about it and more effective means of combatting it are available. [fol. 4881] The emphasis has shifted from the negative and sometimes irrelevant aspect of merely preventing galvanic corrosion to the positive and more fruitful attitude of maintaining proper joint conductivity, despite the presence or possibility of galvanic corrosion.

This philosophy has resulted in the recent development and introduction of all-aluminum bolted connectors of relatively massive proportions for aluminum-to-copper, as well as aluminum-to-aluminum joints. Reduction of electrolytic deterioration to a negligible proportion is accomplished in three ways, (1) by maintaining relatively wide separation between the copper and aluminum cables, (2) by presenting a relatively large anode surface, thereby greatly reducing electrolytic current density at the anode, (3) by the large aluminum connector, acting as a sacrificial material in lieu of the aluminum conductor.

49. *Certain Disadvantages of Aluminum Cables*

It has already been pointed out that the use of aluminum building wire and cable must overcome certain handicaps, such as generally increased conduit sizes for an appreciable range of loads and different joining methods which require somewhat more care and effort than all-copper splices. These have been discussed and to some extent evaluated. In addition, there are some other considerations which should be recognized by the designer and contractor in order to eliminate or minimize the disadvantages resulting therefrom.

[fol. 4882] 50. *Educating Electricians*

One of these is the fact that relatively few electrical journeymen are acquainted with aluminum cable handling and splicing. In most cases, it will probably be advantageous and economical to brief the workmen beforehand on proper methods. Experience has shown that the installation and splicing techniques for aluminum conductors are readily acquired and successfully applied. Practically all

contractors consider present splicing techniques for aluminum conductors entirely adequate. (See Section No. 12 for additional discussion of this subject.)

51. *Additional Wiring Space Requirements*

Another difficulty that arises is that most electrical devices such as switches and starters are usually supplied with terminals suitable for copper cables. In many cases, the aluminum cable is too big and will require an adapter to fit the equipment lugs. Or the original lugs will have to be replaced by lugs suitable for aluminum cables, if this is possible. Since aluminum cables are usually one or two sizes larger, wiring space adequate for copper cables may become too crowded, thereby hindering the making of satisfactory connections.[22]

It is therefore essential that the engineer and contractor keep these considerations in mind when preparing specifications or ordering equipment. Many equipments can be supplied with connectors or lugs suitable for aluminum cables and with increased wiring space at little or no additional cost, if specified beforehand.

[fol. 4883] 52. *Examples of Insulated Aluminum Cable Installations*

Actual installation of insulated aluminum cables in commercial and industrial establishments are relatively few, except for those owned by the various aluminum producing and fabricating companies. Among these, particularly notable recent installations are: (1) the ALCOA Building in Pittsburgh, [28,29] a sky-scraper-type office building, (2) the huge Davenport, Iowa, rolling mill of the Aluminum Company of America,[30] (3) the vast Kitimat electrical power and aluminum producing complex of the Aluminum Company of Canada,[19] and (4) the heavy forge plant of the Aluminum Company of America in Cleveland.[33] These structures use aluminum branch circuit wires as well as aluminum cable feeders.

53. *Forge Plant Aluminum Cable Installation*

The forge plant installation was built in 1953. The choice of aluminum wires and cables was made on the basis of comparative bids in which quotations were received for both copper and aluminum cable conductors. The quotation for the entire job using aluminum conductors [32] was about 4 per cent lower than with copper conductors. It should be noted that since most of the heavy, low-voltage feeders were run as open wiring in lightweight aluminum utility baskets, the inherent price advantage of aluminum cables was not penalized by larger conduit requirements. Also that the percentage differential for those items involving direct comparisons between aluminum and copper conductors would have been much higher than the 4 per cent for the entire job.

[fol. 4884] 54. *Aluminum Cable Installation in San Francisco*

Successful and economical installations have also been achieved by establishments other than the aluminum companies. A particularly interesting example is the distribution system of the 22-story Standard Oil Company office building in San Francisco. This system consists of aluminum cable risers in asbestos-cement ducts and was installed in 1949.

Aluminum cables were chosen after a comprehensive economic study involving copper and aluminum low-reactance bus, tubular bus, and copper cable, as well as aluminum cable-risers. The results of this study were published in 1952 and later, 1956,[31] were recalculated to conform with 1955 material and labor prices.

A comparison of all system costs, including main switchgear, external switching equipment, bus vault connections, conduits and total labor cost, as well as conductor costs, indicated that a copper cable installation would involve a total of 5.2 per cent more in 1949 and 7.2 per cent more in 1955. Of particular pertinence is the fact that all savings were in the conductor and labor costs. Using copper cables in 1955 would have required 34 per cent more for cable material costs and 4 per cent more in total labor costs.

It should be noted that the cable installation labor costs alone would reflect a much greater difference than 4 per cent.

[fol. 4885] 55. *Aluminum Cable Installation on Long Island*

Another interesting aluminum cable installation, this one in steel conduit, was installed during the Korean War period in a large Long Island Department Store.[33] Although the system had originally been designed for copper cables, the shortage of copper forced the substitution of aluminum.

It was found possible to switch to aluminum cable of nearly equivalent capacity despite the fact that the conduits originally specified for copper cables had already been installed. Moreover, since some copper cable was on hand, some feeders were installed with aluminum phase wires and copper neutral and others with copper phase wires and aluminum neutrals. Connectors and terminal lugs are bolted types and made of plated cast copper alloy.

A recent inquiry revealed that after five years service, this installation continues to give satisfactory performance. No serious defects or problems have been encountered by the maintenance engineers, who regard the installation with considerable satisfaction and a certain pride in its uniqueness in their area.

56. *Previous and Recent Use of Aluminum Cables*

There are, of course, scores of other successful aluminum cable installations all over the United States and also in other parts of the world. The use of all-aluminum cable can be traced as far back as 1899,[16] of ACSR cable to 1909 [16] and of insulated aluminum conductors to 1927.[33] [fol. 4886] However, the substantial use of insulated aluminum cables received its great spur during the copper shortage occasioned by World War II.

In 1947 a very considerable amount of insulated aluminum cable was shipped to hundred of installations all over the country, with one cable company alone supplying over half a million feet to seventy industrial plants and facilities.[34]

However, the vast majority of all building wire and cable installation has been and still remains copper. National (U.S.) Comparative Statistical information for the years 1955 and 1956 has been collected by the National Electrical Manufacturers' Association (NEMA), but is generally unavailable for previous years.

Table 9

Building Wire Sales

	Copper		Aluminum	
Year	Millions of Dollars	per cent	Millions of Dollars	Per Cent
1955.....	113.9	99.5	0.58	0.51
1956.....	156.6	99.1	1.35	0.86

There is reason to believe that in previous years, notably 1947 and 1952 the percentage of aluminum wire was higher. One major cable company indicated that aluminum building wire and cable constituted 2 per cent of its gross sales in 1952 (during the temporary Korean War copper shortage) although only about 0.3 per cent in 1956.

[fol. 4887] The fact that in the past two years of relative normal supply, aluminum building wire and cable sales constituted less than one per cent of total building wire and cable sales should prove a powerful spur to aluminum cable sales organizations, since the potential area of economic application and use of aluminum building wire and cable is certainly far greater than this percentage.

57. *Summary and Conclusions*

The use of insulated aluminum wires and cables is now entirely practicable with the development of flexible, partially annealed conductors and satisfactory splicing and joining techniques. The major present problem in this area involves the education of engineers and contractors to this realization.

Considerable economies can be realized by the use of aluminum building wires and cables in view of existing price differentials between aluminum and copper insulated conductors. These economies are more apparent for rack or fibre-duct installations where the economy of the aluminum cables is not penalized by the need for larger metallic conduits. Considerable savings can also be realized in cable

and conduit installations for loads above 200 amperes. There appears to be good reason for appreciable savings in the use of aluminum branch circuit wiring in 480/277-volt systems.

Although there are many successful and economical installations of aluminum building wires and cables through-[fol. 4888] out the United States, the relatively small amount of aluminum building wire and cable sales as compared to copper, indicates that many economical applications are being overlooked or neglected. This represents a considerable challenge to design and sales engineers.

[fol. 4889] *References*

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[fol. 4893] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 52 1739

An Address by

A. D. R. FRASER

President, Rome Cable Corporation

To the Members of the
ROCHESTER SOCIETY
OF INVESTMENT ANALYSTS

ROCHESTER, N. Y.
January 16, 1957

ROME CABLE
CORPORATION

1740

[fol. 4894]

ROCHESTER, N. Y.

January 16, 1957

[fol. 4895]

On behalf of Rome Cable Corporation I wish to express our appreciation for your kind invitation to tell you something about our Company and the great electrical manufacturing industry of which we are a part.

I would like to divide this talk into four sections, one, some general background facts about our Company and the industry of which we are a part, second, financial facts, third, our organization and what it works with and something of what we are doing and fourth, some current estimates and a glance at the future.

Now, as to our Company, we were incorporated as a New York State corporation on January 20, 1936, which is just twenty-one years ago next Sunday. So, you see having come through infancy, youth, adolescence as we enter 1957 we are just coming of age. Those of you who can remember 1936 will have some memories that the country was in the midst of its worst depression and the idea of raising one and three-quarter million dollars to start a new company in an industry operating at 35 per cent of capacity did not have the investment appeal of brewery and distillery stocks, following in the wake of repeal of probihition. We were among the first industrial companies to file a Registration Statement and Prospectus with the Securities & Exchange Commission. One week after the offering we had sufficient assurance to proceed on a small scale and had subscriptions for our entire million and three-quarter dollars by June and shipped our first product in mid July 1936.

We are a part of the electrical manufacturing industry which last year had an estimated gross output of nineteen and a half billion dollars. The wire industry with almost two hundred manufacturers does about 10 per cent of the electrical manufacturing industry total. Our industry consumes about half of the new copper consumed in the United States. Less than 15 percent of the total manufacturers produce the greatest percentage of the overall total. There are a large number of small

specialty manufacturers. Anaconda, Kennecott, Phelps-Dodge, American Smelting & Refining and more recently Consolidated Copper and Cerro de Pasco operate wholly owned or controlled subsidiaries. United States Steel Company and Colorado Fuel & Iron have electrical conductor operating subsidiaries. With the increasing use of aluminum as an electrical conductor ALCOA, Kaiser and Reynolds have been expanding their interests. Kaiser Aluminum just last week acquired the wire and cable facilities of the United States Rubber Company.

When we started in business in 1936, we were the only independent company to have its own copper rolling mill. Now there are three or four others. We were one of the earliest copper producing companies to also install our own aluminum casting and rolling mill. Our rolling mill and bare wire fabricating units process sizeable quantities for General Electric, Westinghouse and other wire fabricators. We have one wire and cable plant in Rome, N.Y., and a steel conduit plant in Torrance, California which we acquired in 1950. This is the only conduit plant in operation today west of St. Louis.

We started with a limited line of standard products of rods, bare and weatherproof wire which has now expanded to cotton, paper, asbestos and glass magnet wire, rubber and plastic construction wires, flexible cords, mining cords and cables, signal wires, control cables, rigid and thin wall steel conduit, high and low voltage overhead and underground cables, and many specialties for various industries and the Government. It is important to note that in times of emergency the same machines that produce civilian items can and have produced sizeable quantities for the military. We make tens of thousands of sizes and varieties from sizes smaller than the human hair to cables larger than your wrist. We sell approximately a quarter of our product to each of the following three groups, utilities and electrical manufacturing industry, other fabricators and electrical wholesalers, while about seven per cent goes to local, state and national governments of which a

[fol. 4897]

sizeable portion is for utilities and the balance of about fourteen per cent goes to industrial, chemical, oil, mining, railroad and a miscellany of other channels.

We sell through our own salesmen and some agents. We have eighteen offices, nine warehouses and almost three hundred other stocks strategically located throughout the United States.

So much for a brief rundown on general items. Let us now look at some items on the balance sheet. Even in this period of tight money our receivables are turning over in excess of twelve times per year. We have sold in excess of half a billion dollars of products since our start and our bad debt loss has been only $61,000, which gives high commendation both for the type of customers we have been dealing with, as well as our Treasurer's ability to get payment for what we ship.

From the start our cost of inventory has been taken on the well known and conservative LIFO principle. With copper selling at 36 cents in January our inventory cost approximates the 12 cent level. Chart No. 1 shows the average price of copper by years since 1937 to date and the price in Rome Cable inventory. Market price of our inventory today is over three and a half million dollars in excess of book value.

Net fixed assets of approximately eight million dollars for almost a million square feet of floor space and equipment have an appraised gross replacement value almost three times that figure.

By the end of our fiscal year, March 31, 1957, we will have an outstanding long term debt of $3,049,000 at the favorable interest rate of 3.9 per cent. Further payments of $460,000 will be made next year. As of March 31 this should be our only borrowing, and we have no present plans involving major financing for the new year.

With the addition of the shares issued on the 5 per cent stock dividend on January 4th we have 556,000 shares outstanding and 35,794 shares additional in treasury stock. We have almost 1900

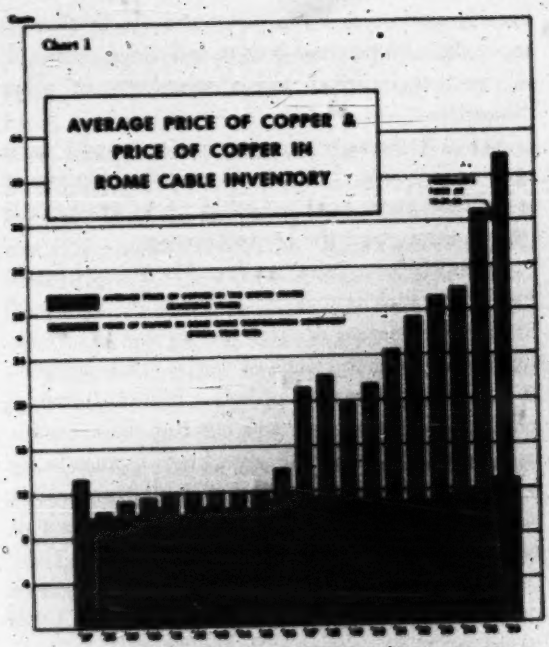


Chart 1
AVERAGE PRICE OF COPPER &
PRICE OF COPPER IN
ROME CABLE INVENTORY

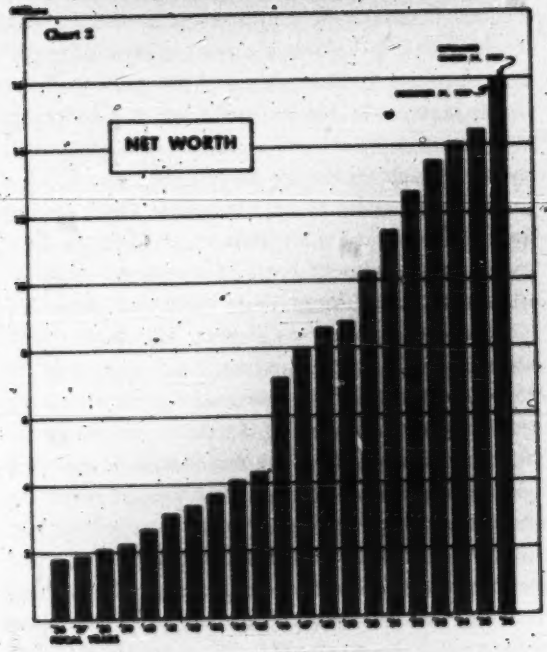


Chart 2
NET WORTH

[fol. 4899]

share owners and about one-third of outstanding stock is owned by employees and their families.

Chart No. 2 shows the growth of net worth since the start of the Company. At the time of the last quarterly report, at the end of September, it totalled $15,300,000.

There is one item I would like to comment on and that is our investment in the American Synthetic Rubber Corporation, wherein five other wire and cable companies and a group of other mechanical rubber goods manufacturers formed a new company to purchase the assets of the Louisville plant of the Reconstruction Finance Corporation making GR-S Type Synthetic Rubber. This is an investment which gives us a call on a portion of their production and insures us an adequate supply as well as keeping us abreast of most up-to-date research activities in the production of this type of synthetic rubber.

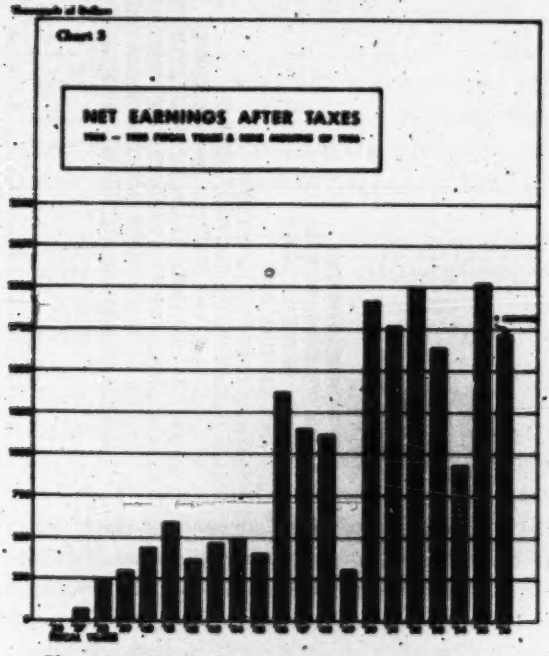
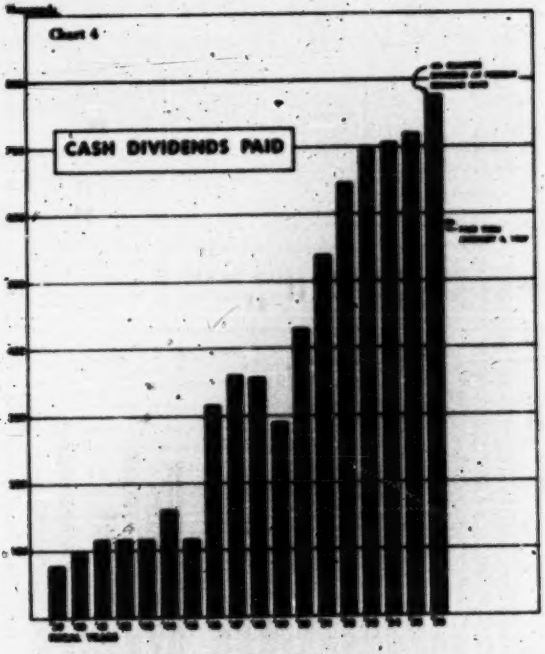


Chart No. 3 shows net earnings after taxes since the start of the Company. Total earnings to date

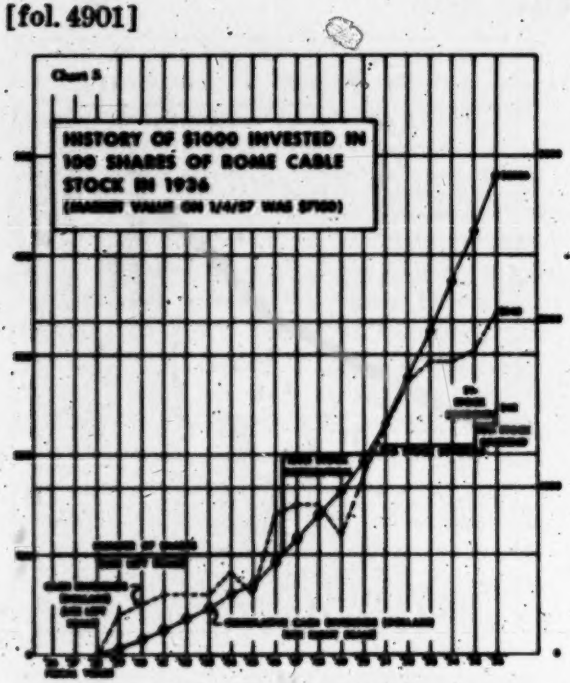
exceed nineteen million dollars which are after the heavy impact of taxes charged against a growth company. Our total direct tax bill since the start has represented almost 7 cents on the sales dollar, and when we add in withholding taxes paid for employees we come to a figure of over $45,000,000 compared to the $19,000,000 left as retained earnings.

Chart No. 4 shows cash dividends paid since the start, a total of over $6,400,000. In addition we had a 100 per cent stock distribution in 1947, a 5 per cent stock dividend in 1951, a 10 per cent stock dividend in February 1956 and another 5 per cent stock dividend in January of 1957.



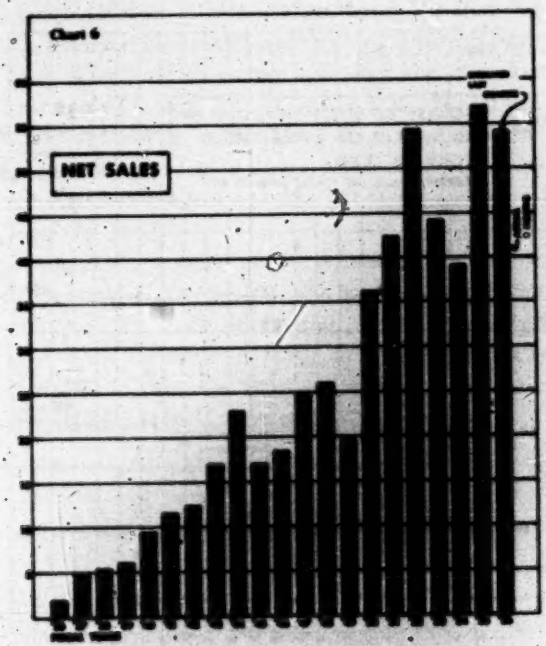
I particularly call your attention to Chart No. 5 which gives the history of the investment of $1,000 in 100 shares of Rome Cable Common Stock in 1936 when the Company was formed. If you will look at the chart you will notice that with the above stock distribution and stock dividends the share

[fol. 4901]



owner would now hold 242 shares of stock with a market value of approximately $7,100. He would have received $2,886 in accumulative cash dividends to date, and his dividend income in fiscal year 1956 would total $343.

The next Chart No. 6 shows the sales growth. In our first year, 1936, we had sales of $1,800,000 and that climbed to almost $57,000,000 last year. In the current fiscal year the total will be slightly less. We have been called a "war baby." I would therefore like to say for the record that our direct Government business in the current fiscal year is approximately 1 per cent. Both in World War II and the Korean episode our Company made significant contributions in specialized products, which added considerably to the sales volume in those periods. We were the main contractor to manufacture aircraft ignition leads in World War II and we held the largest contract to manufacture a special communication cable for the Signal Corps in the



Korean War. In both instances we made voluntary refunds to the Government of several millions of dollars.

Now let us come to the third part of this talk, namely, organization, what it works with and what we are doing. We have over fifteen hundred employees, only a small percentage of whom are unionized. We have a Board of Directors of twelve, eight of whom are working officers, comprising the executive committee. This provides flexibility and promptness of action. While organization does not appear as an item on the balance sheet we believe that as H. T. Dyett, Chairman of the Board and founder of the Company, said at the time of starting the Company "Organization is much more important than bricks and mortar."

While the Company is only twenty-one years old most of the major executives have had many more years of active experience in the wire and cable industry. Each year we have added a number of College graduates for a student training course.

Some of the early graduates of that course now hold leading positions in the Company. We have never had a work stoppage due to labor grievances.

I believe each of you have a copy of our last Annual Report, which shows that 67½ cents of our sales dollar goes for materials we use. This covers copper, aluminum, steel, rubber, plastics, cotton, paper, glass, lead, tin, zinc, chemicals and a whole host of other components. We consider our relations with our suppliers as one of our most important responsibilities. Diversity of supply, particularly in the major items, has saved us from the crippling shutdowns that have affected some in our industry.

Industry strikes throughout the world in 1955 which cut out approximately one month's production, plus the then booming European economy, ran the world price of copper in March of 1956 to approximately 55 cents per pound. Production caught up with and exceeded demand by mid-year, and the January producer price is 36 cents with some available in the world markets down as low as 34 cents. Aluminum which started the year in tight supply is now plentiful. Our suppliers and commitments for steel should take care of us adequately. So, as of this moment, we have no raw material supply problems.

Ours is a very competitive industry, so that in addition to expanding our facilities to take care of increased demand we are ever on the alert to provide the most modern equipment to get the best quality at the lowest cost. By the end of the current fiscal year we will have spent a yearly average of $1,100,000 since the end of World War II for capital equipment. Our depreciation in the same twelve year period has been running at the rate of half a million dollars per year average; so you can tell from those figures that, in addition to funds from our long-term loan, a sizeable portion of retained earnings has been plowed back for this purpose. In the current fiscal year our total expenditures will approximate our present depreciation rate of about $800,000. In the last two fiscal years

[fol. 4904]

earnings have been charged with approximately a total of $300,000 as plant rearrangement costs for more efficient production with an expected annual savings therefrom in excess of half a million dollars gross per year.

In 1956 and 1957 we will have doubled our capacity for production of aluminum rod, have added to our insulating, extruding, cabling and drawing equipment. We will also have facilities for enameling rectangular magnet wire, besides adding capacity in many other lines, particularly in the rapidly growing and less competitive high voltage field.

We are a Company that believes in incentives. Practically all of our direct labor operations have been on piece work, or bonus systems for many years. Starting January 2nd all of our indirect workers at the Rome plant are included under a new incentive production plan. With the issuance of the original prospectus we included a management bonus plan which enabled us to start with moderate salaries with improved compensation as earnings warranted it. The same holds true for other key employees who are covered by a supervisory bonus. Furthermore, since the start of payment of the first dividend to share owners all employees, other than those included in the executive bonus plan, have been covered by what we have called an Employee Dividend-Sharing Plan, which has been adopted by several other companies in United States and elsewhere. Almost two and a half million dollars have been distributed under this Plan since the start.

Recognizing the difficulties of providing adequate compensation under present tax laws and the added incentive of key employee stock ownership, our share owners approved in 1950 offering shares to employees on a ten year purchase plan. Ninety-seven employees have shared in the distribution of 46,175 shares under this authorization. At last June's meeting share owners further authorized 36,000 shares on a Stock Option Plan. We have

up-to-date pension and profit-sharing plans, provide sick and accident, medical and hospitalization coverage, as well as a Company and Employee contributed Group Life Plan with an average coverage of over $6,000.

Like Eastman Kodak, who were most helpful in getting our own plan started, we have a full-time Medical Director, with nursing staff, laboratory technicians and equipment, so that all employees get an annual physical examination. I could spend considerable time extolling the virtues of this program alone.

We are also great believers in the matter of keeping our employees up-to-date on happenings in the Company or the national scene which affect their livelihood, and have carried on plant-wide courses to all employees to better acquaint our people with the workings of our private enterprise system and how our Company fits in as a part. We likewise believe in upgrading or promoting from within the organization and have a full-time educational director working with our student course, interviewing graduates, checking candidates for Foundation scholarships and eventually arranging other educational in-plant work.

Our people are active in the life of the community, and our executives are serving in important industry, state and national organizations. We aggressively pursue improvement of relations with share owners, customers, suppliers, employees and the public.

In 1952 the Aluminum Company of America decided to enter the insulated aluminum conductor field and entered into an agreement with us to insulate bare conductor, which they furnished us, with rubber and plastic covering for their selling. This has been a very satisfactory arrangement for both companies. We gained increased production output and experience. In the latter months of 1956 they have installed their own plastic covering equipment at Massena.

[fol. 4906]

Our changing economy with its heavy taxation burden has shifted an increasingly large responsibility on industry for contributions to educational, religious and a wide variety of charitable institutions. Rome Cable Foundation was started by the Company in 1952 as a means of better carrying out our part. Annual contributions have been made by the Company to the Foundation. Forty-seven scholarships have been granted to sons and daughters of the community, of which about half have been to relatives of employees. The Foundation now has assets totalling over one-quarter million dollars and is earning 4.5 per cent on its investments.

In our rapidly moving age of change and progress I wonder how many of you realize the many major items in our daily life that we accept which we did not have in 1936 when our Company was started. There was no FM radio, no TV, no jet airplanes, no 300 horsepower automobile engines, no guided missiles, no atom bomb, no H-bomb, nylon was a rarity and there was very little diesel transportation. The use of gas and oil for heating wasn't general. There were very few deep freezers. The heat pump was unheard of, the outdoor movies, and the three-D dimensional movies or cameras were not common. Hosts of new electrical appliances have come into being.

Likewise in our industry we started out with copper as our only conductor, and natural rubber as our main insulation. We now have man-made rubber of several varieties, Neoprene, GRS, Butyl, the Isocyanates, a great variety of plastics of which Poly-vinyl chloride and Polyethylene are most used, but there are many more. I had one of the executives of a chemical company tell me the other day that they were furnishing industry with twenty-two different kinds of plastics, and they had nineteen more they were working on in the laboratory. Glass fibers have become an important use item with us. In the last five years aluminum has become an important base conductor for insulated wire. In 1952 it only represented 5 per cent of our total volume in

[fol. 4907]

copper equivalent whereas in this last year it has climbed to almost 25 per cent of our total.

I have told you all this as background because it emphasizes the importance of research. I have seen some figures that state that industrial research only totalled approximately one quarter billion dollars in 1940 and is now running at the rate of seven billion dollars annually. The electrical manufacturing and machinery industry is currently spending 30 per cent of the total research and development expenditures of the country. While our research and development budget is not equal percentagewise to some of the large units in the electrical manufacturing industry, we believe our budget proportion equals or exceeds other leaders in our industry. Fruits of that excellent work of the Research and allied departments can be gained from the fact that 39 per cent of the products which we sold this year we were not making at the end of World War II. Because it has been proven that dollars invested in research, return many times in volume and earnings, and with the many new challenges presented to us by suppliers and customers our program for research is being expanded in the next and succeeding years. I have a number of samples on the table here that you can look at, if you desire to do so after the meeting. I want to speak particularly about one, however, a Polyethylene Insulated Power Cable, which is the product of our Research and Engineering, a 34.5 KV Cable which I believe is the highest voltage polyethylene cable in actual use in an industrial company in this country.

As Investment Analysts I presume you are particularly interested in earnings for the current and future periods. I hope that my predictions will be better than the Michigan editor who seventy years ago writing under a gas lamp said "electricity is developed by waste and disturbance of atoms which is expensive. The great mass of people will never use this costly illumination to banish darkness from their humble dwellings." For the period ending December 31, 1956, which is the third quarter of

our fiscal year, we estimate our earnings to be about the same as the corresponding period of a year ago, but down approximately 15 per cent from the previous quarter in this year. This is due mainly to drop in sales volume and change in product distribution, caused in some part by heavy inventory liquidations by some of our customers owing to high prices of copper. Although fourth quarter sales are estimated at lower than those for the one just ended, overall earnings for the year should better last year's record.

Now as to the new fiscal year, which we will start in April, we like to use the newspaper headline used in connection with Secretary of Commerce Weeks' yearend statement, which said that the Outlook for 1957 was bright but prosperity was not automatic. Specifically we do not believe we will be troubled with raw material supplies. A rising number of companies have made settlements of labor contracts for three years; so we should have a longer period of labor peace.

Our industry serves utilities, electrical manufacturing, construction, mining, oil, chemical, automobile, airplane, communications, railroads, as well as Government. Almost without exception the difference in predictions for 1957 by the various economists is one of the amount of increase. Preliminary survey of utility expenditures and budget made by McGraw-Hill estimate increases as high as 20 per cent in the new year. Estimates for new plant and equipment are up as high as 11 per cent. New housing starts may be down but the size of homes is increasing due to population and income increases. Coupling this with commercial, industrial and public construction plans, overall construction should be higher. Coal mining industry is definitely on the upgrade. Recent world events are going to add 10 per cent to Government defense spending, and the Middle East situation will require further increases in the oil industry. The automobile and airplane industries are scheduling higher production levels. Railroad equip-

[fol. 4909]

ment backlogs are heavy. The chemical industry as a service industry and supplier of all industries will also be up. The need for rewiring of most homes over five years old to provide increased power for the many new electrical appliances necessary to modern living provides an increasing market. The slogan of the campaign launched last year "Live Better Electrically" is catching on apace. Gross national product and consumers spending are estimated to be up 4 to 5 per cent.

On the other hand, there are other factors which must be recognized as progress deterrents. Inflation continues with the annual hypodermic of wage increases. Price increases are generally not sufficient to offset these rising costs, and even increased productivity from better mechanization and labor efficiency has not kept pace with these added costs. Foreign competition is increasing in many industries.

You have seen indications of deferment of some capital expenditures due to the tight money market. The growing need for municipal and state services for schools, hospitals, roads and public buildings which has mushroomed their taxation programs is going to be a further significant drain on corporation profits. Excessive taxation deprives companies and higher income individuals of "seed money."

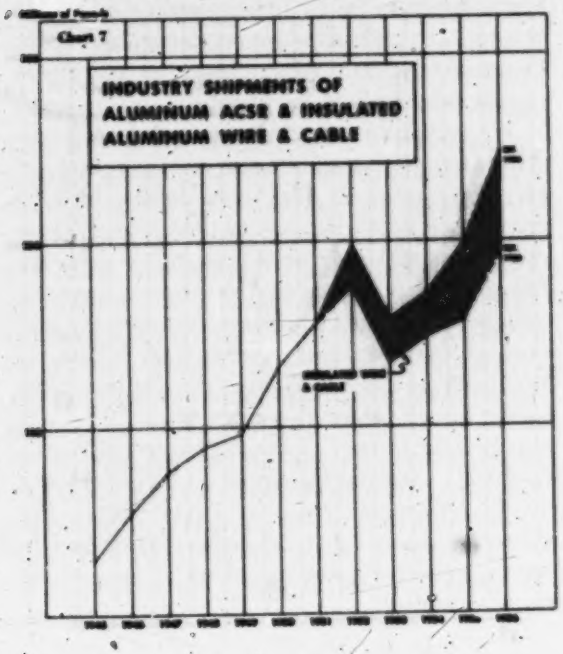
We need a more realistic approach to depreciation by recognizing replacement costs as a means of providing money to finance the future. In 1955 depreciation of all industry totalled fifteen billion dollars, and with the retained earnings of about ten billion above dividends this was close to financing the total of plant and equipment corporate expenditures of twenty-seven to twenty-eight billion. In 1956 with a thirty-five to thirty-eight billion dollar budget there is a much wider gap. With 1957 scheduled between forty and forty-five billion emphasizes need for a more realtistic approach by Government on the subject of "stay even" depreciation. The above factors will put additional strains on the profit picture and mean narrowing of margins for many industries.

[fol. 4910]

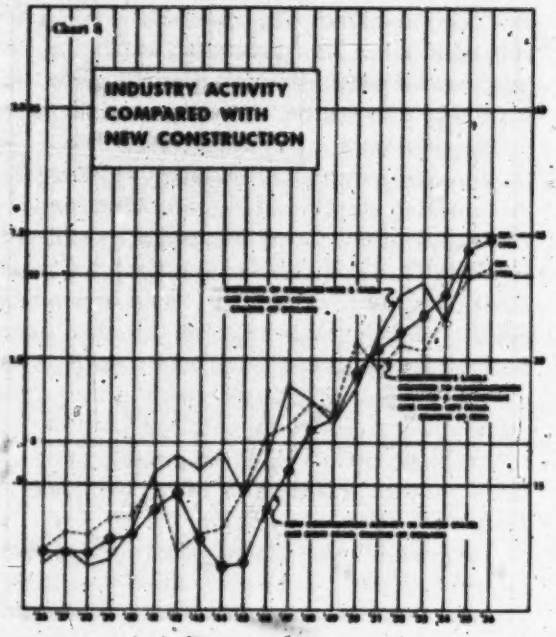
In our own industry we expect that some of the adverse factors of inventory liquidation may reduce volume in the early part of the year, but we look for volume in this year as a whole to be better than in 1956.

Now we come to the "Great Beyond" or the period following 1957 on a long range basis. Chart No. 7 shows the tremendous growth in the use of aluminum as an electrical conductor. Note the rapidity of growth of the insulated product in the last few years. Chart No. 8 shows that parelleling of insulated wire and cable shipments and construction wire labels purchased compared to the construction activity index, which would indicate that as that progresses so should sales volume on insulated wires and cables.

Chart No. 9 is a most interesting one. We used it as far as capital expenditures and production of Kilowatt hours were concerned in our original prospectus in 1936. We have now plotted our sales volume and note how it has kept pace with the kilo-



[fol. 4911]


INDUSTRY ACTIVITY
COMPARED WITH
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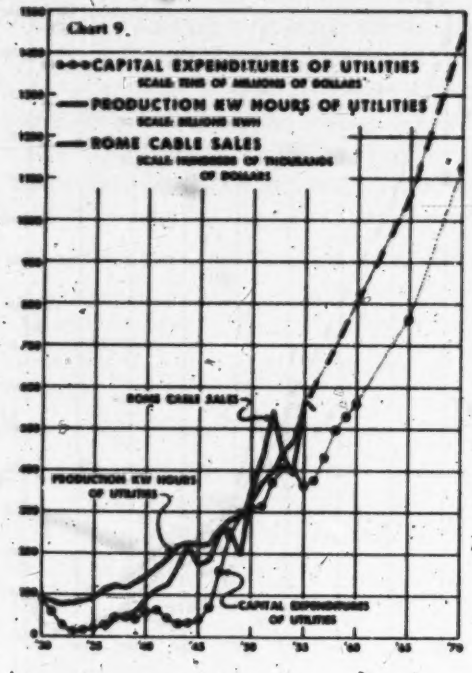
Chart 9.
CAPITAL EXPENDITURES OF UTILITIES
PRODUCTION KW HOURS OF UTILITIES
ROME CABLE SALES
ROME CABLE SALES
PRODUCTION KW HOURS OF UTILITIES
CAPITAL EXPENDITURES OF UTILITIES

watt hour production. The projections of McGraw-Hill on Kilowatt hour production and capital expenditures of utilities are shown on the graph and if we kept pace you could easily project our sales.

The electrical manufacturing industry was a six billion dollar industry in 1936 when we started. In his remarks to the National Electrical Manufacturers Association at its annual convention in Atlantic City last Fall, Ralph Cordiner, President of General Electric Company, predicted it would be a ninety billion dollar industry by 1976 and that Gross National Product would double what it was in 1956, and that kilowatt hour output would be four times greater than the six hundred billion of 1956. He further stated that the electrical manufacturing industry has been growing from two to three times as fast as the economy as a whole.

You are well aware of the forecast on population increases, so that even maintenance of present living standards is going to tax our productive machinery. If the wire and cable industry were to maintain its proportion of the total electrical manufacturing industry, it would mean volume of four times the present levels by 1976.

In conclusion I can only say that our organization is alert to the opportunities which lie ahead and by continued effective teamwork will accept and meet whatever challenge the future holds for us.

[fol. 4913] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 53

Minutes of Meeting of Executive Committee of Rome Cable Corporation, November 6, 1950

A meeting of the Executive Committee of Rome Cable Corporation was held on Monday, November 6, 1950, at 11:00 A.M.

There were present: Messrs. Barnard, Collins, H. T. Dyett, Ellis, Fraser, Rolston and J. H. Dyett.

The Secretary read the minutes of the meeting of October 27, 1950 which minutes were unanimously approved as read.

Mr. Fraser reported on Mr. Andersen's visit to Rome on November 3rd. He pointed out that with increases over estimates the total building and equipment program at Torrance now totalled $1,236,000. At the meeting with Arthur Andersen an additional amount of $24,000 was approved for the wiping and cooling equipment and $100,000 for a second heavy tube mill. In respect to the tube mill the supplier has agreed to a cancellation clause until January 15, 1951. It was the unanimous decision of the Committee that these purchases be aproved. Mr. Fraser pointed out that an additional $50,000 would be needed to complete the tube mill if the order is not cancelled prior to January 15, 1951.

Mr. Fraser further reported on his very satisfactory talk with Mr. Andersen who indicated that he was willing to stay with the company at least until January 3, 1953.

A discussion followed covering certain features of a deferred compensation plan but no decision was made pending further study by Messrs. Fraser and H. T. Dyett.

Mr. Rolston reported on expansion plans of Southern Electrical Corporation in the manufacture of aluminum. He also advised of the speed at which this company is drawing aluminum. It was thought that a further study of developments at Southern Electrical Corporation might be made.

[fol. 4914] Mr. Ellis presented the following E.R. which was unanimously approved:

E.R. No.		Amount
1418	Furniture and Fixtures to be purchased during second half fiscal year 1950	$3,850.

The Secretary advised that a Corporation Deed-Easement resolution should be approved at the meeting covering water rights at the Torrance Plant and after discussion, upon motion duly made, seconded and unanimously carried it was

Resolved, that for and in consideration of the sum of $1.00, the Corporation does hereby grant, convey, and dedicate to the City of Torrance the right of way for the construction of water line and appurtenances thereto, situated in the County of Los Angeles, State of California, described as follows:

> Beginning at a point S. 89° 25′ 50″ W. a distance of 432.99 feet from the Southeasterly corner of Lot 5 of Tract 5944 as recorded in Map Book 64, page 82 of Records in the County Recorder's Office, Los Angeles County, State of California; thence N. 0° 34′ 10″ W. a distance of 312.02 feet to the Southerly line of Lot 29 of said Tract 5944; thence S. 89° 25′ 50″ W. a distance of 5.00 feet; thence S. 0° 34′ 10″ E. a distance of 312.02 feet to the Southerly line of Lot "A" of said Tract 5944; thence N. 89° 25′ 50″ E. a distance of 5.00 feet to the point of beginning.

There being no further business to come before the meeting it was adjourned.

John H. Dyett, Secretary.

[fol. 4915] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 54

To: A. D. R. Fraser
From: R. A. Schatzel
Date: March 28, 1951
Subject: Aluminum

CC: G. E. Rolston

This is not a new subject in our discussions and we decided several months ago to produce Aluminum Line Wire and Self-Supporting Service Drop Cable. This would involve our purchasing #6—4 and 2 AWG. solid and stranded Aluminum conductor and insulate with Neoprene or Polyethylene in our mill. When volume of such wire warranted our devoting a machine to it we could draw such wire without difficulty. I believe arrangements are now made to purchase such wire when C.M.P. goes into effect around July.

If C.M.P. does not go into effect we would apply for permission to use Aluminum and produce such wire.

This restricted field appears to be a very sound application for Aluminum. As I mentioned sometime ago, and as we know when the presently contemplated construction is completed we will have, within a few years, double the ingot production of Aluminum in this country. A similar expansion is taking place in Canada; in fact, a greater expansion. It is estimated that there will be an abundance of Aluminum ingot available, beyond our normal peacetime, or even the present emergency needs within a period of about three years.

The efforts of Kaiser, Reynolds and Aluminum Company of America have created a wide interest in Aluminum, for certain insulated cables.

In Boston last week Mr. Avila of Boston Edison stated, "we will just have to learn how to use Aluminum; because of cost".

I have received an invitation to attend a special meeting of Committee IX of the Signal Section of Association of

American Railroads on April 3. Among the subjects to be discussed is substitute materials, and Aluminum conductors suitable for Railroad use.

I believe the approach we would make in producing a limited line, where Aluminum has found ready acceptance, is sound.

I would suggest that, if we find C.M.P. is not to be made effective, we apply for a position in Aluminum as above outlined. If we are to start production in July or August we would need to place an order for such conductor sometime in April or May.

I believe that the situation on Neoprene will be considerably relieved by August.

RAS-P R. A. Schatzel

[fol. 4916] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 55

To: J. R. Woods
From: R. A. Schatzel
Date: April 26, 1951
Subject: Consumers Power Corp., Self-Supporting SD
CC: F. S. Marks and AERF, A. K. Buckenmaier

Dear Jack:

Thanks for your fine letter of April 12. I can appreciate that you are disturbed by the importance which aluminum has taken, particularly for SD cable, both open wire and self-supporting. I believe we can best meet a situation by recognizing the facts. We have watched this situation for some time. Utilities throughout the country have been making similar studies and many have made trial installations over the past few years. They had a bad scare sometime ago over the shortage of copper and have not forgotten it. There is an aversion to the use of aluminum because of its low strength, difficulty to terminate, tendency to break wherever it is notched, as by a knife in stripping insulation. There is much for each utility to learn before they can have a trouble-free system approaching the experience with copper. However, there is a great economic incentive at the present time and with proper training and

precaution there are some places where aluminum can satisfactorily substitute for copper. Service Drop Cable—Self-Supporting type, is one of them. Open wire in light loading districts is another. The use of Copperweld or ACSR messenger in self-supporting type eliminates the great disadvantage of low strength which Aluminum, by itself, has.

If the utilities are satisfied to use Aluminum SD we may consider supplying it later in the year and your suggestions on this will be appreciated.

Now to turn to questions you raise. Copper is superior to aluminum for practically every application. Inherently aluminum has technical disadvantages. Your questions, however, are largely economic.

1. If I were to gaze in the crystal ball I would say that the price ratio between aluminum and copper would remain in the future and probably increase in favor of aluminum. The reason for this is that there are large new sources of aluminum being developed which will more than double the ingot capacity of aluminum in this country and Canada. No similar expansion of copper is in sight.

2. In heavy loading areas aluminum lines are not reliable. In light loading areas, or where structures involve ACSR there is no question that aluminum installed costs are in about the same ratio as the cable cost, and lower than copper.

[fol. 4917] *3.* Rome would furnish copperweld messengers for copper ,or hard-drawn copper. Either is OK with us.

4. On cable above #4 AWG. aluminum (#6 copper equivalent) cost is in favor of aluminum. We refer now only to Service Drop.

In the matter of attachment I enclose some information obtained from Public Service of Northern Illinois and Detroit Edison. You are very close to Detroit Edison and I believe it may be well to discuss this with them. The attached sketches show practical methods which have proven satisfactory.

As you probably know, Detroit Edison have approved our all Neoprene construction, and I understand from Bob Graham's visit, that they are very well satisfied with it.

Summarizing, I believe there are economic advantages

for certain applications of aluminum for electrical conductors which no utility engineer may afford to overlook. We as a manufacturer of cable must also consider these advantages.

There are well known technical disadvantages of aluminum and for many applications these far outweigh the economic.

In certain locations after crews are properly trained and practical experience is gained, aluminum can be as satisfactory as copper and the economic advantages realized. Self-Supporting Drop wire with Neoprene insulation appears to be one of these. There are precautions to be observed and any company would be ill-advised to rush headlong into it. Open wire for light loading districts has possibilities, although I hear that heavy wind storms have taken down all straight aluminum lines in Oklahoma. ACSR has the required strength.

We believe Consumers Power should study the application of aluminum for Service Drop and other applications just as we are. There is much to be learned about installation and installation practices.

Copper is an ideal material both physically and electrically and we all have years of experience in its use. Aluminum is not as ideal and many adjustments must be made and much experience gained before it can be as satisfactory.

RAS P R. A. Schatzel
Attach.

[fol. 4918] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 56

Minutes of Meeting of Board of Directors of Rome Cable Corporation, May 18, 1951.

A special meeting of the Board of Directors of Rome Cable Corporation was held in the main office of the Corporation, Ridge Street, Rome, New York, on Friday, May 18, 1951 at 10: A.M.

There were present: Messrs. Fraser, H. T. Dyett, Barnard, J. H. Dyett, Collins, Ellis and Rolston, being a ma-

jority of the members of the Board and a quorum. Messrs. Loeb and Sharp were absent.

Mr. H. T. Dyett, Chairman, presided and Mr. John H. Dyett, Secretary of the Corporation, acted as Secretary of the meeting.

The Secretary presented to the meeting a copy of the Notice of Meeting, together with his affidavit of service thereof, and upon motion duly made, seconded and unanimously carried, it was

> Resolved, that the copy of Notice of Meeting together with his affidavit of service thereof, as presented to the meeting by the Secretary, be and they hereby are approved and ordered prefixed to the minutes of this meeting and marked Exhibits 1 and 2 respectively.

The Secretary read the minutes of the Board of Directors meeting held February 21, 1951 and the minutes of the Executive Committee meeting held April 30, 1951, which minutes were approved as read. Upon motion duly made, seconded and unanimously carried, it was

> Resolved, that all actions of the Executive Committee since the last meeting of the Board of Directors be and they hereby are approved to be the actions of the Board.

The Chairman read the report to the Board of Directors covering operations for the last quarter. Upon motion duly made, seconded and unanimously carried, is was

> Resolved, that the report of the Chairman be accepted and placed on file.

[fol. 4919] In his report, the Chairman recommended consideration be given to payment of the Preferred Stock dividend. After discussion, upon motion duly made, seconded and unanimously carried, by roll call vote, it was

> Resolved, that there be and hereby is declared from the earnings of this Corporation, Dividend No. 20 for 30 cents per share of the 4% Cumulative Convertible Preferred Stock of the Corporation payable July 2, 1951 to holders of record on the 11th day of June,

1951. The Treasurer is directed and authorized to cause the same to be paid on the date specified.

In line with the recommendation in the Chairman's Report as to the Common Stock Dividend, upon motion duly made, seconded and unanimously carried, by roll call, it was

Resolved, that there be and hereby is declared Dividend No. 49 for 25 cents per share on the Common Capital Stock of the Corporation, payable July 2, 1951, to holders of record at the close of business on the 11th day of June, 1951. The Treasurer is directed and authorized to cause the same to be paid on the date specified.

The Chairman advised that with each declaration of Common Stock dividend in the past an Employee Dividend had also been declared and in view of the above declaration asked for a resolution covering employee payment. Upon motion duly made, seconded and unanimously carried, by roll call vote, it was

Resolved, that whereas there has just been declared Dividend No. 49 on the Common Stock of this Corporation authorizing payment of 25 cents, of which 20 cents is regular and 5 cents extra, per share on July 2, 1951 and

Whereas, the rules and regulations of the Employee Dividend-Sharing Plan, as approved by the Stockholders, permit payment to employees at the same rate as to stockholders based on computed participating units and upon approval of such payment by the Board of Directors, be it

Resolved, that the Treasurer is authorized to make such distribution to all eligible employees on July 2, 1951.

The Secretary advised that 4302 shares of Cumulative Convertible Preferred Stock had been purchased for the sinking fund and after discussion upon motion duly made, seconded and unanimously carried, it was resolved that

[fol. 4920] Whereas, the Certificate of this Corporation filed pursuant to Section 11 of the Stock Corpora-

tion Law, dated the 20th day of June, 1946, creates a sinking fund for the retirement of this Corporation's 4% Cumulative Convertible Preferred Stock and in connection therewith provides in paragraph III D as follows:

"D As and for a sinking fund for the retirement of the 4% Cumulative Convertible Preferred Stock, the Corporation shall, during each fiscal year, commencing with its fiscal year beginning April 1, 1948, apply a sum equal to 5% of its net earnings for the preceding fiscal year, in the purchase, at not exceeding the then current redemption price, and/or in redemption and retirement of shares of the 4% Cumulative Convertible Preferred Stock."

and

Whereas, the "net earnings of this Corporation as defined in paragraph IV 9 of this Corporation's Certificate of Increase of Capital Stock, Authorization of New Shares and Classification of Shares, filed pursuant to Section 36 of the Stock Corporation Law, dated the 19th day of June, 1946, means "the net income of The Corporation and any subsidiaries on a consolidated basis as determined in accordance with generally accepted principles of accounting practice"; and

Whereas, said net earnings so determined for the fiscal year of this Corporation preceding April 1, 1951 (viz., its fiscal year ending March 31, 1951) amount to $1,922,136 and 5% thereof amounts to $96,106.80 and

Whereas, this Corporation has acquired, at a total cost of $96,146.25 and now holds 4302 shares of its 4% Cumulative Convertible Preferred Stock; and

Whereas, paragraph IV 5 of said Certificate dated the 19th day of June, 1946, provides as follows:

"5. Shares of Preferred Stock that shall have been redeemed, or that shall have been purchased pursuant to (or purchased and for which credit shall have been taken against) any obligation of the Corporation for the purpose of a sinking fund, or that shall

have been converted into shares of any other class or series, shall not be reissued or otherwise disposed of and shall be cancelled. Any other shares of Preferred Stock acquired by the Corporation, except as otherwise provided herein, may be reissued."

Now, Therefore, be it

Resolved, that the 4302 shares of 4% Cumulative Convertible Preferred Stock so acquired and now held by this Corporation be deemed to have been purchased pursuant to the obligation of this Corporation under [fol. 4921] the sinking fund provisions hereinbefore set forth, and that said 4302 shares of said 4% Cumulative Convertible Preferred Stock be retired and cancelled and shall not be reissued; and be it further

Resolved, that this Corporation eliminate the said 4302 shares of its 4% Cumulative Convertible Preferred Stock by filing a certificate for that purpose with the Secretary of State of the State of New York pursuant to Sec. 28 of the Stock Corporation Law; and it was further

Resolved, that the President or a Vice-President and a Secretary or an Assistant Secretary of the Company be, and they hereby are, authorized and directed to prepare, execute and file such certificate and to take all proceedings and steps necessary to accomplish the elimination of such shares.

The Secretary presented to the meeting a proposed notice of meeting of stockholders, proxy statement and form of proxy. After discussion, upon motion duly made, seconded and unanimously carried, it was

Resolved, that the Secretary of the Corporation be and he hereby is authorized and directed to call the annual meeting of the stockholders of the Corporation for June 20, 1951 at 10 o'clock A.M. Eastern Daylight Saving Time to be held at the office of the Corporation, Ridge Street, Rome, New York and it is

Further Resolved, that the stockholders of record as of the close of business May 18, 1951 shall be entitled to notice of, and to vote at, the meeting to be held June 20, 1951; and it is

Further Resolved, that the notice of meeting, proxy statement and form of proxy, all as presented to this meeting; be and they hereby are in all respects approved as to form and content; and it is

Further Resolved, that the Secretary of the Corporation be and he hereby is authorized and directed to file the notice of meeting, proxy statement and form of proxy all as in the form presented to this meeting, with the Securities and Exchange Commission, and to mail the same not later than May 25, 1951, with such changes as the Executive Committee of the Corporation may hereafter approve, to stockholders of record as of the close of business, May 18, 1951; and it is

Further Resolved, that the copies of the notice of meeting, proxy statement and form of proxy be placed on file.

The Secretary read the annual report to stockholders and presented the financial statements thereto annexed and upon motion duly made, seconded and unanimously carried, it was

[fol. 4922] Resolved, that the annual report to the stockholders and the financial statements thereto annexed be and they hereby are in all respects approved as to form and content, and it is

Further Resolved, that the Secretary of the Corporation be and hereby is authorized and directed to file the annual report to stockholders with the financial statements for the fiscal year ended March 31, 1951 thereto annexed, as in the form presented to this meeting, with the Securities and Exchange Commission, and mail the same not later than May 25, 1951 with such changes as the Executive Committee of the Corporation may hereafter approve, to stockholders of record as of the close of business May 18, 1951;

Further Resolved, that a copy of the annual report to stockholders with financial statements for the fiscal year ended March 31, 1951 thereto annexed be placed on file.

The Secretary advised that with the conversion of the 4% Cumulative Convertible Preferred Stock of the Com-

pany stockholders were receiving Common Stock Fractional Scrip, for which a provision to purchase should be made. Upon motion duly made, seconded and unanimously carried it was

Resolved, that, subject to statutory and contractual limitations, the President, Treasurer or Secretary of the Company be, and each of them hereby is, authorized in the name of, and on behalf of, the Company to purchase, from time to time, the Company Common Stock Fractional Scrip, resulting from the conversion of the Company's Preferred Stock, whether or not the certificates for such Scrip were issued more than three years prior to the date of purchase thereof by the Company; and be it further

Resolved, that the President, Treasurer or Secretary of the Company be, and each of them hereby is, authorized in the name of, and on behalf of, the Company, from time to time, to sell, assign, transfer and deliver the Company's Common Stock Fractional Scrip acquired pursuant to these resolutions, and be it further

Resolved, that the price at which Fractional Scrip shall be purchased or sold pursuant to these resolutions shall be the market price, on the date of any such purchase or sale, of a full share of the Company's Common Stock multiplied by the fraction to be purchased or sold, as the case may be; and be it further

Resolved, that the President, Treasurer or Secretary of the Company be, and each of them hereby is, authorized in the name of, and on behalf of, the Company to deliver certificates for Common Stock Fractional Scrip, which may hereafter be owned and held by the Company, aggregating rights to receive one or more full shares of Common Stock to Guaranty Trust Company of New York, Transfer Agent, in exchange for a full share or shares of the Company's Common Stock; and be it further

Resolved, that said officers of the Company be, and they hereby are, authorized and empowered to execute such documents,

[fol. 4923] Take such steps and perform such acts as may in their judgment be necessary or incident or

convenient to the carrying out of the purposes of these resolutions, and any such documents executed or acts taken by them shall be conclusive evidence of their authority in so doing.

The Secretary reported that approval of the auditing firm of Ernst & Ernst for the ensuing year should be considered and upon motion duly made, seconded and unanimously carried, it was

Resolved, that the firm of Ernst & Ernst be and hereby is designated as auditors for the fiscal year ended March 31, 1952.

In line with the Chairman's Report unanimous approval was given to the following E.R.'s and additions to E.R.'s:

E.R. No.	Rome Plant	Amount	
4914	Purchase and install two lighting transformers each 50 KVA, 2300 V Primary, 110 V Secondary	$ 3,000.00	
1450	Purchase and install one 12-wire 8" High Speed Tubular Strander, which will replace a 7-wire 8" Strander #38-14	16,000.00	
1451	Purchase and install one 7-wire 12" High Speed Tubular Strander, which will replace a 7-wire 8" Strander #38-11	13,000.00	
1452	Purchase and install two magnetic gauges on flat rolling machines	4,000.00	
1453	Purchase and install pneumatic oven operating device on Machine No. 55-1	300.00	
1454	Purchase and install a ventilating fan over the Sheeting Mill under 3-A Banbury Mixer in the Plastic Mixing Dept.	500.00	
1455	Construct and install three (3) improved-type payoffs at sparking units in Synthinol Dept.	500.00	
1456	Purchase and install one (1) Barrett Yarn Saturating Machine	10,400.00	
1457	Complete enclosure for three (3) trucks at Shipping Dept.	18,000.00	$65,700.00
[fol. 4924]			
1415-A	For an additional appropriation to cover additional cost of office addition as shown on the attached tabulation	$22,854.20	
	Torrance Plant		
C-98	Let contract for grading and paving areas #2 and #3, 57,675 sq. ft., and resurfacing area #1, 14,430 sq. ft. Paving to be 4" asphalt concrete over asphalt concrete over 2" base of local material. Resurfacing to be 2" with asphalt binder for water seal on all edges.	10,600.00	
C-105	Purchase 1 Mercury Abrasive cutoff saw with 7½ H.P., 220 V, 60-Cycle, 3-Phase motor & control	730.00	

E.R. No.	Supplemental E.R.'s—Rome Plant	Amount	
C-109	Purchase 1-Landis "Lanhydro" automatic double end pipe threading machine	25,000.00	
C-110	Construct storage and operating racks for elbow plater	187.77	$36,517.77
	Supplemental E.R.'s—Torrance		
C-34-B	Distribute professional fees to North building extension	2,928.00	
C-35-C	Distribute professional fees to office modification	816.00	
C-36-B	Distribute professional fees to machine shop addition	722.00	
C-50-A	Make additional expenditures on slitting line installation	10,200.00	
C-79-B	Purchase and install additional equipment for sulphuric acid storage rack	350.00	
C-88-A	Distribute professional fees to hot dip building	10,534.00	$25,550.00

The President reported that an advertising budget had been submitted by Mr. Thayer, and after discussion upon motion duly made, seconded and unanimously carried, it was

> Resolved, that an advertising budget of $125,000 for the 1951 fiscal year be and hereby is approved. Suggested financial advertising in certain papers and magazines was presented by the Secretary, and it was the [fol. 4925] unanimous decision to leave final approval to Messrs. Fraser and J. H. Dyett.

Consideration was given to having an appraisal made of the Company's Torrance property, and after discussion upon motion duly made, seconded and unanimously carried, it was

> Resolved, that an appraisal of the Torrance property be and hereby is approved to be made by the American Appraisal Company at an estimated cost of between $5000 and $6000.

A full discussion followed covering price and wage levels, the possibilities of aluminum drawing equipment and other general subjects.

There being no further business to come before the meet- it was Adjourned.

John H. Dyett, Secretary.

[fol. 4926] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 57

Mr. A. D. R. Fraser

To: Mr. H. T. Dyett
From: R. A. Schatzel
Date: July 5, 1951
Subject: Aluminum

It is estimated that with the completion of facilities now under construction the ingot supply of aluminum in the United States and Canada will be approximately doubled during 1952. Further aluminum expansion by Aluminum Company of America at Wenatchee, Washington, 170 million pound Reduction plant at a cost of 40 million dollars is now decided on. In British Columbia at Kitimat an additional 220 million pounds annually at a cost of 160 million and a 45 million dollar Reduction Plant in Quebec will all tremendously and nearly triple present capacity in the next four years. This will all be reasonably low cost production.

The outlook for aluminum is that even with all wartime requirements there will be a surplus of aluminum for civilian use. Processing facilities to handle this will, no doubt, lag behind the primary supply, but this also is being greatly added to by Alcoa, Kaiser, Reynolds and U.S. Aluminum. The latter three with the aid of Government funds.

There is no need for review of Copper. Richer ore supplies are being depleted. Expanded industrial requirements world wide make a constant demand for more metal. Higher prices and a diminishing supply are probable. The trend of Aluminum and Copper are opposite each other. The spread in price between the two will be continually more favorable to aluminum.

There is a natural reluctance to the use of aluminum in the Wire industry. This is because of lower strength, lower conductivity, and consequently larger dimension—difficulty in soldering and difficulty in terminating. Despite these inherent disadvantages aluminum with steel reinforcing has captured the field of bare transmission conductors for medium and high voltage. There were many problems of terminating, vibration fatigue, etc. to overcome. But these

have been overcome in addition to the engineers' aversion. Except along seacoast areas where salt spray is particularly severe ACSR is the standard high voltage bare transmission conductor. About 75% of the total conductor miles 33000 volts and over were aluminum. It is probably higher now.

For insulated conductors Aluminum still has many hurdles and its inherent disadvantages are more formidable so that in some fields it is doubtful that it will ever be used except in an emergency by Government decree, as in Germany during the last war. These we can rule out of any present consideration. They are, Magnet wire, flexible cords, appliance wiring, flexible cables of all sizes. There are other fields of insulated conductors where the use of insulated [fol. 4927] aluminum conductors are of very doubtful possibility.

Building wire sizes 6 and smaller. Here, even if a very large price saving were (and is) possible, aluminum is not a good substitute for copper. To overcome weakness of strength the conductors must be used hard. They are therefore stiff, subject to fatigue and crack on bending if kinked. They are used by unskilled workmen and dangerous to safety. When installed the surface oxide is highly insulating and leads to a high resistance and unsatisfactory service. New methods may possibly be found to overcome some of the present deficiencies, but I do not feel it a good bet that all will be overcome.

Weatherproof H.D. Aluminum in sizes #1 and larger—here strength does not permit the same pole spacing as copper. It is doubtful if the differential in price would make up for the added labor and pole cost for closer pole spacing.

Insulated conductors generally installed in raceways, ducts, and similar confined space. Space is a valuable attribute and asset in design. In most cases replacements are being made to get more copper in the same space through improved insulations, design, etc. The use of aluminum is therefore quite uneconomical even if technically permissible.

Aluminum has a field which we believe needs only the economic impetus of price differential which we believe is now under way.

Weatherproof—Hard-drawn aluminum in sizes up to and

including #2 which is equivalent to #4 AWG. Copper. This includes all the present contractors weatherproof sizes and a large volume of utility requirements. There are no serious problems to be overcome here, but there is a natural aversion. Aluminum is considered inferior to copper; gangs are used to working copper. The growth will probably need time and additional economic incentive.

ACSR—Bare Transmission conductors—need no comment—they are already accepted.

ACSR—Weatherproof in sizes 2 and larger. The present price differential, I believe, still favors copper generally. [fol. 4928] Special equipment is required and care in joining aluminum to copper. Insulation may be of any type—braid, knit, polyethylene or Neoprene again a question largely of economics on which we would be on polyethylene.

Building wire in sizes #1 and larger where professional electricians are traveling, and equipped with proper tools for pressure connectors and terminating methods.

Underground cable in voltages up to 5000 volts and sizes #1 and larger. This is a range where utility crews are trained and always installed with proper supervision. The danger is that over-enthusiastic advocates of aluminum, such as at present characterize Kaiser efforts, will preach its use in smaller sizes and consequent troubles condemn its use over the entire range. Some of this has already happened.

U.S. Rubber, Okonite, Crescent, General Cable, Collyer, and perhaps a few others have sold aluminum building wire. Okonite have done a good job and wired up several large installations at Indianapolis and other locations for Aluminum Co. of America. These are going good and giving good service. U.S. Rubber's experience is the opposite.

Self-Supporting Service Drop Cable. This is a construction we pioneered in copper. This is an ideal application for insulated aluminum conductor with hard-drawn copper, Copperweld, ACSR messenger. Page 72 of "Electrical West" for May describes an installation of this kind in Portland, Oregon. Conductors were supplied by Kaiser; the messenger is of galvanized steel. The conductors insulated with polyethylene. One of our best customers for copper Triplex has been Detroit Edison. Their studies indicate the possibility of saving 20 to 40% using aluminum.

We, as well as Anaconda, General Cable and Kaiser are supplying 100,000 ft. to Detroit. They also estimate they can realize a saving of $160,000. per year by using 1/0 aluminum Neoprene insulated line wire in place of #2 copper we have been supplying. This also we will need to share now with Kaiser. We are prepared to supply.

Many engineers have investigated Self-Supporting Service Drop, and are prepared to accept it. Some are investigating Self-Supporting insulated Aluminum for secondary and there is no reason to believe this will not be accepted. In-
[fol. 4929] sulated aluminum conductor for open line wire has been used and accepted, particularly in the South and West. Some go so far as to say that there is no need to use copper for any aerial use. I do not believe such a generalization can be justified at this time, but that it will grow, cannot be doubted.

We would not recommend pushing aluminum at the expense of copper, but that we be prepared to supply our customer if aluminum does continue to grow in favor as we believe it will.

R. A. Schatzel.

RAS P

[fol. 4930] In United States District Court

Plaintiff's Exhibit 60

C. H. Ellis
R. M. Fraser

October 2, 1951

Aluminum Project

The estimated cost of capital items under the project of casting, rolling, and drawing aluminum is $283,530.00. This is made up of the items in the attached list. There may be a few expense items such as lighting and ventilating changes but they will be of a minor character.

The main items of equipment are the Ajax melting and pouring furnace with a capacity of 2000# per hour; the Properzi casting wheel and rolls; a 10 die Vaughn drawing

machine. This machine is recommended in spite of the fact that the total cost of the project including it is $8,589.00 more than a similar list including a drawing machine of the Southern Electrical type.

The matter of delivery requires further attention but at present the indications are that the delivery of the Vaughn machine would be no later than transformer and switch gear which are necessary.

Another reason that the Vaughn machine is brought in line is the thought that casting, rolling and drawing can be made a continuous operation. This would necessitate increasing the speed, and hence the size of motor of the "Southern" machine.

An accumulator would be installed between the rolls and the drawing machine—thus eliminating coiling, handling, and welding operations, and a DC drive would be substituted for AC. It would also be necessary to install a second spooler with drive. The estimated annual savings in labor by making the operation continuous and on the basis of a 5-day week is $46,000.00.

Two 2300 V breaker cubicles will be required at the main substation, and a 1000 KVA transformer and necessary 2300 and 440 V switch gear will be required for this department. It is suggested that this unit substation be installed in the space now occupied by the Bare Wire Inspection and Testing, which would be moved to a new mezzanine over the rod storage area.

The equipment would be located in Building #19 between the Bare Wire mill and Shipping room, and for about three-fifths of the length of that building the floor would have to be level. It is also proposed to compensate in a small degree for the loss of this area to copper storage and shipping by enclosing the open areas between the Machine Shop and the Shipping building.

While not a part of this project—it seems desirable while building alterations are being made to replace the Easterly and Southerly walls of the locker room in the Machine Shop with the customary tile partitions. The Northerly wall of the Machine Shop would under the above plans be located on the line of the Northerly wall of Building #16, and this

would provide the Machine Shop with a 50% increase in locker space, which is badly needed, and would also correct the dingy appearance of the present facilities. The estimated cost is $2,700.00.

R. M. Fraser.

RMF k
Encl

[fol. 4931] Aluminum Project—Estimate of Cost
October 1, 1951

Equipment Items	With "Southern" Machine	Delivery	With Vaughn Machine	Delivery
Furnaces and Rolls	$125,000	6 mos	$125,000	6 mos
Drawing Machine—200 HP	65,000			
250 HP			77,250	12 "
Dip System	5,000		5,000	
2 Cubicles, main Sub-station	10,000	10 "	10,000	10 "
1-1000 KVA Transformer and gear	20,000	14 "	20,000	14 "
Micro welder	1,000		1,000	
Fork truck	3,000		3,000	
Sub-total	229,000		241,250	
For continuous operation Add:				
Increase 200 to 250 HP	5,353		0	
Accumulator	4,000		4,000	
Additional spooler and drive	9,500		11,192	
DC and AC drive	6,838	8 "	6,838	8 "
	254,691		263,230	
Deduct				
Fork truck	3,000		3,000	
	251,691		260,280	
Vaughn over Southern $8,539				
Building items:				
Leveling floor, Bldg. 19	2,500		2,500	
Mezzanine for B.W. Testing	6,500		6,500	
Bldg. 19 Extension	14,250		14,250	
	$274,941		$283,530	

Estimated annual savings in labor by continuous method and on 5-day week basis—$46,000.

[fol. 4932] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 61

Engineering and Research Conference, October 4, 1951
R. A. Schatzel, Conducting

A guided tour was taken through the Laboratory in the morning prior to the formal engineering session. A varied and interesting display of samples were exhibited and a series of demonstrations were presented by the Laboratory personnel to illustrate test equipment and methods used in development work. Much interest was shown by the outside sales personnel in the attractive sample board that had been prepared by Mr. Mitrovich of our Portland sales office. In addition, exhibits prepared by the Laboratory of aluminum wire, spiral four cables, and numerous insulated cables completely illustrated Rome Cable Corporation's determination to keep pace with the latest development in the wire and cable field. The most spectacular highlight of the tour was the electrical laboratories high voltage demonstration which established conclusively the desirability of shielding high voltage power cables. Following the tour R. A. Schatzel opened the meeting and welcomed all those present.

R. A. Schatzel

Since our last meeting we have had several organizational changes. At the present time Mark Wolf is concentrating his efforts as Technical Manager of the Spiral Four Program. At the same time Mark is continuing his contact with some of our special accounts such as I.B.M., Westinghouse and Allis Chalmers. George Acock has been added to our Engineering Staff as a Product Engineer who will assist in field contacts. In addition George will continue his work with I.P.C.E.A. and N.E.M.A. At the present time it is expected that he will make most of his field trips in the Southern and Central New York territory.

Mert Williams is heading the Engineering Standards and Specifications section. John Hayes, Lew Selden and Mike Kopchik are working with Mert. In addition to working with the Engineering Standards and Specifications, Lew

Selden is taking over the Underwriters' Laboratories contact work.

I would like to emphasize that our past success and continuing success is the end result of team work between the Sales, Production, Laboratory and Engineering. In addition to strengthening the Engineering organization, we expect to strengthen the Laboratory and development work on new products.

The rubber crisis is over because we feel natural rubber is not as necessary as before due to the fact that we now have an adequate supply of synthetic rubber. In many cases synthetic rubbers are equal to or superior to natural rubbers; in most applications where natural rubber still has some advantage there are synthetic rubbers that can be used as a satisfactory substitute. At the present time the synthetic rubber industry is producing 80,000 tons of GRS rubber per month. This breaks down to 54,000 tons of "cold" rubber, 18,000 tons of "hot" and 8,000 tons of "Arctic" and other special Polymers.

[fol. 4933] Butyl

Butyl rubber is still in short supply. At the present time two plants are producing 5,700 tons a month. Two more plants are being built by the government to produce an additional amount up to 10,000 tons per month. Therefore, it is expected that the supply of Butyl for electrical insulation will increase greatly in the next six months. At the present time we are supplying low voltage Butyl for Navy contracts. We are working on a high temperature, low voltage Butyl rubber that we expect will in a large measure replace Varnished Cambric insulation. I.P.C.E.A. and A.S.T.M. are working on specifications for 80 C Butyl insulation. It should be emphasized that even though high voltage Butyl insulation costs less than RoZone, Butyl is not generally available today. Therefore, you should strive to have customers specifications and inquiries specify RoZone for the preferred insulation with Butyl, when they wish to consider it, as an alternate insulation.

A recent government order allows the broadened use of natural rubber, however, it still is not allowed for insulation under 2,000 volts, except for control and signal appli-

cations. The particular difficulty is that there has been no increase in allocations of natural rubber. Under present international conditions, natural rubber is simply a political and economic football and, therefore, is not a stable commodity.

Our present stock pile of natural rubber is approximately 900,000 tons. It is estimated that we would need 1,000,000 tons to carry on a five year war. Some of the European nations are concerned regarding the effect of our stock piling of natural rubber on world price stability, and economics.

At the present time the transplanting of the rubber trees in South America is progressing satisfactorily because they appear on the way to overcome the blight that has retarded rubber production there for many years.

To show the limited amount of natural rubber that is actually available for consumption, in 1950 this country consumed 395,007 tons in seven months. During the same seven months of 1951 our natural rubber consumption was 245,688 tons. Since our imports of natural rubber during these same months of 1951 were 395,684 tons, our rubber stock pile was increased 150,000 tons. It is expected that even less natural rubber will be available for consumption from now on. At the present time natural rubber costs twice as much as GRS.

To highlight the precarious conditions under which natural rubber is being produced today a recent letter from Malaya written during the first week of this month states that an inspection visit to a plantation was made in armor plated cars under the protection of a private Army. This convoy was subjected to continual harassment by local bandits.

Aluminum

On the question of aluminum we are taking a realistic approach. We do not intend to follow either these fanatics who would completely replace copper for all uses, or those who would oppose the use of aluminum where it is entirely [fol. 4934] satisfactory. We shall evaluate the proposed application and make recommendations in agreement with sound technical and practical consideration. In this con-

sideration we should remember that the properties of aluminum have not changed with respect to its electrical and physical characteristics. The differences that make aluminum such an important metal to us at the present time are first, economy; second, availability. Copper is still the best metal for electrical purposes when it is available at a reasonable price. For a long term swing, we expect that aluminum will replace copper only in places where copper is not really necessary. Present planned increase in aluminum production calls for double ingot capacity by 1952 and triple ingot capacity by 1954. This change over will occur just as ACSR replaced copper for overhead bare transmission lines long ago. In the immediate future we expect the use of aluminum, in place of copper, for weatherproof, self-supporting aerial cable and triplex service drop cable will continue to grow rapidly. The next field for aluminum substitution will be in underground applications, where space is not a major limitation. In the next year or two if is probable that the decision regarding the use of aluminum or copper will go out of engineering hands in many cases. It is expected that many utilities will swing over to aluminum on the basis of executive decisions, owing to the economic advantages it presents. In most cases the change over will be on a 100% basis for a particular application.

We are actively producing increased quantities of insulated aluminum conductors. You can help us by sending in all facts and rumors. We will investigate, corollate, and then pass back to you the facts. At the present time some companies are using aluminum in enamel magnet wire, but we do not think aluminum has a permanent place in this application. For some types of magnet wire it may well have an important and permanent place.

RoZone

During the past year we have had considerable experience with 15,000 volt cables insulated with RoZone. We expect there will be no change in our present voltage limits. We do expect that the use of 15,000 volt RoZone insulated cables will increase.

Shielding

We will recommend unshielded power cable from 2001 V to 3000 V. Above 3000 V we will recommend power cables with insulation shielding in accordance with our Catalog. We are willing to quote without insulation shielding on 3001 V to 5000 V power cables where customer or industry experience has proven such cable satisfactory.

All non-metallic sheathed power cable above 5000 V will be furnished with shielded insulation, unless single conductor cable on insulators.

All inquiries for semi-conducting tape should be referred to the Engineering Department. Although some members in the industry are using a semi-conducting tape as strand shielding at 3,000 volts and above, we do not recommend strand shielding until the voltage exceeds 5,000 V.

[fol. 4935] Polyethylene

There will be an international symposium at Cleveland this month at the A.I.E.E. meeting on the use of Polyethylene. Following this meeting it is expected that industry specifications will be developed for Polyethylene as electrical insulation and other uses on wire and cable, for example, weatherproof covering on line wire. We say that Polyethylene is an excellent insulation for control, signal, street lighting and some special high voltage power cable applications, such as the 15 KV Union Carbide application. The Union Carbide installation will develop a service record for high voltage power use. At the present time this is the only 15 KV Polyethylene insulated power cable that we have manufactured and we will not make any general recommendation for this use until further experience is obtained.

Equipment

Continuous Lead Press

We have purchased a new continuous lead press that should be in operation before the end of next year. The actual O.D. limits that this equipment will enable us to manufacture on Rome 60 cables will be given to you at a later date. It is expected that this continuous lead press

will give us an improved product and put us in a better competitive position.

Shielding Tape

We have installed a new machine for applying bedding tapes, tinned copper shielding tape, and rubber filled tape in one operation on shielded cables. We expect an increase in the demand for shielded cable at voltages as low as 3 KV.

Cabling Machine

We have purchased a new cabling machine that will enable us to cable a greater number of conductors in multi-conductor control cable.

Miscellaneous

The quality of our product this year has been higher than any previous year. This is attributable to the excellent team work between the Production, Engineering and Laboratory personnel. Although the number of complaints have been very few the past year, we consider any complaint serious, especially since copper is in such short supply at the present time and customers are reluctant to return materials under present conditions. Constructive complaints can be very helpful. By that I mean complaints that give a complete description and include samples and any other pertinent information that may be available. For example: Is this the first time we have furnished the wire to this customer? Has the customer changed the installation conditions before or after installation of the wire? Did the customer receive satisfactory service from the pre- [fol. 4936] vious use of our wire or perhaps from another manufacturers wire? Two recent examples of very constructive complaints which enabled us to improve our product were turned in by Jack Woods and Jack Guyer.

Bob Graham will discuss in detail our activities with RoZone. RoZone has received increased acceptance by engineering firms and utilities and other important users. Sargent & Lundy, and Stone & Webster are recent engineering firms that have approved RoZone and put Rome Cable on their recommended list. This helps all districts. Stone & Webster have given us this approval without meeting their usual requirement of either a ten year service record or a

ten year guarantee. This acceptance is another illustration of consumers faith in Rome Cable products.

As stated before, we expect to strengthen Engineering and Laboratory to broaden our research and information on our products. We must be prepared both in quality and cost to meet any situation—whether it is in material development or design.

With the introduction of aluminum we will eventually need to expand engineering services to develop installation technique.

This introduces the possibility of a whole new line of products, and a new book of questions. This, we expect, will be your and our concern during the next year and for many years to come.

Maintaining our present team work between Sales, Production, Laboratory and Engineering will enable us to improve our favored position in the industry.

[fol. 4937] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 63

Date: October 17, 1951

To: Mr. F. S. Marks
From: Mr. G. E. Rolston

CC: Mr. L. E. Wells, Mr. A. D. R. Fraser

Subject: Westinghouse Electric Corp. Sharon Plant

In order that you may be informed of developments up to date in connection with request from above to quote prices and general information concerning bare rectangular aluminum wire and glass covered rectangular aluminum wire, I have assembled all of the information in this memorandum.

1. The first request covering the entire subject is covered by a letter from Charles Duffy to A. D. R. Fraser dated October 4, 1951.

2. My first conversation is covered by memo to A. D. R. Fraser dated October 9, 1951.

3. I have had costs figured on six sizes of rectangular bare aluminum. These are covered by cost cards 00741, to 00746 incl.

4. I have secured published price information from Aluminum Co. of America and Reynolds Metals. The Kaiser Aluminum Co. stated that they did not make this product.

5. Following are the prices of the Aluminum Co. and Reynolds:

Size	Alcoa	Reynolds
081 x 204	.535¢ lb.	.51¢ lb.
091 x 410	.51	.51
102 x 410	.48	.48
114 x 410	.48	.48
129 x 410	.48	.48
144 x 325	.48	.48
Plus .01 for Annealling		Plus .01 for Annealling
Quantity Extras for each size ordered		Quantity Extras not known
1000- 2000 plus .03		
2001- 5000 " .02		
5001-10000 " .01		
10001-30000 " .005		

6. Following are the prices I quoted and our manufacturing costs:

Size	Price	Cost	
.081 x 204	.52¢	36.4	Includes Annealling
.091 x 410	.52¢	37.4	delivered to Sharon on
.102 x 410	.49¢	35.7	24 x 6 spools containing
.114 x 410	.49¢	35.6	65-75 lbs.
[fol. 4938]			
.129 x 410	.49¢	35.4	
.144 x 325	.49¢	35.6	

No quantity adders but minimum quantity per size of 1,000 lbs.

7. The prices quoted on the glass covered wire are listed opposite each item in the letter of October 4.

8. These prices were arrived at by the following method which I have been told is filed with the OPS.

(a) Figure the selling price of the size required using copper conductor.

(b) Subtract the price of bar copper (.245).

(c) Multiply the difference by 3.3.

(d) Add the price of aluminum ingot. (.195)

This gives the price of the size in aluminum conductor.

9. This formula was spot checked on an actual cost computation and found to be correct.

10. Mr. Duffy was told that these prices were believed to be conservative and he agreed to re-check with us after he had a chance to review with his people.

11. All papers are included in a folder marked:

"Westinghouse—Sharon—Rect. Alum."

Very truly yours, G. E. R.

GER:he

[fol. 4939] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 67

Aluminum Meeting Held November 29, 1951

A meeting was held on November 29, 1951 at 10:00 A.M. There were present: Messrs. A. D. R. Fraser, C. H. Ellis, R. A. Schatzel, G. E. Rolston, J. C. Ward and J. H. Dyett.

Mr. Ward presented his notes covering the meeting with Messrs. Properzi and Nichols on November 28th. He advised that EC aluminum should be annealed. Rolston replied that the rod must be annealed before drawing. In Schatzel's opinion this is guessing on the part of Nichols. Conductivity will first show up in physical properties. Fraser emphasized that Nichols had had little experience in conductors. Rolston didn't believe we will have much leeway in conductivity standards in respect to Westinghouse Transformer even if American standards were relaxed. In Schatzel's opinion we can use both S2 and EC ingots. On the S2 we can get 59% conductivity which would be okay for some items if the standard is reduced. It was pointed out that S2 production is what is being increased in this country. Schatzel stated that you could not tell the difference in installation between 59 and 60½% conductivity. Ellis thought that perhaps Westinghouse specifications should have enough leeway to provide for this. Schatzel didn't believe this was possible on magnet wire although it might be on building wire and service drop. Paper cable, however, requires even better conductivity than the present EC. Customers will begin to specify what

they want. According to Rolston, Kaiser only has one pot line on EC—in Tacoma. He couldn't find out if or what would be expansion of EC in this country. Schatzel reported that all chemical analysis had been taken out of ASTM. In Europe they are using about 54% conductivity but this cable has better physical properties. In his opinion we would gain in this country if went to this percentage. We don't use the same type of copper for different uses; therefore, why should we use the same type aluminum?

Fraser requested that Schatzel get the names of the eight installations of Properzi equipment in Europe—particularly those three interested in conductivity. He went on to [fol. 4940] state that the government feels lead can be saved by not covering aluminum in paper cable.

In respect to speeds Schatzel advised that the contract guarantees a speed of 1200 pounds an hour. According to J.H.D. the press release on Properzi mentioned production of about a ton an hour. Sprackling of Anaconda had estimated about half that production or about 500,000 pounds a month capacity. Both Ellis and Schatzel thought that on speeds we wouldn't reduce our estimates yet. They propose that we see what can be done in Davenport and where we think we can improve.

Schatzel explained that in Davenport they wanted rapid cooling since did not desire a long plastic area, consequently, the need for a smaller cross section. Fraser advised that everything points to the equipment not being too well engineered. He suggested that we get busy on possible improvements before it is delivered. He suggested the possibility of Steele working on the equipment. Ellis agreed he would be excellent for gadgets and refinements while Fitler would be assigned for long range developments. Schatzel suggested that we might employ a metallurgist for aluminum and that we should make a study of furnace linings. Tama of Ajax had reported that we would have no trouble with the furnace. Friends of Fraser's at Norton might be of some help on any furnace problems. According to Fraser, we have experienced a power reduction unit cost of 6% because of Spiral 4. Although in order to get away from gas, electrical heating for annealing had been tried and found wanting, study should be made on aluminum although Ellis doubted its practicality.

Fraser requested a report from Ward on Aluminum and what the equipment will do. In Schatzel's opinion the equipment will cast aluminum and most likely EC, but many refinements are needed.

Fraser asked several questions covering the projected production as agreed above, limitations on drawing, contacts as to sources of aluminum, where we can purchase and first quarter allocations. He also wanted any suggestions on how we can arrange for second quarter aluminum allocation before the December 11th Wire Industry Ad- [fol. 4941] visory Committee meeting. In his opinion starting with the month of April we should submit information on orders on our books as we do for copper.

Schatzel reported that Nichols had indicated he might make an arrangement with us to run the ingot aluminum in second quarter so that we could get experience. This would be feasible only if we can draw the wire. If Westinghouse gets 150,000 pounds will come to us in the form of rods from Alcoa with breakdown to be performed on our bull block. In response to Fraser's statement that we did not wish to buy all our aluminum from Southern if can get service from any other source, Rolston stated that Aluminum is not living up to its promises at least on rods. He did not know about its wire customers. It was Fraser's thought that we skip Kaiser this quarter but a contact should be set up by the Purchasing Department. When our allocation is received for the first quarter it was decided that Fraser, Rolston and Dyett decide how it should be obtained with the thought that we would cover present orders with Southern and leave a balance for discussion with Alcoa if possible. Dyett was to ask Williams once more to request prices on rods, solid and stranded bare, from Alcoa.

Fraser requested that Ward get from each of the group what wire and brass mill products would continue as aluminum when copper was more plentiful. Schatzel explained that with a continuing economic advantage the following products would find use for aluminum—service drop, some service entrance, large size of building wires and power cables, (not paper, but such as aerial, industrial plant and utility needs). Aluminum won't replace copper in all building wires or in any place where ducts or space limitation.

He was amazed with what Germany had done with aluminum but its use had never gone below size #22. He described the use of #20 copperweld in cords for electrical drills, etc., (not yet approved). We are drawing some samples at present and a visit to Oswego is planned where small sizes of Copperweld are being drawn and annealed. Rolston explained that we have run into trouble when drawing aluminum down to #24. Therefore, there is a [fol. 4942] problem for small electronic devices as seven strands are needed. Since no carbon copperweld available there is as much strength in size #30 as we get in size #22 copper. We are at present drawing size #14 copperweld down to #30. Any purchases of copperweld will be taken out of our copper allocation. Schatzel said we are getting electro-plated samples from Kenmore. It was agreed that the field for fine wire aluminum was very poor.

A general discussion followed as to the future availability of copper as opposed to aluminum. Dyett was to check with the copper producers as to what copper might be available for next five years. The vast expansion of certain industrials was covered although a change in economic conditions could rapidly alter the availablity of metals. Ward was asked to check with Scovill and Chase Brass as to what their opinion is on items in their business that will stay in aluminum. Schatzel brought out the use of lead-steel on plastic water pipe instead of copper.

In line with Ward's study he will consider other products than wire that might fit into our aluminum production. Among other products nails were mentioned. Some 850,000 tons of steel a year are used in the production of nails, which illustrates a large market. At present aluminum nails are not available locally. Before we make any decision on other products, however, we must determine whether we have enough capacity with one machine for products outside the wire field. There might be some uses for aluminum in Torrance such as irrigation pipe. In respect to Polyethylene on EMT Schatzel mentioned that it looked expensive but there might be other uses. Rolston could not understand why Polyvinyl had not been used.

Rolston warned that we must have our program set shortly, so that our fabricators won't think of buying Properzi equipment. He mentioned crazy prices on aluminum

wire at present. In respect to these Fraser stated that before we have our own equipment installed our costs will vary three or four cents higher than after we are operating from the ingot. We might suffer cost-wise until that time. [fol. 4943] Schatzel wished to develop what we would do on a near and long term basis in aluminum with special emphasis on products outside the wire field. In Rolston's opinion if we go into ACSR we will be involved in considerable testing equipment. Southern Electrical has a 50 foot bent plate, and the estimated cost of a straight tensile tester would be $18,000. He emphasized it would be difficult to have testing done outside. However, Schatzel did not think the testing program was too difficult with the exception of long test for the government which he also believes can be done quite simply. Fraser queried who our customers would be. It was Rolston's thought that we could go as far as Virginia competitively on ACSR. The biggest ACSR use is about 13,000,000 feet a month. Ellis mentioned that 500,000 feet a month for us shouldn't be too large, but Rolston pointed out the difficulty of getting 4% of total sales in the country shipped from Rome. He mentioned that American Gas and Electric (60% of the utility business in Ohio as well as other mid-western states including West Virginia) is the greatest exponent of aluminum.

Fraser thought that counting on 1,000,000 pounds of insulated aluminum a month was too much. After deciding how much should go into this type we should then check the fabricators, then nearby utilities and finally such products as nails. He emphasized that we should remember one of the things in favor of the Properzi equipment was the ease with which it could be moved. As a reply to his statement that he doubted that we would get 1,000,000 pounds per month both Schatzel and Ellis restated that this production should be realized in a year's time. After discussion between Fraser and Rolston it was the decision that the following breakdown of our sales on a monthly basis might be as follows:

150,000 pounds a month for fabricators
(if not all in the form of bare wire
might sell some rods)
75,000 pounds Westinghouse

400,000 pounds ACSR
[fol. 4944] 375,000 pounds insulated products
(equivalent of about 800,000 pounds in copper)

In anticipation of production of ACSR consideration was given to stranding equipment. Schatzel outlined a study should be made of where we would put new stranding equipment and whether the old building on Madison Street would suffice. Ellis rejoined that we were making a study of which way the plant operations should run—in which direction material would flow. A study is also being made of handling costs under varying schemes. Rolston pointed out that more stranding would be necessary in aluminum wire than in copper since the use of larger cables is necessary. Fraser asked him to make a special study of this although Rolston is not in a position yet to tell change-over sizes. Ellis will request Bob Fraser starting an equipment review. In respect to this Rolston did not think that we could produce satisfactory ACSR in the larger sizes on a rigid frame strander since we have experienced trouble on hard copper. Fraser answered that Southern had a 61 strand rigid type strander in 1948 but may have a new different type strander. (In checking with R. M. Fraser discovered that the second strander was also the rigid type.) Tessmann has gone as high as 4,000,000 pounds of aluminum a month. He believes that New England is a good territory for ACSR.

Rolston reported that most companies have given up promoting aluminum in small solid wires in the building field but will continue to promote six stranded and larger in this same field. Fraser recommended that stranding and testing are problems to be turned over to Ellis. Rolston did not anticipate any difficulty in getting rating assistance for any new equipment. Fittings must be lined up if we go into ACSR according to Schatzel who thought that Alcoa and Burndy would supply.

Rolston emphasized the seriousness of what scrap had done to our cost estimates on aluminum. We should devise means of saving insulated scrap since at present the aluminum melts in our scrapping process. Dyett reported that some of this aluminum insulated scrap had been sent to American Metal to see what could be done at the refinery. Rolston reported that the waste totaled about 6%. Schatzel

stated that we could re-use any scrap material which the Properzi equipment produced.

[fol. 4945] In addition to Westinghouse Rolston thought that our other transformer customers would be forced to aluminum. He could not see us in automotive wire field. At present aluminum is being used in starter cable.

In the non-electrical use field (or cold-headed products) are nails, machine screws and rivet wires which would bring us into the problem of alloys. This alloy situation, according to WARD, would present us with the problem of more melting diversity. There would be a question of emptying the furnace. Rolston said that most of the non-electrical uses would be from S2. Schatzel outlined the possibility of using the first Properzi for electrical purposes and another for non-electrical.

Schatzel wondered whether the production of nails is a good field. There might be a potential of 50,000 tons of aluminum a year based on galvanized steel nails. Ward advised that airplane rivets is a cyclical business as is true of the nail market which is both highly cyclical and competitive. If we serviced a nail manufacturer it would have to be largely on the basis of our location. He wouldn't state whether or not it might be interesting to us without making a survey. Schatzel posed the question of what we would do if we had a second Properzi furnace in another location with its extra capacity in the event that we only needed part of it for electrical. Fraser emphasized that we were looking for something in this non-electrical use which could help us in poor times.

Schatzel brought out the subject of pipe. We would start with ingot, melt and then process. It might resolve around buying aluminum pelletized which would not be connected with the Properzi method. Ward brought out the question of small piping in various types of equipment as well as whether or not plastic could compete with aluminum or copper tubing. In Schatzel's opinion these two latter types are expensive. Ellis mentioned that Nichols' business was mostly in clothes line which sold extensively in his territory. However, Schatzel did not think much of this type clothes line. Ellis mentioned the possibility of manufactur-

[fol. 4946] ing stock pins for electric furnaces since they stand up better than galvanized steel.

[fol. 4947] In United States District Court

Plaintiff's Exhibit 68

Aluminum Meeting Held January 4, 1952

A meeting was held on January 4, 1952. There were present: Messrs. A. D. R. Fraser, C. H. Ellis, G. E. Rolston, R. A. Schatzel and J. H. Dyett.

Mr. Fraser called the meeting for the purpose of determining from whom we should do our ordering, what the supply situation might be on aluminum, what trips should be planned and any other near term angles. In respect to the equipment ($336,000. approved to date on E.R's) Ellis advised that the furnace had been promised for May and should be ready by July while the Properzi equipment should be available at the same time having been promised in April. Schatzel reported that Properzi had been running about 30 days late on deliveries. He had been told this by Mr. Hagan of General Cable who also advised that his company had purchased four Lindbergs rather than the Ajax. On furnace linings he didn't see any cause for worry, a result of the testing at Nichols.

Ellis discussed moving the elevator supply and the attendant equipment from Reliance should be available in August. It should be remembered that the 250 h.p. motor comes from Electric Machinery in St. Paul. Vaughn's spooler has been promised for August. In respect to power, Westinghouse has given an August promise but we can experiment from present cubicles. The dip system is being made here and the welder situation is satisfactory. Although the main substation is not promised until December we will be in a satisfactory position. The Vaughn 10 die machine is anticipated in October and the motor in December.

A discussion followed of what we could do on copper without production from the Elevator Supply. There is a possibility of using both aluminum and copper on this equipment. Ellis could see three months or so of troublesome operation. Fraser recommended that our Vaughn machine be completely overhauled this summer. He asked Ellis to get out figures of possible production under vari-

ous set-ups. According to Schatzel Nehring flushes out the dip when he changes metals.

[fol. 4948] Fraser queried as to when we should explore the ingot picture. It looked like about the third quarter. We could sell the rod Okonite draws from the rod. Rolston had previously thought of just wire bars. He doesn't know what Simplex program will be as they haven't been active to date, as is also the question of Walker Brothers.

In respect to the first quarter allotment everybody got the same poundage as in the fourth quarter although the list was increased from 16 to 60. Requests were made for 17 million pounds against 6 million pounds available. Fraser believed that there would be an improvement in amount in the second quarter. The important thing is to have orders which we can substantiate. Rolston pointed out that 6 million pounds goes a long way toward the approved utility use. He advised that the aluminum form has to go in on January 15th. He reported that Washington had stated that no use information should be contained in the application letter but he was wary of what the Aluminum Branch would do with insufficient information. Tickets are not available in the field; so it is impossible to get accredited orders. The whole thing is in a mess. We can build up a story of orders—can get. For instance, we could have included all of the 177,000 lbs. of the Public Service program as well as Westinghouse requirements. The Sales Department will also check on Allis Chalmers, Maloney and Kuhlman interests.

J. H. Dyett reported that no delivery information had been received on first quarter from Alcoa. (Satisfactory information giving 'early in the month' shipping promises was received later in the day. The 10,000 lbs. for Westinghouse have also been delivered.) The suggestion that Fraser might check DeKlyn on deliveries was unnecessary as the information was received through Patterson. J. H. Dyett will check to see that the full first quarter allotment is filled. Fraser mentioned that since we were taking the rod and putting it through the bull block for Westinghouse, could we take the rod through the bull block and then to the heavy intermediate while waiting for the full set-up. Ellis replied that we would be doing this on copper rather than aluminum.

[fol. 4949] Rolston reported that we could not get back our aluminum scrap on a returnable basis from American Metal. We should find out from Alcoa and Kaiser as to their interest in replacing our scrap. Schatzel stated that Kaiser was definitely interested and J. H. Dyett will discuss this with their representative when he is next in Rome. Fraser will check this situation with DeKlyn.

Fraser explained the Southern Electrical position. They delivered to us fourth quarter aluminum after which the Aluminum Division issued a directive on Alcoa. Consequently, Southern Electrical was shy 150,000 lbs. and we were unable to get Alcoa to make up this deficiency. Tessmann stated that he did not see how Southern could give us rod from one furnace unless we could get him the ingot. J. H. Dyett mentioned that Alcoa did not seem interested in the ingot business since it has excess capacity at Massena for fabricating. A visit to Alcoa is advisable some time in the early spring. Rolston thought that he could get some of the answers to our various problems in Washington. He stated that we would get the aluminum in the form in which it was allocated.

In respect to Les Fitler and Carl Ward going to Nichols Ellis thought that it should be after all equipment is installed. He will write to Nichols to find out when this might be. Schatzel is currently looking for a metallurgist. He will keep him in the Laboratory and train one of our own men for the plant.

Meeting adjourned.

[fol. 4950] In United States District Court

Plaintiff's Exhibit 69

Aluminum and General Meeting Held January 15, 1952

A meeting was held on January 15, 1952, at 2:00 P. M. There were present: Messrs. A. D. R. Fraser, H. W. Barnard, G. E. Rolston, R. A. Schatzel, J. C. Ward, Jr. and J. H. Dyett.

On ACSR a request for test equipment in the amount of $45,000 has been submitted. Mr. Fraser advised that the

line up of 1952 capital expenditures would be available when R. M. Fraser returns. He pointed out that there was still Three-Quarter Million Dollars of past programs incomplete.

According to Rolston there is nothing new from his angle on ACSR. He foresaw selling limits of 300 miles from Rome in the states of New York, New Jersey, Pennsylvania, New England States and Ohio, in which latter state Tiffin and Kaiser would be competitors. Ellis and Rolston had yet to discuss the necessary equipment. According to Rolston utility and R. E. A. complete programs total Sixteen Million pounds per month, in view of which during the first year we would be fortunate to get 500,000 pounds of ACSR a month. It looks as though we would not be in ACSR until late 1952 or early 1953. Both Schatzel and Rolston agreed that if we produce One Million pounds of aluminum a month we would need ACSR in our line. Fraser questioned on how our insulated accounts could help. For ACSR business Schatzel stated we would need tensile equipment but our testing requirements would be $25,000 less as wouldn't need modulus testing. According to Rolston 500,000 pounds a month of ACSR would represent billings of $225,000. Fraser will pass this information on to Ellis.

Rolston advised that Allen of Anaconda had stated that the Properzi equipment was experimental. They are producing ACSR at Great Falls at the present time. If the Harvey deal works out satisfactorily Anaconda expects to put rolling facilities at Great Falls and then will produce ACSR at Orange, Sycamore and Hastings. In respect to [fol. 4951] this Ward advised that he had received information from the Aluminum Division that Harvey would proceed as scheduled.

Ward advised that Texas had made requests for forging plants and other fabricators. Fraser stated that Texas prospects had been much in H. T. D's and his mind. One or more of our competitors are considering locating there. We should consider possibilities of a base operation in Texas and what the base should be. There is a possibility of a community interest such as Texans taking all Preferred Stock issue and we taking the Common. Ward told of Temco which now has ten thousand employees. Dallas and Fort Worth are now growing at the rate of four times the rest of

the country and an industrial band of plants is growing up between the two cities. This area now has one and one-half million population. There is a great deal of overhead distribution which should make for a large aluminum market. Fraser emphasized that the company who gets there first will benefit, to which Ward agreed as well as that there was money there to invest. Consolidated engineers on the B-26 are not using aluminum. They gave up after six planes as assemblers stretched the wire and Wright Field does not have the proper specification. (The B-36 uses Two Million Dollars of electrical equipment to Two Million Dollars of other materials). Schatzel pointed out that aluminum cuts too easily and a bad situation results when strip. According to Ward engineers receive $500 if they can save one pound in the weight of a plane. This is a great incentive.

Ward told of his advisory meeting in Washington. This group with forty minimum and ninety maximum in attendance meets once a month for two days and hears the members of the Cabinet, E. C. A., etc. This meeting acquaints business with what's happening and allows business men to give recommendations to the Department of Commerce. The present economic situation was covered very ably by Mr. Lazarus of Federated Stores. He said that if not for the impact of defense we would now be in a recession. At present our economy is on a flat curve. The danger in the [fol. 4952] situation is that Congress has been the watchdog of government expenditure but has now given Eighty Billion Dollars to the Executive Branch, or you might call it a blank check for the Defense Department, which can throw these monies into the pot at any time and add to the inflation or can feed it to the country as it can be absorbed. Since Air has the largest percent of these funds it can raise hob. The danger from heavy inventories at retail has disappeared but manufacturers inventories are dangerous. The public has shown common sense by saving. Mr. Lazarus summed up by saying that subject to a sensible policy of the Defense Department there should be no serious dislocation.

Ward went on to state that steel negotiation is the key to the labor situation. Historically speaking labor lost strike and union was desperate. Demanded the President bail them out. The Labor Board was constituted four, four and four, and its job was just to stabilize. Labor got an agree-

ment to enlarge the Board to six, six and six and to handle grievances in return for election support. Reeve of the Textile Union stated that everything was set and would now strike against the Board as soon as the Board was enlarged. This was highly unethical as he was a member of the Board. The Board has tried to conceal that it is a Labor Board. In Ward's opinion Wilson of General Motors has advanced a bad thesis in recognizing an advance labor trend which he says is inevitable. Too many people appeared confusing his position with his ability.

Fraser pointed out the great mistakes that have been made in government fiscal estimates. General business will be slowly declining but this can be changed by the Defense Department. According to Ward General Marshall was more interested in tools and capacity than in the final product while Lovett is slightly more realistic. We must have skill in picking the right airplane plans for production. Today's tools change as do plans. Lovett believes that the monies of the Defense Department should supplant the economy, that is, the Department should hold business level where it is by the flow of the money under its command. He seems willing to cancel excess capacity and [fol. 4953] orders. Fraser queried whether this would affect our Spiral Four program. Schatzel answered that field wire stocks are being replenished only as they are used but that Spiral Four still should continue since it has hardly been started. Fraser wondered what would happen to field wire suppliers if cut back. Would the government cut down on other business so that this could be spread around among our less fortunate competitors. J. H. Dyett mentioned that the government had just announced a policy of placing business at higher cost with companies in depressed areas. Ward mentioned that this has happened in aircraft.

Fraser reported that our reels with utilities showed a building up of wire stocks. He is sending a letter to our District Managers to get inventory information. What measures should we take in order to protect ourselves? He is getting lists of customers showing copper purchased in 1950 and 1951 and our order backlog projected into 1952. Also our customers total inventories. (This is done through our reel study.)

In Fraser's opinion our ability to get material will some time during this year meet our sales requirements. We are presently looking for companies who have pyramided orders. If we have a controlled amount of material we should pick and choose our customers. Ward advised that there had been hoarding of materials by the automobile companies. Fraser pointed out that General Electric wants to cut its inventory by One Hundred Million Dollars. This may be a warning to other people who may discover the high cost of maintaining inventories through borrowed money. Ward believes that the expansion plans of many big companies may be revised downwards and the government will some time find a plethora of copper. We should study whether or not our equipment is satisfactory for any changes in demand in housing, appliances, etc. Schatzel thought that we must be prepared for plastic powder mixing which will not be a major equipment expense. There is also the question of cold feed development. Is Anaconda ahead of us on this? Schatzel did not think so. He agreed that we might have to accelerate some of our developments. [fol. 4954] In commenting on our California Plant Ward advised that it was an interesting operation, outstanding in neatness and in new equipment. The plant gave the impression of not being crowded and much hand operations have been eliminated. The control of plating is excellent and the flying loop shows much ingenuity. He discovered very rough records and blue prints, but Fraser thought that we had them. Ward was amazed that the Machine Shop could get such good results without being well outfitted. Ward believed that the west coast plant should be digested. If we can secure volume we should have a good return. It is a big investment with small labor costs. According to Schatzel a lot of money has been made in mechanical tubing.

[fol. 4955] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 70

Meeting on Aluminum Program for Rome Cable Corporation Held January 30, 1952

Present: Messrs. A. D. R. Fraser, R. A. Schatzel, G. E. Rolston, C. H. Ellis, R. M. Fraser, J. H. Dyett and J. C. Ward, Jr.

Ross Fraser opened the meeting by stating that the purpose was to arrive at probable types and quantities and size ranges for aluminum conductors which will probably remain in aluminum indefinitely. He stated that there were five principle objectives for discussion:

1. This refers to the first meeting on the subject and the question, namely, what products in the brass and wire mills will stay with aluminum and if so how many tons of copper will be made available.
2. A report on Bob Fraser's trip to the Hunter Continuous Casting Plant at Riverside, California.
3. How to determine the extra stranding equipment, etc. that may have to be included in the 1952 budget for capital expenditures stemming from aluminum cable in place of copper conductor.
4. Define more accurately the ACSR conductor picture so that Ellis can be certain of his equipment needs by the Board meeting of February 29th.
5. Bring up to date any new or added information that may have been gathered by those present. Note any changes in the forward equipment delivery schedules that would be significant.

Rolston desired to point out that in certain cases when aluminum conductor is substituted for copper the conductor size may be jumped four gauge numbers in place of the usual two. He cited overhead conductors size #8 copper used by West Penn Power that may be considered [fol. 4956] undersize for ice and sag load and that upon switch to aluminum will be required to go up four gauge

sizes. He also pointed out that Westinghouse, for instance, is planning to have all its small motor leads go to aluminum stranded and that in this instance they will probably not change the conductor size due to the small drop realized. No. 14-19 strand is an example. The discussion that ensued focused attention on the fact that as the conductor sizes increase in the larger ranges the strand lay may jump from 19 to 37 or from 37 to 61 thus placing a heavy requirement on the stranding equipment, even though the cable footage is not increased. It will be necessary for Mr. Ellis to estimate this effect.

At this point Ross Fraser called on Bob Fraser to report on his Hunter-Douglas Corporation inspection at the Riverside plant. Bob Fraser reported that Hunter got into the continuous rod casting through hearing about the Properzi process. He was escorted through by their Research Director, Mr. Quadt. Since they had no drawing equipment they have had the Anaconda Orange plant draw down their cast rods and thereby Anaconda had become quite interested and an active collaborator. Their equipment starts with three Ajax electric furnaces apparently lined with normal silica linings. These pour alternately into a holding furnace of the gas reverberatory type. (Note: This may be for the purpose of bringing about a reducing atmosphere.) The holding furnace pours into two troughs each ending in a refractory tip which is believed to be immersed approximately 1" in the fluid metal. Each trough fits into a caterpillar type split mold set-up. The mold sections being short blocks of steel, water cooled. The rate of casting is 6 ft. a minute and the cast ingot (of the type used for venetian blind sections) is sheared into 55 ft. lengths which are fed into a soaking furnace at 1000° F. after which they are hot rolled in eight passes. Cooled water in the mold is 97° F. and each mold block section is fed by a flexible hose attached to a revolving drum in the manner of spokes which revolve with the caterpillar mold. For wire the mold blocks are curved and cast three strands or rods simultaneously. They started with ⅜" rod and when drawn [fol. 4957] to final size the wire lacked sufficient tensile. They then went to ½" with a first draft of 40% but the finished .077 wire lacked tensile to meet ACSR requirements. They now plan to cast ¾" rod and will keep Rome informed

of the progress. They may have to cold roll several passes or pass through a double deck bull block to work the metal. In the case of the venetian blind strip this is rolled to ⅛" thick, the same width as the cast ingot, and then to .008 in a series of "H" stands to finished "blind" stock.

Schatzel: What micro sections have they taken?

Bob Fraser: There were no micros.

Ellis: What is the advantage of the Hunter over the Properzi system?

Bob Fraser: It is a better machine, having been designed and built by the Hunter organization. The pouring conditions are believed to be much better. (Probably due to the ceramic spout and the immersed condition.) In addition, one man handles two machines and each machine will cast three wire rods.

Ross Fraser stated that he felt Schatzel should look at the Hunter process in March while out at the coast meeting.

Bob Fraser: Probably through the ceramic spout there has been no iron pick up by the molten aluminum. Hunter has made no arrangements for licensing as yet although Anaconda who are doing the drawing at Orange are very interested.

Schatzel pointed out that Properzi depends upon a rapid chill for the desired structure and agreed with Rolston that if Hunter is not testing for conductivity he could be fooled by his results, although undoubtedly Anaconda was following this since they were doing the drawing. Schatzel agreed that the mold set up would be more flexible for large flats and rounds and the production of 4600 lbs. per hour is high. He agreed to make both porosity and conductivity tests on the samples Bob Fraser brought back with him.

[fol. 4958] Ellis commented that he liked the idea of casting the rod shape direct and Bob Fraser commented that by casting three wire rods simultaneously they could be fed from each mold set-up onto large reel take-ups and that this has some advantages in speeding up the drawing process. Schatzel pointed out that he knows of no extruded or cast rods successfully drawn without splits along planes of structural weekness. The rolling process in the normal fabrication brings about heterogeneity and thus eliminate the splitting. He pointed out that the extruded rods from

Scovell led to trouble in drawing, probably through lack of homogeneity. Bob Fraser pointed out that there was no splitting of the Hunter rods which drew successfully but did lack tensile. Schatzel commented that the lack of tensile may be due to porosity and this could be detected by micro sections. Rolston stated that Reynolds Aluminum casts a 1" slab and slits it into squares, then passes it through drawing dies into rod sizes, but that the customers do not like Reynolds' rods and report them as lacking in uniformity, thereby supporting Schatzel's comments. Paul Williams confirmed this to a Rome representative very recently in his experience at the Lister Hill plant where they were compelled to use Alcoa, Kaiser and Reynolds rods and the latter were distinctly more troublesome. This concluded the discussion on the Hunter process.

Ross Fraser then suggested that the stranding requirements be discussed. At this point there was an interruption due to a long distance call to Ross Fraser. Upon resumption Ellis asked what should be used for making the stranding requirements estimate—what basic assumption? Rolston pointed out that there will be no more footage used by shifting to aluminum but that the stranding lay-ups will be more complex due to the larger gauge sizes, that Ellis should start with the premise that in building wires, either plastic or rubber, the shift will increase conductor size by two gauges; that is, No. 4 strand for No. 6 strand—but pointed out that No. 8 solid in copper will undoubtedly stay as copper conductor. He feels that branch circuits will remain in copper but that main feeder circuits will swing to aluminum, thus the sizes No. 14 to No. 8 inclusive will stay copper and aluminum will start at No. 4 (No. 6 equivalent [fol. 4959] in copper.). It should be obvious No. 8 in copper will be cheaper than No. 6 in aluminum strand and that the latter size wire, while it will not drop out, will go down in volume. The overall effect will be that much more 37 strand will be used than presently due to the shift from 19 to 37 if the gauge sizes increase in aluminum. Ross Fraser threw out the suggestion that for estimating purposes we may assume 33% of present copper in appropriate sizes will switch to aluminum. Rolston warned that there would not be any appreciable effect this year due to the lag between the engineering design of systems, placing of the

orders and the delivery of the material. For instance, in the second quarter of this year for the whole country eight million pounds is allocated for aluminum conductor for utilities, one million pounds for electrical equipment manufacturers and five hundred thousand pounds for the construction program. He doubts whether by the fourth quarter there will be more than one million five hundred thousand pounds for all construction for the United States in aluminum conductor. Ross Fraser stated with an 11% cut back in copper allocation for the second quarter the aggressive section of the industry will be forced to make more substitutions for aluminum. Rolston cited as an example for his argument the Utica fifteen million dollar General Electric plant expansion program utilizing $338,000 of new wire, 245,000 ft. of conductor and 350,000 lbs. of copper and that once this is designed you cannot substitute aluminum for copper because of terminal boxes, conduit sizes, fitting sizes and the like and that such an example indicates why the effect of switching to aluminum will be small in 1952, since deliveries on the Utica project are specified for the third and fourth quarters. Washington advises that they will increase the allowance of aluminum to utilities for overhead distribution primarily other than H-3 and H-4 (utility government classification). If Rome gets the orders they will get the needed aluminum allocation. General Electric should get 25% of the total of one million pounds for electrical manufacturers allotted for the second quarter. Westinghouse have put in a large allocation but many of the electrical manufacturers are in-
[fol. 4960] active on this subject. Rolston figures that by 1953 there will be sufficient aluminum available but not in 1952 to get the desired needs. He has instructed Rome Sales to take orders for 250,000 lbs. in aluminum for the second quarter in anticipation of the allotment for which he cannot wait. This will go into Weatherproof and Drop Cable with no triple braid type. The first quarter allocation for Rome is 150,000 lbs. and that as a guess he would expect the third quarter to have upwards of 300,000 lbs. and the fourth quarter 400,000 lbs.

Schatzel pointed out that for reasons previously discussed at earlier meetings there should be no ACSR for Rome in 1952. If the Properzi equipment is available for

the fourth quarter it is conceivable that we would get some requirements and allotments from other fabricators. If we did not, then the 400,000 lbs. estimated by Rolston would provide less than one-half month's rated capacity operation for the Properzi equipment for the entire fourth quarter.

Ward inquired as to the overall effect of the aluminum plus the copper total poundage on the total mill load. Rolston replied that it will lead to a much higher mill stranding load in all probability. Schatzel quoted from a Consolidated Edison report that was very favorable to their experience on terminals for aluminum distribution network and that this will lead to the use of aluminum as an alternate for copper upon the issuance of the formal report. Schatzel believes this will have an important effect. Rolston warned that if Consolidated Edison uses equivalent resistances in conductors they cannot pull the same number of conductors in their present installed conduit sizes. Schatzel replied that they can on large portions of their system, namely Queens and the outlying sections, and that compression terminals have operated successfully. Rolston answered that economics will govern as the effect of insulation thickness, complexity and cost enters into the conductor picture. It is obvious that the larger aluminum gauge required will run up the installation cost more in proportion as the thickness of insulation and the expense of insulation increases. Schatzel stated that the final report should be made to the A.I.E.E. in March or thereabouts by Consol. Edison.

Rolston stated that Westinghouse is switching their 6-4-3-9 specification from copper to aluminum for motor leads. [fol. 4961] Westinghouse is talking of a five million two hundred thousand pound copper requirement for their corporation per month plus another one million three hundred thousand pounds for their present requirements and that Mr. Henderson of Westinghouse estimates they will need 10,000 tons per month. Rolston points out that by comparison the General Electric Company is using only 6,000 tons per month. Whether these figures are accurate or not they point to the switch to aluminum in any event and this may save money as well. Thus General Electric advises that they can switch 25% of their copper to alumi-

num conductor with no important design changes. Ross Fraser asked if Ellis is satisfied with 500,000 lb. allotment for ACSR per month as a basis for making his equipment analysis. Ellis said he was and would assume that the distribution by size would be similar to the experience of Southern Electric which was available to him. Rolston stated that we must remember 70% of Southern Electric's sales is to R.E.A. In any case he felt that capacity for large 37 and 61 strand conductor will be needed and that we may need one right now for normal growth. Ellis stated that he may not want a 61 wire machine and instead may run the wire through twice to better advantage. He will test his estimate by Southern Electric's practice and will use wire footage capacity by Larmuth machine, perhaps adding new 7 and 12 strand Larmuth type machines. He will proceed on this basis for his estimate.

Ross Fraser pointed out that we were now back to the question as raised in the first meeting and he would like a forecast as to what items in whole or in part will stay as aluminum. He used as an example the new copper clad radiator studies by Henry Ford. Rolston replied by stating that final price has much to do with this answer. He cited as a particularly bad practice General Cable's proposed pricing schedule filed with OPS for aluminum building wires as compared with copper in which General Cable apparently made the price come out for No. 6 RH in copper equal to No. 4 in aluminum even though it is obvious that the No. 4 will cost less. As a further argument against this practice it should be recognized that the purchaser [fol. 4962] will in many cases require larger conduit size and hence his switch to aluminum will increase his costs. Rolston feels that for construction wire where aluminum price savings bring an incentive that there aluminum will stay and this will be in the larger feeder sizes, say, beginning at 1/0. Schatzel commented that this not only will give economy but that in these sizes trained electricians will install the cable and that thereby there will be less resistance to the products involved and less complaints may result. The smaller sizes may at times be indifferently installed and if so aluminum conductor would give trouble and bring about sales resistance. He said he was leaving

out comparisons of a 12¢ per pound copper market as this seemed far off.

Rolston stated that in the case of service drops few fittings are involved and that after a change to aluminum is made it will stick. He feels that in general overhead distribution will go to and will stay in aluminum. The underground situation is quite complex and the use of aluminum will grow but he isn't clear yet to what extent. Schatzel stated that undoubtedly some underground will stay in aluminum in the large sizes. Ward asked about street lighting. Schatzel replied in Polyethelene types aluminum would be appropriate but as to magnet wire this is questionable except the large sizes and flats in aluminum as there should be enough copper for a non-defense economy. Ross Fraser asked who knows how long before the defense economy will be out?

Schatzel said that all insulated aerial cable, in his opinion, will stay as aluminum under normal business conditions, whenever that may be. Ellis asked what about the high cost copper producers who may be forced to go out of production when copper comes down in price? Schatzel felt that they may have to keep the high cost producers in production.

Ross Fraser pointed out that in addition to the type discussed, non-leaded paper cable is claimed to be a market for aluminum conductor. Schatzel answered Ward by stating that he felt no flexible cords or flexible power cables, welding cable, mine cables, etc. will be suitable in aluminum for mechanical reasons.

[fol. 4963] Rolston summarized as follows:

A. Type ACSR and all overhead primary and secondary conductors down to No. 4 in aluminum will stay as aluminum when aluminum ingot is 19½¢ and copper ingot is 16¢. He takes exception, however, to seacoast areas where aluminum erosion is evident and in other special applications.

B. That large size underground in sizes No. 1 and heavier will remain aluminum where the installation costs do not offset price advantage.

C. Magnet wire will stay in copper except during emergencies.

D. Building wire will stay in aluminum from 1/0 and larger for feeders and will not be used in secondary distribution.

E. Automotive wire may stay in aluminum if economy proves out but offsetting this is the problem of pressure connectors and automotive servicing which makes this complex and hence doubtful.

F. Railway requirements will stay in copper and power control cables and signal cables.

G. Marine wires and cables will probably stay in copper.

H. Aircraft cable will probably stay in copper as at present.

I. Power busses will stay in copper for mechanical reasons.

Ross Fraser then asked what the opinion was with respect to brass goods switching to aluminum. Rolston replied that overhead bus duct may be converted to aluminum and that this is a considerable tonnage. In general discussion it was agreed that much building hardware has already switched from brass to aluminum and will undoubtedly stay. That Alclad screen cloth has proven suitable in place of brass and copper and that also plastics have come in. Architectural grills and ornamental work in the construction industry have largely switched to aluminum from brass. Gift shop and novelty lines have in many instances switched to aluminum from brass or copper. The [fol. 4964] automobile industry is substituting other materials for copper and in the case of Ford expect to cut their requirements per car from 42 lbs. to 28 lbs. Ross Fraser pointed out that no doubt Revere could give a better summary of this switch from brass goods to aluminum in a post-war economy.

Meeting adjourned.

Carl Ward.

JCW:AS

[fol. 4965] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 71

March 3, 1952

Inspection Trip to Rome Cable Co.

Preface: Messrs. Plummer & Knouse of A.C.O.A., Pittsburgh, Messrs. Holcomb, Wheater & Glascock of A.C.O.A., Massena, spent 2 days, Feb. 13 and 14, 1952 at the Rome Cable Plant, Rome, N. Y. This trip was arranged by Mr. M. E. Noyes, A.C.O.A. Product Manager for wire and cable.

Purpose—

The general purpose of the trip was to enable A.C.O.A. personnel to gain some knowledge of the insulated or covered wire industry. It has been proposed that A.C.O.A. Massena Works enter the covered wire manufacturing business, specifically to make neoprene covered weather resistant wire and cable and Triplex service drop wire, as well as polyethylene covered weather resistant cable.

Multiple purposes of the trip, in connection with the above general purpose, are as follows—

1. To study the production methods for making the above outlined products.
2. To study operational difficulties of neoprene versus polyethylene extruded covering applications to aluminum wire and cable.
3. To study mechanical and electrical equipment and facilities used in the insulated wire and rubber industry.
4. To determine what technical control problems are involved in the successful production of extruded neoprene and polyethylene wire coverings.
5. To determine temperature effect on physical properties of aluminum in covering processes.

Personalities—

During our visit we spent most of our time with the following Rome Cable men—

Mr. Charles Ellis, Works Manager
Mr. Rudy A. Schatzel, Product Development Chief
Mr. J. Carleton Ward, (Consultant on Aluminum Conductors) (Assumed this to be title)
Mr. Robert Frazer, Plant Engineer

[fol. 4966] We believe all these men had in the past worked for General Cable Co. These men extended us every courtesy and answered all questions to our satisfaction. If there was any reserve on the part of any of the men it was, we felt, a natural reaction to a future competitor. If these men tried to influence us in such a way to keep us out of the covered wire business it was certainly in a mild way and no more than we would do in similar circumstances. For example, they did not minimize operational difficulties, which somewhat discouraged us in connection with neoprene. On the other hand, they freely gave us operating speeds, costs of materials and showed us their standard operating procedures.

Discussions

Types of Weather Resistant Wire & Cable—(Cotton Knitted versus Cotton Braided versus Neoprene versus Polyethylene).

(Mr. Ellis' comments).

In the industry at present over 80% of all weather resistant wire is cotton covered. At one time, all cotton coverings were braided; now most manufacturers prefer to make knitted cotton cover because it is cheaper to make. Many Southern Utilities will probably always specify a cotton cover. If cotton drops in price, practically 100% of weather resistant wire will be cotton covered. The price of basic neoprene is pretty much fixed and stable. Polyethylene in a precompounded form is the most expensive at present—55¢ per pound at .92 gravity and also in short supply because of defense orders. In the next few years polyethylene will become more plentiful and cheaper. Polyethylene is the easiest to apply and makes a better covering, but a covered wire manufacturer for many years to come must be equipped to supply all three coverings. Rome

Cable by the end of 1952 will be doubling their present production of polyethylene covered weather resistant wire.

[fol. 4967] *Problems Confronting a New Manufacturer in Connection with Diversification—*

(Mr. Ellis' comments again).

It will be very hard to draw the line and furnish to the trade only weather resistant and Triplex wire and cable. For example, some Utilities want some rubber in the neoprene mix for Triplex cable—you must give it to them. Triplex specifications vary and the first thing you know you are applying braid and furnishing insulated wire and you will then have to go to pan vulcanizing and will have 600 mixes of covering compounds and 375,000 different products like Rome Cable makes. We told Mr. Ellis we hoped to avoid such pitfalls—he wished us luck.

Hot Process Neoprene versus Room Temperature or So-called "Cold" Process—

We indicated our interest in Western Electric "Cold" Process whereby the neoprene mix is dumped from a Banbury mixer into an extruder which produces a 3" wide strip of stock which is rapidly chilled and then can be stored and fed to the continuous vulcanizing extruders at room temperature without going either thru a sheeting mill or a warming mill as is necessary in the "Hot" Process in use at Rome Cable. The "Cold" Process requires a strainer in the head of the continuous vulcanizing extruder.

Mr. Ellis said they had a license for the "Cold" Process from Western Electric but that the process was no good for covering wire and that if it did work you would have to cut your C. V. machine speed in half and that he did not believe Western Electric had the process in operation on covered wire—though it might work on less critical operations, such as molding of battery cases. Mr. Ellis strongly felt the sheeting mill and its thorough mixing and blending, after the Banbury mixer, was essential and, likewise, the warming mill was essential. He said if you didn't do the work on the sheeting and warming mills you did it in the

screw chamber of the C. V. machine whereby you would cut the extrusion speed in half and you would have to put a lot more horsepower on the screws of the C. V. machines. Mr. Ellis felt that if we were going to tie up with the West- [fol. 4968] ern Electric "Cold" Process we should see it in operation on covered wire before we took a chance on it.

Note: We do not agree in toto with many of Mr. Ellis' views as covered under "Discussions". Mr. Schatzel for example did not condemn the "Cold" Process so strongly. We point these things out to indicate how controversial all opinions in connection with the industry can be.

Rome Cable Co. as a Producer of A.C.S.R.—

We were quizzed at some length in connection with the manufacture of A.C.S.R. Rome Cable is going into this phase of the business. They are perhaps forced into the A.C.S.R. and aluminum conductor business due to the shortage of copper. They questioned us on the pattern of business of 7-strand versus multi-strand cable. This question of course has no good answer, and while today multi-strand may predominate, the pattern varies with changing economy. They also questioned us on performing and types of multi-strand machines. Their questions were rather general in view of the fact that they intend to call on Massena Works in the spring to get more detailed data on the manufacture of A.C.S.R. and aluminum conductors.

Covering of A.C.O.A. Products on Toll Basis by Rome Cable Co.—

Mr. E. J. Holcomb discussed with Mr. R. A. Schatzel of Rome Cable at some length, the problems in connection with Rome's covering wire and cable for A.C.O.A. on a toll basis as a temporary expedient to get us in this field of business.

It was tentatively decided that for reel shipments of the finished covered cable, we would ship the cable to Rome on a reel large enough to hold the same length of cable after covering. Rome Cable would probably have to have an extra reel of each size used in final shipment so as to eliminate the necessity of rewinding to get it on one of our reels.

In the case of covered cable to be furnished to customers in coils, we would still want to ship the cable to Rome on reels in long lengths to facilitate covering on their C.V. machines. Rome Cable would have to take care of cutting and coiling and then wrapping for shipment. We would of [fol. 4969] course have to provide labels, shipping tags, etc.

Another possible procedure which Mr. Holcomb discussed was the shipping of a length of cable on a reel which would give a covered reel length (same reel size) plus a coil length. In any case Rome Cable would want to use the same reels which we shipped the cable to them on for the final covered cable reel shipments so as to prevent the necessity of shipping empty reels around and to reduce their problem of storing such reels.

Mr. E. J. Holcomb also discussed with Mr. Schatzel the possibility of Rome Cable Co. providing compounded neoprene stock to us. Mr. Schatzel thought that this could probably be done since they have two Banbury mixers and have some excess capacity. However, he felt that we should figure on this only as a temporary arrangement. He felt that in the long run we would want to do our own mixing, since he believed that that was the only satisfactory method if we were permanently in the business.

Observations

Manufacture of Neoprene Covered Weather Resistant Cable—

The start of this operation is in the batching room where two men weigh up the various ingredients which go into a Banbury mixerful of neoprene compound. The mix which Rome uses for weather resistant covering is made from one grade of neoprene. This mix is known as #9007 having a gravity of 1.6. The cost per pound of the materials in the mix is 20¢ or 32¢ per pound volume. This does not include some 4 to 7% operating scrap or 1% inventory shrinkage lost in handling and storage of the ingredients. The men weigh up the neoprene and other solid materials and place them in batch box #1, having a capacity of about 200 lbs. The neoprene is received from DuPont in 4-ply bags on

pallets. Each bag weighs about 50 lbs. The pure neoprene [fol. 4970] itself comes in sticks or chunks about 1" square and about 10" long and is covered with a light powder, apparently to keep it from sticking.

Batch box #2 is filled with about 200 lbs. of additional ingredients, including lamp black, clay and other reinforcers or fillers. After the two batch boxes are weighed up, an additional paper bag of perhaps 10 lbs. of zinc oxide is weighed up and placed on batch box #2. The two batch boxes are then discharged by roller conveyor to an elevator which delivers them to the charging platform of the Banbury mixer.

The Banbury mixer operator on the charging platform dumps the first box of the batch containing the neoprene and other solids, etc. into the mixer with a cylinder operated dumping device and closes the ram, which shoves the material thru the hopper into the mixer cavity. The operator then starts the mixer in accordance with the instructions on his "batch card", which for example calls for a total mixing time of 16 minutes, the first 8 minutes being required to mix batch box #1 at low mixer speed with a temperature limit of perhaps 300° F. After 8 minutes of mixing the ram is raised and the second batch box is dumped into the mixer. A large cloud of dust is evolved which is fairly effectively collected by a hood over the charging hopper.

As the powder and filler from batch box #2 are being mixed into the batch at low mixer speed a charge of perhaps 5 lbs. of Circo plasticizing oil is added from a tank alongside the operator. This is done thru a drain pipe from the tank which connects directly to the mixer cavity and the amount of oil added is measured by a scale on a sight glass on the storage tank. After mixing perhaps 3 minutes in accordance with the instructions on the "batch card" the ram is raised and the hopper is carefully swept down, at which time the 10-lb. bag of zinc oxide powder is added. The ram is then closed and the mixer is operated 2 more minutes at high speed, after which the hopper is again swept down and 2 cupsful of liquid accelerator are added from the bucket on the mixer platform. The ram is again closed and the batch continues to mix for 3 minutes at high [fol. 4971] speed, at which time the batch is dumped

from the bottom of the mixer onto the sheeting rolls. The Banbury operator need not be a skilled man if he keeps awake and performs the operations as outlined on the "batch card" and as long as he watches the temperature of the mix.

The mixer is water cooled but the flow of water to the various parts of the mixer is not controlled by the mixer operator. The operator can and must carefully watch, the temperature of the mix, the time, and the load on the mixer motor. If the mixer motor load becomes excessive or the temperature climbs above that prescribed by the mix card he knows he is in trouble and promptly dumps the batch and calls the control laboratory to see what is wrong. The chief difficulty in Banbury mixing of neoprene is caused by reaching vulcanizing temperatures wherein a portion of the mix will partially vulcanize. If this occurs your entire batch is probably ruined and must be sold for a few cents a pound as scrap, or you may elect to take a chance on it and put it thru the extruder. If you are lucky you get a good finished product. If not, you may tie up the extruder for a long period of time and turn out a large amount of scrap. The Banbury mixer we saw in use was a #9 and it was not the universal spindle driven type known as the Unidrive type. They maintained, however, that maintenance had not been excessive on this unit. The unit is cooled by recirculated cooling water which is limited to a maximum of 55° F. when the mixer is used for mixing neoprene. This requires a refrigeration system which, in their plant, had a capacity of maintaining a flow of 650 gals. per minute of 55° cooling water. Their refrigeration unit was a Lummus, 4-jet, single effect steam jet unit which cost about $40,000 in 1947. This particular refrigerator would be a much larger unit than would be required for our use in the "Hot" Process.

The handling equipment for the batch boxes between the batching room and the mixer was very elaborate; perhaps much more than we would require. The Banbury mixer room was reasonably clean considering the amount of pulverized fillers and reinforcers used in the batches.

[fol. 4972] After the batch was dumped from the Banbury mixer it fell on the 84" x about 24" sheeting rolls which are very similar to a 2-high flat sheet mill laid on its

side. The rolls are driven by square gearing without the use of pinion stands and/or spindles. The teeth on the gearing are rather deep whereby one roll can be screwed in and out to vary the thickness of the sheet without unduly affecting the tooth contact of the gears. The roll on the operator's side is slightly smaller than the back roll. This causes the neoprene batch to always cling or wrap around the front roll. There are two men on the sheeting mill who continually work the 400-lb. mass of neoprene mix which is continually cut, crossed over and worked on the front roll very much like taffy candy. The labor involved here is somewhat strenuous, and it appears to the writer that the operation could be very hazardous in that the men use their arms and shoulders to roll up large sheets of compounded neoprene which they then throw back into the bite of the rolls. A horizontal safety stop bar has been provided above the rolls which a man could hit with his shoulder, arms or head if he should get tangled up. This stop bar actuates an air valve which bleeds air from a Fanwick internal expanding clutch. This special clutch has two elements, one which dis-engages the mill drive motor and the other stops the mill half of the clutch. The entire mechanism works very rapidly and the rolls stop in approximately 30° of rotation after the safety latch is operated. With this arrangement it appears that the mill is reasonably safe. At Rome Cable they claim to have had no serious accidents.

The mixing cycle on the sheeting mill no doubt gives the mix additional work over and above that which it gets in the Banbury mixer. Mr. Ellis feels very strongly that this mixing of the sheeting mill is an important part of the preparation of the material in the "Hot" Process. The men work the batch approximately 5 minutes and we are told they have considerable skill and judgment as to just how much working should be done. After the prescribed amount of work has been done, a rotary knife, along with a [fol. 4973] stripper is swung into position on one side of the front roll. This knife cuts off a 12" wide strip, which is fed thru pinch rolls to a cooling conveyor. The operators keep rolling up and throwing the rubber into the bite of the roll above the stripper as it is delivered by the stripper to the cooling conveyor.

Before the rubber is carried up into the roof trusses by

the belt of a long cooling conveyor it goes thru a bath of cooling water and a bath of water containing latex and soap solution which prevents the compounded neoprene sheet from sticking to itself. After the strip is cooled by fans blowing fresh air over the long belt conveyor the strip is returned to a flying shear near the sheeting mill where it is cut into approximately 48" lengths and is then stacked by the second sheeting mill operator onto batch pallets which have hinged shelves each side of a center panel; each shelf accommodates 3 pieces of sheet. This keeps the bearing pressure very low and prevents the material from sticking together. At this point a sample piece of compounded sheet is taken and identified and sent to the laboratory for control purposes on the batch just mixed. In the laboratory this sample is checked for plasticity after sheeting and before curing. It is also checked for specific gravity and then a sample is cured to check curing time, curing properties, etc. After being cured the sample is then tested for elasticity, tensile strength, etc. This control laboratory either condemns or passes a given batch of compounded neoprene for further application in the continuous vulcanizing extruders.

At Rome Cable they attempt to use the batches of compounded neoprene sheet within 30 days after they are prepared in the Banbury mixers and sheeting mill. When utilized for covering weather resistant cable, compounded neoprene sheet is withdrawn from stock and placed on a warming mill in batches of about 200 lbs. At the warming mill, a small amount of plasticizer is added as the material is worked. At Rome they use two men on each warming mill. The warming mill, for all we can see, is a duplicate of the sheeting mill except that it is probably not as. [fol. 4974] wide a mill. Both mills have water cooled rolls which are driven thru square gearing.

After the raw neoprene batch is worked on the warming mill and is warmed up by horsepower input in the form of work, it is removed from the left hand edge of the roll by a rotary knife and slitter, which feeds a 3" wide strip of warm compounded neoprene stock to a coiling device wherein the strip of stock weighing about 20 lbs. is coiled on a flat steel spool with one flange called a "hat". These "hats" of prepared and warmed strip are delivered to the extruders.

At Rome Cable the extruders were located in a pit or cellar. The pit at the extruder proper was open while the pit over the capstan and curing tube was floored over to convert this portion of the pit into a cellar. The "hats" of rubber were lowered into the pit by a small hydraulic elevator in an insulated box which tended to maintain the heat in the strip which was developed at the warming mill. At the extruder head the operator loaded each "hat" onto a payoff and fed the warm strip into the hopper of the extruder. "Hats" which cooled off too much according to the operator's judgment were returned to the warming mill for re-work. The feed was controlled by spiked pinch rolls driven by a ratchet mechanism from the motor driving the extruder screw. The wire being covered was payed off from a reel on a let-off at main floor level ahead of the extruder. At the edge of the extruder pit the wire was snubbed around a capstan and was held against the capstan by a pair of V-belts running on three sheaves which maintained pressure on the wire against the capstan, preventing it from slipping. The capstan shaft drives a worm gear speed increaser, the high speed shaft of which carries a brake drum. Wrapped around this brake drum was a brake band of leather which was weighted by a small weight of approximately 2 lbs. This speed increaser and small braking action provided for smooth constant back tension required in extruding. The back tension by this method is independent of the diameter of the reel from which the wire is payed off.

[fol. 4975] As the wire left the back tension capstan it went over a sheave and into the pit where it first passed thru a 2-plane roll straightener and then entered the extruder thru the back of the head. The wire was threaded thru the head of the extruder and thru the tip around which fits the die. This head applies the covering on the wire. After the covered wire leaves the extruder head it enters the curing tube. The curing tube has a telescoping section at the extruder head which can be retracted by a rack, pinion and reduction gear driven by a small motor thru a fluid coupling. The curing tube has a steam tight slip joint at this point and seals against the die head. Steam at 250 lbs. pressure is introduced to the inner curing tube thru a 3-way valve; position 1 applying steam to the curing tube, position 2 shutting off steam and exhausting tube to

atmosphere thru vent pipe thru roof of building. The curing tube itself is about 150 ft. long, the internal tube being 4" I.D. for the first 20 ft. Beyond that point the tube drops to about 3" I.D. The curing tube proper is jacketed with a larger tube about 6" I.D. which is maintained at 250-lb. steam pressure at all times and is insulated. At the exit end of the curing tube there is a rubber seal. This seal can be removed and replaced by shifting the cooling tube toward the capstan. The cooling tube is about 20 ft. long and is supplied with cooling water. It is sealed at the exit end and water pressure in the neighborhood of 200 lbs. is maintained in the cooling tube. This water pressure is secured thru the use of centrifugal pumps, using mill supply for suction. As the covered wire leaves the cooling tube it goes thru a spark stand and then to the capstan. At the capstan several wraps are taken and the wire, if large size, is then spooled on take-ups mounted on the floor in the cellar. In this set-up they have two large take-ups set up in tandem and both driven from the same motor by means of chains and clutches. If small size wires are being handled, the wire is returned to the front end of the machine where it is taken up on dual reel take-ups next to the pay-[fol. 4976] offs. In the case of large wires it is not practical to lead the wire clear back to the starting end of the machine as the tension required would be excessive and the wire would be subject to vibration and whipping when going thru the curing tube. Rome has dual payoffs for each extruder and with the dual take-ups they are able to operate their extruders continuously except for shutdowns for change of size, change of seals, week-ends, etc. The following points in connection with extruding neoprene covering on weather resistant wire and cable were made by Rome Cable Co.—

1. In general, stranded wire which is to be covered should be made up of small size individual wires. This gives better concentricity of cover, prevents ridging action which would occur using larger size wires and eliminates voids which might not be filled with covering, this being objectionable on insulated cable, particularly on lines where high voltage and ionization is involved. In the case of

weather resistant cable these ridges are objectionable from an appearance standpoint.

2. Sizes larger than 1/0 or 2/0—7-strand cable are not suitable for extruded covering. They should be made up of more than 7 strand for satisfactory covering.
3. A 4½" continuous vulcanizing machine is suitable for sizes up to about 500,000 C.M.
4. It should be remembered that the scrap loss running a continuous vulcanizing machine is a minimum of 400 ft. per change of size plus 400 ft. every time a curing tube seal is replaced, which is on the average of every 12 hours. Therefore, it is absolutely essential to operate a C.V. machine continuously as long as possible.
5. Rome Cable saw no advantage of a stainless steel tube for the first 20 ft. of the curing tube. They point out good operation would require tension which would keep cable from touching tube in this region.
6. Whether or not the curing tube slopes down or is level is somewhat controversial. Rome used a 4" I.D. tube for the first 20 ft. and a 3" tube and offset reducer keeping the bottoms of the tubes aligned for the remainder of the curing tube.
7. Steam required per C.V. machine is approximately 200 to 250 lbs. per hour at 250-lb. gauge.

[fol. 4977] 8. 4½" machines are satisfactory for the range of sizes we intend to produce in weather resistant as well as Triplex cable. However, different lead screws would be required for the large and small range of size.

9. Weather resistant wire should be run in longest length available to reduce stringing up difficulties.
10. Weather resistant wire must be respooled and repaired if there are more than 3 spark breakdowns per 1,000 ft. or if there are any spark breakdowns of long duration indicating a bare section of wire.
11. If weather resistant wire and cable is to be sold in coils or short lengths, the coils should be made up as a separate operation, not on a C.V. machine.

To operate a C.V. machine, one operator is required, who must stay at the head of the machine at all times. There must be another man at the take-up end of the machine when running large sizes. If you have a bank of machines running large and small sizes the number of men at the take-up end perhaps can be reduced.

The respooling and repair set-up for cable should be near the C.V. machines and there must be the utmost co-operation between these groups as all the repair and re-spooler men, as well as truck drivers, must pitch in to make a continuous switch of a big cable. We observed a large cable of about 375,000 C.M. being covered on a C.V. machine. This operation requires 2 men to unspool the almost empty reel of bare cable to gain enough slack to make a weld or an attachment of whatever type is required. These same two men saw off ends of cable square and make and file weld while a third man on a platform truck with a horizontal sheave on the platform runs up the aisle of the mill with a loop and enough slack to allow time to make the weld to the new reel. At this weld enters the head of the C.V. machine the operator strikes the bare cable about 3 sharp blows in rapid succession and this causes blobs of excess material to form in the covering which the take-up helpers follow down to the reel and then make a switch to a new empty reel on the fly. We did not see this operation but feel sure that 2 or 3 men would be required to make the switch from one take-up to the other. [fol. 4978] The operator at the extruder head end of the machine controls the relative speed of the screw with respect to the capstan which pulls the wire or cable thru the machine. The motor on the screw and capstan are controlled by V.S. drive unit, the details of which were discussed with Rome Cable Co.'s electrical engineer by our Mr. Plummer. The take-ups of the C.V. machines are driven from the capstan shafts by a chain drive and a type 1000 DoAll 9-speed change gear box with friction clutch to compensate for many sizes of take-up reels.

At Rome Cable a special vulcanizing press is provided for making seals for the vulcanizing and water tubes of the C.V. machines. We did not see this operation.

After the reels of covered wire or cable are removed from the take-up the weather resistant wire is coiled in measured

length, at which time repairs are made by use of neoprene tape and a small electrically heated vulcanizing press.

If the wire is to be shipped on reels and if not more than 3 spark breakdowns per 1,000 ft. and none of these of enough duration to indicate a bare uncovered wire are recorded at the C.V. machine, respooling is not required and the wire can be shipped on the same reel.

Manufacture of Neoprene Covered Triplex Service Wire—

Triplex service drop cable is a 3-conductor cable used by the Utilities to connect from the power line at the pole to a residence. There are generally two 7-strand neoprene covered aluminum conductors, each of which carries 220 A.C. current. These two covered conductors are loosely stranded around one aluminum core wire which is the neutral or ground wire. This neutral or ground wire is bare. The potential between the neutral and covered wires is 110-volt A.C.

The operation of the C.V. machines and the preparation of the mix for making Triplex is essentially the same as for neoprene covered weather resistant cable just described. The mix used normally at Rome Cable is their #9001 having a gravity of 1.97. The cost per pound of the materials in this mix is 21¢ or 41¢ per pound volume. This [fol. 4979] does not include 4 to 7% operating scrap or 1% inventory shrinkage. The material is mixed in the Banbury, sheeted, stored, warmed and fed to the C.V. machine in exactly the same manner as for making neoprene covered weather resistant cable. The only difference is that the number of allowable insulation breakdowns indicated at the C.V. machine is limited to zero due to the fact that Triplex is an insulated cable. The individual covered conductors are taken up at the C.V. machine on large reels, are then respooled on about 30" reels, at which time the cable is repaired if any insulation breakdowns occur at the spark stand.

Two of these 30" reels are then delivered to a homemade stranding machine wherein the two reels are rotated about the third bare neutral strand of aluminum cable. The axis of the spool is parallel to the longitudinal center line of the strander head. The head is basically a rigid frame

machine except that the spool spindles are not cantilevered but are supported by arms on each side of the spool. The machine head was designed for 100 R.P.M. but was running only 75 R.P.M. and showed a lot of heavy vibration from unbalance of the two spools. The machine looked very crude and unsafe to us. In view of the fact that individual strands of covered wire are generally multi-strand rather than solid conductors we are of the opinion that this Triplex cable would look much better if it were stranded on a planetary machine wherein the individual strands were not twisted or untwisted as the Triplex was stranded.

The capstan, take-up and other parts of this machine were conventional. Apparently all the Triplex made at Rome was sold on reels as we did not see any respooling operation.

After the reels are taken off the stranding machine they must be subjected to a 2,000-volt insulation breakdown test while the whole reel is submerged in water. This set-up involves a basket or rack which takes several reels of cable which can be lowered by chain falls into a water tank. The ends of each piece of Triplex on the reel extend above the water and are clamped to a high voltage bus for the test. [fol. 4980] The entire area above the tank where these connections are made is screened in by expanded metal panels as a safety measure. If the Triplex cable passes this test without insulation breakdown, the reel can be shipped. If not, the cable must be returned to the repair center for repairs and then must be tested again before shipment.

Rome Cable normally uses their #9001 neoprene mix, which incidentally requires two grades of neoprene, for Triplex wire. However, some Utilities specify a combination extruded cover using some neoprene and some natural rubber. This varying specification on Triplex cover might cause us much difficulty when we are in the Triplex business.

Manufacture of Thermo-Plastic Covered Wire and Cable—

The Rome Cable Co. does a considerable amount of extruding of thermo-plastic covers on wire and cable. They use polyethylene, polyvinle chloride, etc. for this. However, the amount of polyethylene they are extruding on

wire and cable for a weather resistant covering has been limited because of the unavailability of polyethylene for this use. They took us thru their new 2-story mill building in which they make a product known as "Spiral 4", which is described briefly in another part of this memorandum. In this building they had all new machines, including a number of new Davis Standard Machinery Co. thermo-plastic extruders. These extruders appeared to be well designed and well built machines and were complete with double payoffs, accumulators at both the payoff and take-up ends, double V-groove capstan, and double take-up, all furnished by Davis Standard. The double payoffs and take-ups with the accumulators permitted continuous operation which is undoubtedly the most efficient manner of operating these machines, although it is not as essential as with neoprene C.V. machines.

The Davis Standard thermo-plastic extruder was equipped with a large hopper with conical bottom and this hopper was filled by means of small chain type conveyor [fol. 4981] from a hopper on the floor into which the polyethylene pellets were dumped by hand. The operator controlled the pellet conveyor by a push button and would shut it off when he could see from the floor that the upper hopper over the extruder was full. The extruder cylinder was equipped with three heating zones. The temperature of these zones were individually and automatically controlled by a Wheelco temperature control panel. Each of the three zones of the extruder had a cast aluminum jacket in which water cooling tubes and Calrod heating units had been cast in. Water flow thru each jacket was manually controlled by valves so that enough cooling was provided so that the automatic temperature control could maintain a given temperature by always adding some heat by means of the Calrod units. The extruding head appeared to be of very good design and was hinged to the extruder cylinder and could be opened or closed by use of a single unit. The head was carefully machined and appeared to be easy to clean. The head was electrically heated.

The covered conductor entered a water cooling trough right after leaving the extruder. There was a gap of about 1 ft. from the extruder head to the cooling trough. The cooling trough was approximately 30 ft. long and the wire im-

mediately went onto a double groove capstan from the cooling trough. The wire was then threaded around a combination accumulator and dancer roll arrangement which was a horizontal unit mounted over the cooling trough. The combination accumulator, dancer roll unit controlled a rheostat which controlled the speed of the double take-up unit.

The double take-up unit was set up in tandem with the extruder, cooling trough and capstan. The wire went directly from the combination accumulator, dancer roll unit to the dual take-up in which the two reel spindles were mounted in tandem. Each reel was driven by an individual electric motor and when one reel was filled the operator would stop that reel and cut the wire and attach it to the drum of the second reel and then start the second reel motor. In the meantime the cable put out by the extruder [fol. 4982] would be taken up on the accumulator and once the second reel was started the dancer roll part of the accumulator functioned to speed up the take-up and bring the accumulator back to its normal position.

At the payoff end the accumulator was a vertical unit and served to allow the extruder to continue to operate by serving wire to the extruder and maintaining back tension in the wire while shifting from one payoff to the other. The two payoffs were side by side and when the tail end of the wire came off from one reel one man merely grabbed the end and stopped it while another man hooked the end to the beginning end of the wire on the other reel. They had some special hooks to facilitate this which had previously been attached to the ends by crimping them on. After the two ends had been hooked together the men released the wire and the accumulator moved back to its original position of fully extended. The reason that this accumulator moved to its fully extended position for normal running was because the counterweight which produced back tension in the wire produced a slightly higher tension than that provided by the brake on the payoff. The payoffs were equipped with brakes actuated by a dancer roll to maintain uniform tension.

Altogether, it was evident that the operating of a thermoplastic extruder was considerably simpler and more flexible than the operation of a neoprene C.V. extruder. A thermo-

plastic extruder could be operated on a one shift basis according to the Rome Cable men. They stated that you could stop a thermo-plastic machine and leave the polyethylene in the extruder with low heat applied for a couple of days without and serious trouble. They also stated that it was about a 2-hour job to clean out an extruder.

The Rome Cable people recommended a 4½" dia. cylinder as the correct size extruder for the range of wire and cable sizes which we are planning to cover. They thought this was the correct size extruder for us for both polyethylene and neoprene. One point to remember is that the [fol. 4983] speed of extrusion for neoprene compounds depends mostly on the length of the curing tube and the thickness of the covering, whereas with polyethylene the capacity of the extruder is the influencing factor. In general this would mean higher extrusion speeds for polyethylene for a given size of extruder. The Rome people seemed to feel that in operation of an extruder you should stay below 85 to 90% of the extruder capacity.

Some other points brought out in our observations and discussions in connection with thermo-plastic coverings at Rome Cable Co. were as follows—

1. They would recommend the use of double grooved type capstans for polyethylene extruders as well as for neoprene C.V. machines.
2. Price of natural polyethylene —52¢ per lb. Price of precompounded black polyethylene—55¢ per lb.
   The above are quantity prices. By purchasing precompounded black polyethylene you can eliminate the need of purchasing an integrating sphere photometer for laboratory testing of carbon black dispersion called for by A.S.T.M. specifications.
3. Amount of cooling water on polythylene extruders small, probably a total of only 2 gals. per minute for cylinder and screw cooling. They did not estimate the water for the cooling trough but it was noted that a 1" O.D. copper tube supplied all the water for cooling trough, cylinder and screw cooling.
4. They thought that we could use the same screw for all of our polyethylene extrusion work. Using a

4½" machine, a shallower screw might be necessary on the very smallest wires.

5. They pointed out that the size of wires in the outside layer of a cable to be covered by either polyethylene or neoprene must be limited or you might run into trouble in getting a round uniform cover.

6. When they were extruding a polyethylene cover on a single wire (not a jacket) they used a spark testing unit ahead of the capstan the same as on a neoprene extruder. This spark tester recorded on a counter the number of faults in a length of wire and cable. Any length of wire which had too many faults in the cover would be sent to a repair area the same as with a neoprene cover. When faults were found with the spark tester on this rewind-repair set-up, the damage can be repaired with a Minnesota Mining & Mfg. Co. tape #300. A Muff vulcanizing press is used for this and heat is applied in the dies of the press to melt the patching tape and form it.

[fol. 4984] 7. Rome Cable Co. in some of their operations extrude polyethylene covers on two wires at the same time in one extruder. This is done only with very small wires and they stated that on the size of wires which we are contemplating to cover, it would not be feasible to cover more than one at a time.

When they did this double extruding of wires on one extruder, they doubled up on practically everything else, that is, 4 payoffs, 2 accumulators on payoff end, 2 combination accumulator and dancer roll units, and 4 take-ups. The capstan unit served for both wires but had separate grooves in the capstan bull wheels for each wire.

8. The operator on a polyethylene extruder checks the O.D. of the covering of the cable he is producing with ordinary micrometers. Regulation of the speed of the screw or the speed of the cable controls the vernier adjustment of the O.D. of the finished covering. The operator on the extruder carries micrometers and checks the O.D. of his finished cable coming off at frequent intervals. This is also true in the case of the operator on a neoprene extruder.

Manufacture of Cotton Impregnated Type of Weather Resistant Cable—

The Rome Cable Co. people advised us that cotton impregnated type of coverings for weather resistant covered cables still consituted approximately 80% of the total volume for the industry as a whole. They also stated that with the Rome Cable Co. the percentage even ran a little higher.

In our trip thru the Rome Cable Co.'s mill, we saw them putting on cotton type coverings using both braiding machines and knitting machines. Their braiding equipment consisted of both maypole type braiders and Wardwell type braiders. They had a very large number of braiders. For operating efficiency they had braiders arranged in two parallel lines, face to face, perhaps 10 to 12 or more per line, with an operating platform (3 ft. high) between the lines. Some of their maypole type braiders were apparently quite old machines and very slow. The operations of their braiders appeared to be the same as what we do or have done at Massena. The put on both double and triple braid coverings.

[fol. 4985] The knitting machines which we saw at Rome were the "Sinfra" type machines manufactured by the Fidelity Machine Co. These machines cover at speeds about 2 to 3 times as fast as a braider. The cover is knitted on by a group of special needles which are actuated by a cam. Their machines were all arranged with three heads for triple coverings, and they advised that with knitted covers they always put on a triple layer cover to insure satisfactory covering.

These "Sinfra" knitting machines are a much simpler machine than a braiding machine. About the only moving parts are the needles and operating cams and these parts require the major part of the maintenance on these machines. The needles have to be replaced at frequent intervals but even so the maintenance on these machines is less than on a braider. There is a good deal of fuzz, from the cotton threads, covering these machines and the area and this of course constitutes a fire hazard, but we have this same condition to a certain extent on our braiding machines. The yarn supply is on large cops or cones placed on support

spindles on the back side of the machines. The individual yarns are fed from their respective cops up thru an automatic tensioning and stop motion device on an overhead rack and then down to the knitting heads. If a yarn breaks, the stop motion device shuts down the machine.

The "Sinfra" machines are equipped with a small straightening head at the entry end for straightening the wire as it enters the machine. However, Rome Cable did not appear to be using this device on any of their machines. They did pass the wire or cable thru the straightener, but the rolls in the straightener were not adjusted to do any straightening. These machines were equipped with a 36" single flat capstan and about a 40" reel take-up unit driven from the main machine. These "Sinfra" machines were equipped with individual saturating tanks for impregnating the knitted cover so the impregnating could be done at the same time that the covering was knitted on and this saved an additional operation. The "Sinfra" type knitting machine lends itself to this additional operation since they are a horizontal type of machine instead of vertical like a braider. [fol. 4986] Since the speed of cable even from a knitting machine is relatively slow (about 25 ft./min.), few wraps around the drum in the saturating tank are required.

The Rome Cable people pointed out that they did not always use the individual saturating tanks on these machines since it was sometimes more economical for them to impregnate in their large impregnating set-up when they were operating these large units and had the capacity available there. All the braided covers were impregnated in the large separate saturating tanks.

The saturating tanks for putting on the asphaltic impregnating compounds as a separate operation appeared to be conventional. At one location which they showed us, they had 2 saturating tanks, side by side, in an old wood truss building and in this set-up they had their payoffs and saturating tanks in this old wood truss building and then the wire or cable was passed thru doorways in a brick wall onto the take-ups in the adjoining building. The saturating tanks were open with an exhaust hood over them. The saturating tanks had a large driven drum nearly submerged in the asphalt compound and they were taking many wraps around this drum to secure maximum saturation. The cable was

taken up on metal reels, about 36" dia., on the take-up units.

The next operation was the wax covering of this impregnated cable. The metal reels were set up in a payoff frame and the cable was first passed thru a wax covering unit. This unit consisted of a tank heated by steam in which the wax material was melted. They were using a Styrene pitch material loaded with filler (such as slate dust) and they obtained this material all compounded from sources such as Trotter, Solar, and H. H. Robertson. They pointed out that since this cable was sold on a weight basis, it was desirable to use a maximum amount of wax filler as allowed by A.S.A. specifications. This wax tank had a conical bottom and was fitted with a tee head at the bottom thru which the covered wire or cable passed. This tee head was [fol. 4987] fitted with entry and exit guide bushings or dies to prevent leakage of the wax compound, and to provide a uniform coating. A small Bunsen gas burner was used at the bottom of this tee head apparently to keep the head warm enough to prevent any setting up of the wax compound within the head. Without cooling the wax covering, the cable was then passed thru a heated mica dusting unit. This mica dusting unit was equipped with a blower which stirred up the mica dust to give the cable a good uniform coating as it passed thru the chamber of the unit. We believe that the air was heated and a cyclone separator was employed to separate the mica dust from the exhaust air leaving the chamber. It is probable that this mica duster was a purchased unit. There appeared to be much less waste of the mica powders compared to our method of application. The wire or cable was then passed thru a water cooling tank over a capstan and onto a reel.

Rome Cable advised us that this product was sold both on reels and in coils. The coils were approximately 19" I.D.

General Observations

During our inspection trip, in addition to the manufacture of weather resistant and Triplex wire and cable, we observed other operations as follows—

Copper Rod Mill—

This mill was rolling 5/16" copper rods from about 4" x 4" x 60" copper wire bar. They utilize 2 pusher type oil fired preheat furnaces which discharged onto a driven table which fed a 3-high breakdown stand individually driven, where the bar received 2 passes—there were two more 2-high breakdown stands where the bar received 2 additional passes. Then on Belgian train mills the bar received an additional 11 passes, or a total of 15. After pass 4 the rod was repeated and caught by hand alternately. The looping table and runout table sloped rather steeply and not many roller guides were used. There were 4 coilers on the mill and it was delivering rod at about 1400 F.P.M. [fol. 4988] (my guess—JCG). There were 2 strands in the mill after about pass 8. There were about 9 men on the mill. The mill was old and very compact. They changed rolls by monorail. There was no crane in the building. The mill was a single purpose rod mill with many toggled up labor saving devices to make it a semi-automatic mill. They had 2 men tying coils when they were in a horizontal position after being kicked out of the coilers. This looked dangerous, if they had a coiler cobble the men would have to jump. However, the coiler speed was only about 1400 F.P.M. After being loosely tied, the coils were automatically up-ended and hung on hooks of an overhead continuous hook conveyor. This conveyor took the coils thru a sulphuric acid dip which removed scale and produced a bright coil. The dip produced copper sulphate which in a recovery process was reduced to electrolytic copper. This same recovery unit was used to copper plate all the steel spools used in the wire drawing processes. After the coils came from the pickling tank they were inspected. Ends were cut off and a third tie was applied. Then, all 3 ties on each coil were snugged up with a speed wrench with a hook on the end. Such a device might have an application at Massena. Coils were stocked or stacked and delivered to

the continuous rod drawing machines, similar to our Vaughn and Waterbury machines in Bldg. 1 except that they were probably 15" capstan machines. They were Vaughn and Syncro machines.

They were effectively using the overhead type payoffs which we have tried out here and which we understand Vancouver is using. They had one difference—the flat conveyor to deliver coils from the pinload in a horizontal position was a driven slat conveyor and was operated by the welder. A man still seemed to stay right at the payoff to prevent trouble. See page 8 of Rome Cable Co. publication "Bare and Weatherproof Wire and Cable."

Labor Situation—

Rome Cable Co. has no Union in their plant. Labor relations seemed to be excellent and there seemed to be a lot of flexibility in the types of work expected from each man. [fol. 4989] There seemed to be a good spirit of cooperation between employees. The company, as pointed out by Mr. Ellis, spends a lot of time, money and effort keeping such relations. They have many social services such as complete annual medical examinations, etc. for every employee. Rome Cable Co. has no trouble getting the better class of labor as the men are always ready to leave General Cable and Revere to work for Rome Cable—this was Mr. Ellis' opinion.

Laboratories—

The Rome Cable Co. has quite extensive laboratories for the control and testing of the various products which they make.

On a brief trip through their laboratories we saw oxygen bomb aging equipment, accelerated ozone aging set-up, various high voltage insulation testing set-ups including immersion tests, etc. In another part of their laboratory they made tensile tests, plasticity tests, and performed experimental work in developing coverings. They had a small extruder, a small Banbury mixer, small working rolls, etc. which could be used as a pilot plant set-up or in developing new compounds.

In their laboratory they also had set up a striping ma-

chine where they were putting a special stripe on plastic covered wire with a special dye or ink. After passing through the marking pen the stripe was carried up vertically in a circular stairway first past heat lamps and then up and over a sheave on the second floor landing and returned back down to complete the drying before spooling. The speed in feet per minute appeared to be fairly high, maybe 1000 ft. per minute. They stated that it was an experimental project as yet but they were actually operating on somewhat of a production basis.

Although much of the equipment in their laboratory at Rome Cable is required because of their insulating business, it appears that the following items would be needed in the weather resistant coverings—

[fol. 4990] 1. Tensile testing—they use a Scott testing machine which has a testing speed up to 20" per minute and which is much faster than anything we have in our laboratory at Massena. Their Scott tester had special jaws. We would need a similar machine for this since the speed of our present machines make them impractical.

2. Oxygen pressure aging test equipment. This is necessary to check specifications on neoprene cover. Rome recommended this equipment in place of air pressure aging which requires a longer time interval test.

3. Plastometer test—Rome Cable was using a plastometer test unit made by Firestone for a rapid qualitative test for control of the mix. In the laboratory Rome Cable also used a Scott tester for plasticity test. This is a quantitative type of test used as final tests to check specification requirements of finished product.

4. Size checks (O.D. of covering) are made by inspectors in mill using micrometers. However, the use of micrometers for this check of specifications requires considerable technique to obtain consistent and reliable readings. This check is required on both neoprene and polyethylene.

"Spiral 4" Signal Corps Wire—

Rome Cable Co. has a contract with the U.S. Government to manufacture the product known as "Spiral 4". This is a special telephone or communications cable which can be laid from a plane and can be laid over land or water. This "Spiral 4" consists of 4 polyethylene covered wires around a polyethylene core and enclosed in a polyethylene (black) jacket.

Rome Cable Co. built a new modern 2-story mill building for the manufacture of this "Spiral 4". They are allowed a 5-year write-off of this building and all the machines in the building are Government owned.

The manufacture of this "Spiral 4" requires the drawing of fine copper wire which is stranded into a small 6/1 cable. They have a large number of small (16" tube) high speed tubular stranders manufactured by Syncro Machine Co. on which they do this stranding. These small cables then have a polyethylene cover extruded on and one Davis Standard extruder does this to 2 of these cables at the same time. The have several machines doing this.

[fol. 4991] Other operations in this mill include the extruding of a polyethylene core and then the stranding of 4 of the polyethylene covered cables about this polyethylene core. The next step in the manufacture of this spiral cable is the extruding of a polyethylene jacket around the stranded cable. They have 4 Davis Standard extruders for this purpose. The final step in the production of this cable is the installation of special terminals or connectors to each end of each length of cable. These connectors have to be water tight and there are several steps in the installation of these connectors.

They have an elaborate set-up of test equipment and each length of cable produced must be tested thoroughly. Many different types of tests are made.

This "Spiral 4" product is finally made ready for delivery on special metal reels with special heads for the connectors.

Pan Vulcanizing and Lead Sheathing—

The Rome Cable Co. was also doing a large amount of pan curing of their insulating rubber covers. In this pan

method of curing the cover, as the cable left the extruder where the compound was put on, it was coiled onto a large pan (about 15 ft. dia.) in a soapstone powder to prevent the coils from sticking together. The pan was later moved to another location where it was covered with a large hood or oven and steam applied to cure the compound under pressure for a prescribed time cycle.

On the very large cable, they extrude a lead sheath on the cable over the insulating compound and then the cable is coiled onto a pan in a soapstone powder for "pan vulanizing" of the compound. In some cases, they reeled the lead sheathed cable up on large metal reels (very wide traverse) which were placed in a special steam oven for curing. After curing in the pan vulcanizing oven, or on reels in the steam oven, the cable is payed off thru a machine for [fol. 4992] removing the lead sheath and wound up on a reel. This unit, which removes the lead sheath, has two rotary slitting knives which cut the lead sheath on opposite sides of the cable and then the lead is pulled off by rolls with serrations on top and bottom of the cable. These serrated rolls are driven and above the top and below the bottom roll is an idler roll with ridges on its face which cuts the lead off or nearly off so that is breaks apart and falls into a container in short pieces. It is probable that this lead stripping machine was a purchased item and not Rome Cable Co.'s own design.

Conclusions

After collecting our thoughts and data secured at Rome Cable Co. we, at Massena, find we must change our thinking somewhat in connection with the manufacture of weather resistant and Triplex wire and cable. We believe this change in thinking agrees generally with Mr. Knouse's and Mr. Plummer's views. Our conclusions as of now are as follows—

1. The manufacture of these products is actually much more complicated than we had anticipated.
2. More technical control is required than we thought. One good rubber chemist will be required full time.
3. More elaborate laboratory and control equipment will be required than was originally planned.

4. We should not commit ourselves to the "Hot" or "Cold" neoprene process until we know much more about the "Cold" Process.
5. We should definitely buy a Banbury mixer and be prepared to mix our own compounds. Mr. Schatzel did indicate that we could probably call on them as a temporary supplier of sheeted compound if necessary in getting into production.
6. Decisions on extruders versus sheeting and warming mills must be held up pending further study of "Cold" Process.

[fol. 4993] 7. We should make a strong effort in our advertising and sales program to keep our covered wire products limited to the simple ones; viz., weather resistant and Triplex for the initial period at least.

8. We should be considering the purchase and operation of "Sinfra" knitters for making cotton covered weather resistant cable if we are to believe that 80% of the business is in cotton covered wire and cable and will remain so. Kindly refer to Rome Cable Co. bulletin (attached to Mr. M. E. Noyes copy) which devotes many pages to weatherproof wire and cable, giving a good deal of specifications for cotton covering, but devotes only one small paragraph on page 25 to extruded coverings.
9. We should study revisions to our process of making braided weather resistant cable toward incorporating certain practices employed at Rome Cable such as the use of loaded wax and heated mica dust application.
10. From our observations at Rome we lean toward Davis Manufacturing Co. as being the more progressive manufacturer of C.V. and polyethylene extruders. However, this opinion is subject to change as we saw no modern Royle machines at Rome.
11. We should inquire more specifically into priorities required to get this type of equipment. Mr. Ellis, in contrast to information from suppliers, feels that N.P.A. will be reluctant to authorize expan-

sion in this field as the copper industry still has surplus capacity.

12. An extensive cable repair and respooling center must be provided as perhaps 90% of our finished production will have to funnel thru this center.
13. The C.V. covering department must operate on a 3-shift basis and will require considerable backlogs of cable and raw material as well as warehousing of finished products and careful planning so as to secure long uninterrupted runs.
14. Of all phases of the business the neoprene covering is by far the most difficult to pursue and if in any possible way we could limit our products to polyethylenes we would be in a much more favorable position. (We doubt that such a limitation is even a remote possibility at this time).
15. With additional facilities required such as refrigeration equipment, respooling, insulation repair, water submergence test for Triplex, process control laboratory, etc., which were not originally contemplated, we feel present estimates of the cost of the project are too low and that the area available in Bldg. 56 will be much more congested than original floor plan studies indicate.

[fol. 4994] 16. A definite problem of removing and salvaging aluminum wire from neoprene covered scrap exists. We are doing some experimental work on this problem now and hope that we may be able to remove neoprene economically by charring and then tumbling the scrap.

17. Operating personnel other than technical control people, in our opinion, do not have to be highly skilled. We believe we would have little trouble filling the hourly rated jobs in such a department.
18. In the organization and supervision of an operation of this type it is essential that there be a very fluid crew of labor on material handling operations and respooling and cable repair work who can rapidly drop their assigned work and pitch in to help make rather complicated flying changes from reel to reel at the C.V. machines.
19. From information secured at Rome Cable Co. ap-

parently physical properties of aluminum wire and cable will not suffer as much from tension and temperature in the neoprene vulcanizing process as we had originally expected.

Properties of A.W.G. #4 solid aluminum neoprene covered as tested at Rome are—

	P.S.I. Tensile	*Elongation—%*
Minimum	22,075	1.25
Maximum	23,050	2.18
Average	22,650	1.77

and for A.W.G. #4—7 strand .07772" neoprene covered—

Minimum	24,850	1.8
Maximum	27,800	1.9
Average	26,188	1.85

We do not definitely know, but we think that the aluminum before covering was EC-H19. This data from Rome is very incomplete and does not indicate whether the covering operation has any effect on the size of the wire being covered or not. When we are giving Rome Cable some toll covering work we will then be in a position to completely check properties and diameters before and after covering and vulcanizing.

20. In general, multi-strand conductors which are to be covered by extrusion should be made with a larger number of conductors than is our practice with A.C.S.R. This is desirable to insure a concentric covering without spiral ridging and voids, which detract from the appearance of the finished cable. Sizes larger than 1/0 or 2/0 should be made of more than 7 strands to insure satisfactory covering.

[fol. 4995] 21. We feel that Massena Works should subscribe to certain technical publications devoted to the rubber industry and also to the complete series of A.S.T.M. specifications. We are taking steps to do this.

22. We got the impression that the insulated wire business is a highly competitive one and practically all the insulated wire manufacturers already offer weather resistant covered wire and cable.

23. The mixing, extruding and handling of neoprene is very critical. The raw mixes are very heat sensitive and if any portion of the mix reaches the curing temperture prior to its entering the C.V. machine curing tube it is scrap and cannot be reclaimed.
24. The original manpower estimates upon which Mr. Kerry based his production costs should be reviewed. Additional men are required for technical control, respooling and cable repair, warming mill operations (if we should go to the "Hot" Process), testing crew for submergence test of Triplex, etc. We also may need 2 or 3 maintenance men per shift to keep such a department operating on a 15,000,000-lb per year basis.

Our final conclusions are that even though the profit in this phase of the insulated wire business looks promising, we should not be too optimistic; there are many unknowns, pitfalls and techniques and problems not yet apparent.

Mr. Kerry's estimates of Feb. 8 and Feb. 19, 1952 of profit on such an operation we now feel should be reviewed in the light of additional technical control and manufacturing facilities required, possible scrap losses and changes in manpower—Items 2, 3, 12, 15, 23 and 24 above.

We believe that with an installation of proper equipment at Massena Works we can operate a profit making unit. However, we do not wish to leave the impression with Top Management that we can show a profit the first few months of operation, as there is much to lean thru experience.

J. C. Glascock, W. W. Wheater

JCG, WWW, EM—

Cc to: Messrs. J. P. Haight, D. R. Knouse, E. J. Holcomb, M. E. Noyes (2) T. H. Kerry, J. H. DeKlyn & A. J. Stewart.

[fol. 4996] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 72

Mr. H. T. Dyett,
Hobe Sound, Florida

16 February 1952

Dear Bert;

It was nice to talk with you on the phone from New York. I have just finished dictating this report and probably may not review it before it reaches you. If so, please overlook any inaccuracies that may have perchance crept in. This may be more detailed than you would prefer to have it but it was such an important conference, or at least so I appraised it, that I thought a convenient record for Ross might be of help, even though much of the matter contained in it leads to the same conclusion.

We will drop you and Edith a card from Jamaica and have only just learned over the phone from someone who has returned this week that where we are going is a particularly lovely spot. We will be with our old friends from Bermuda and it should be a quiet, pleasant time.

It appears that the Properzi equipment will be installed at Davenport in time for an inspection shortly after I return. This news was received by Charlie Ellis this week. All the information that comes to hand leads to the inescapable conclusion that whereas copper producers are perhaps alarmed at the unfavorable publicity directed toward lack of copper and therefore will take every step to increase supply, nevertheless the aluminum situation will continue to improve much more rapidly and that it is only a question of reasonable time before there will be ample aluminum from the three billion pound capacity program.

This has been accelerated by the severe cutback to the aviation program, therefore releasing capacity in the next few months to other needs. It seems generally agreed that the aircraft companies have piled up their inventories with the help of Wright Field and perhaps are also guilty of over-ticketing in order to protect themselves. If so, with a cutback this should be shaken out and should be apparent, unless some new factors enter into the situation not now foreseen. As Ross may tell you, the Steel Corporation in-

dicated at the Kroger dinner this week that steel may be in over-supply during 1952, stating that "these were straws in the wind but that they were substantial straws."

With best regards, J. Carlton Ward, Jr.

jcw:mnk
enc.

[fol. 4997] J. Carlton Ward, Jr.
Farmington, Conn.

16 February 1952.

Memorandum regarding visit of Alcoa representatives to Rome, N. Y. 13, 14 February, 1952.

The following three gentlemen represented the Massena plant—

Mr. Edward Holcomb, Mr. William Wheeler, Mr. James Glascock—

and in addition there were two engineering representatives from the main office in Pittsburgh, namely—Mr. Dale Knousse and Mr. R. W. Plummer.

From a general discussion held immediately after their arrival, it seemed clear that all of these gentlemen were arriving under instructions that they were to get as much technical and manufacturing information as possible relative to Neoprene and Polyethylene types of weatherproof wires. At the beginning of the meeting their questions were more of a general nature and reflected the fact that they had had previous meetings with the Royle and Hall extruder people as well as with the DuPont representatives. In the course of the discussion they asked a number of questions about rates of production and subsequently they produced a memorandum worked up from their conversations with the machine manufacturers. On the whole their figures were surprisingly good although in general slightly below the Rome figures. These figures were for extrusion speeds only.

Naturally they were interested to know what sizes of wire they should be ready to manufacture and during the two days they produced some make-up tables for their ACSR cables which they felt they would have to insulate. These tables showed some unusual stranding lays due to the

manner in which their customers juggle the steel core in order to get the necessary tensile characteristics for their special tower spacing. In general, they realized they would have to make from #6 through the larger C.M. sizes. They wished to know if 1,000,000 C.M. would go through the C.V. machine and if not, up to what size they could count on for a 4½" worm feed machine. Shallow vs. deep groove worms were discussed and particularly in relation to the sequence of operations from the Banbury mix to the C.V. machine. They had been told that they could do away with the warming rolls by substituting a worm-fed strainer in accordance with Western Electric practice. Charlie and Rudy made it clear this could be done but that they did not feel Western Electric's production compared favorably with that at Rome Cable and that Rome would prefer their present practice of using warm-up rolls.

It was clear that the Alcoa representatives did not have much information or knowledge on the insulating compounds and had naively assumed that one Neoprene compound would serve their needs. This point was cleared up when they were taken through the factory and were allowed to witness the operation of a Banbury machine and examine the number of batch cards in the rack, together with Rudy's explanation as to the reasons for their being more than one Neoprene compound and that different customers also utilized different constructions. For instance, a soft compound was suitable for a single conductor but a hard compound was necessary for 3 wire combinations in order to resist deformation after twisting and under load. This had a disheartening effect and their illusions regarding manufacturing simplicity were being rapidly dispelled. In sub- [fol. 4998] sequent conversations on the following day the question of entrance cable and service drop wires was thoroughly presented and it was pointed out to them that from the utility's point of view, the arguments brought to bear upon their sales representatives for them to get into weatherproof if they were to receive favorable consideration with their ACSR line was also going to be brought to bear after they were in weatherproof production in connection with other utility requirements, largely in the insulated field, and that service entrance and drop wire was a "twilight zone!" They were shown that Public Service of New

Jersey would require an underlying rubber insulation before the Neoprene was applied and this apparently disturbed them considerably. They were heard to remark from time to time that it was clear to them that the Rome representatives did not believe they could get into weatherproof wire without shortly thereafter being pressured to get into other lines, with the result that they would be in the insulated wire and cable business before they got through.

Mr. Holcomb, the Assistant Manager of Massena, remarked to me when I took him home on Wednesday night after they had made their decision to stay over another day, that their plan to go into weatherproof seemed as though they might get into a very complex business, ending by manufacturing what he called "end products." This he stated had not in the past been Alcoa's policy. It was clear that Kaiser's aggressiveness was driving them into consideration of this problem, particularly for the weatherproof field.

To conclude this line of thought, their subsequent thinking on Thursday was that it would be nice if they could avoid Neoprene and merely manufacture Polyethylene, as this was simpler and there was no compounding problem, as the material arrived in form to apply directly in the C.V. machine.

To return to their plant inspection, they asked a number of questions in the rod mill and particularly with respect to quality control. They commented to me on the degree to which repeaters had been applied and indicated that they felt a good job had been done but that we could go further.

In the wire mill they were especially interested in the continuous wire drawing and welding practice and particularly with respect to the method of handling the coils so that they would not give trouble on the drawing machines.

In the weatherproof mill, they were interested in the knitting machines and the braiders and commented that for a long time they had avoided making any changes in their braiding plant on the theory that it was something they could get rid of and that this had been going on for some time. They apparently did not think very much of this operation and were not enthusiastic about staying in the braided weatherproof field. I did not gain the impression that they were interested in going into the knitters.

In the rubber mill they apparently became very confused at the complexity of the processes, the wide variety of machines and the inspection and quality control, as well as the final electrical testing. They seemed to regard the different forms of insulating and vulcanizing including the C.V. machines, the drum vulcanizers, the pan vulcanizers, and the lead sheath process as very complex.

[fol. 4999] They began to understand why so many compound formulas were required. They spent a great deal of time in the basement observing the stranded cable being vulcanized in one of the large machines and saw a splice made and run through the machine. This was the type of information that they were particularly interested in and keen to observe.

Upon returning to the office a long conference resulted, in which a great many detailed questions were asked, not only as to shop techniques but with emphasis on costs and cost methods. They seemed to be shocked to find that two 200 foot lengths of cable had to be scrapped each time the C.V. machine was shut down for splicing, for change-over, for quality defects, etcetera. This brought up the question of scrap metal salvage and they emphasized that this problem had not been solved. They asked Charlie and Rudy many questions and were surprised to learn that when Messrs. Davies and Noyes had been to Rome on the previous visit they indicated that this type of scrap could be shipped to Massena for recovery. The Massena representatives told several instances where the cost of recovery turned out to be more than the value of the recovered product and indicated that they had worked on the problem but had not reached a satisfactory solution. They agreed that Neoprene types would be the worst, because of the compound adhesion.

They were particularly interested in finding out how much shrinkage there is to a batch of compound and what the cost of ingredients was and if there was any salvage to the insulating compound. They were told that Neoprene had none and that under certain conditions scrap Polyethylene, being a thermo-plastic, can be re-used. As previously indicated, the Polyethylene seemed to be a way out for the factory and technical people in that they indicated it would be nice if they could settle for this and avoid the complexities of Neoprene and the tendency toward getting into border-

line insulated wire and cable problems. They certainly did not wish to go into immersion testing as it would apply to insulted cables.

Charlie and Rudy did a splendid job in impressing on them the competitive situation and the necessity for good production and minimum scrap. In fact I can say as an observer that both Charlie and Rudy must have made a great impression by their frankness, their manner of supplying the answers to a great variety of questions including those of a general and a detailed nature. They were heard to remark on several occasions that they had certainly been given every consideration. I particularly noted the fine teamwork between Charlie and Rudy in handling the production and technical questions and I am certain that this also made a fine impression.

It was clear during this conference that they wished to see more of the mill and that while it was late in the day and they had their bags packed and ready to go in their car outside, that they preferred to stay over night and return the following day. Therefore it was arranged to take them through the Spiral-Four Department, which lasted until approximately 6 o'clock, where Rudy and I took them to dinner at the Rome Club and then I drove them to the Green Lantern for the night. They were delighted with their trip to the Spiral-Four Department and commented on how clean the department was and what a fine impression it made. Upon learning the time from inception of the plant they were impressed with the accomplishment. They had little knowledge of such a complex construction [fol. 5000] and likewise the connecter problem but their engineering competence was quickly reflected in their ability to assess many or the machine features in the new equipment. They were very interested to watch the accumulators at work as well as the high speed stranders and cablers. They made a special note of the inspection consoles.

I have not mentioned their trip through the laboratory which gave Rudy an opportunity to show them the various testing machines, the pilot line for insulating compound mixes and the generally large amount of technical work necessary for a full line. There seemed to be some hesitancy on their part to contemplate getting into a business

not too close to their aluminum metal fabrication and we were able to point out that insulated cables were largely a chemical and electrical engineering problem, quite a different field from the mechanical and metallurgical problems which they normally dealt with.

The following day they went into conference and this continued until I left, during the lunch hour, for New York to meet Ross Fraser. The conference continued and I understood merely gave them more technical information without apparently altering the nature of their conceptions as far as they could be ascertained.

In summary, it seemed clear that they had come under orders to get as much information as necessary to help them to manufacture weatherproof wire and cable. All representatives of Alcoa seemed efficient and competent as far as could be observed and the writer is not in a position to know what their recommendations will be or whether they have been asked to make any recommendations other than as to equipment and methods for doing the job. However it would seem reasonable to assume that they left with a far clearer picture as to the complexity of the problem and secondarily as to whether they could stabilize their manufacturing on any simple basis, such as limiting themselves to Polyethylene wire or even Polyethylene and Neoprene types. As far as one could tell, they had no especial desire to take on these problems although this comment may not wholly apply to the technical engineers who were present as apart from the manufacturing men.

It would seem that Ross's hand should be strengthened by this visit in reaching or attaining the type of relationship that might be most desirable for the Rome Company and the Alcoa Company to have with respect to each other in this and allied fields.

Carl Ward

jcw:mnk

[fol. 5001] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 74

Aluminum Meeting, March 3, 1952

Present: A.D.R. Fraser, J.H. Dyett, G.E. Rolston, C.H. Ellis, R.A. Schatzel and G.A. Weiss

Ross: The meeting is called for a discussion of where we are on the arrangement with the Aluminum Company. I believe that the basis of the arrangement will be a memo which they will write to those in their organization and which will be approved by us, and in turn, we will write a memo for our organization which will be approved by them. This is not a final decision however. Bob Groben is coming at 2:00 o'clock today to review GAW's findings on prices, etc., and also to discuss the topics which should be covered in the memo. At the present time we cannot discuss prices; some costs, some ceilings are being assembled. I believe that on some ACSR and some of the Rolene no ceiling prices have been filed. Glenn and I have talked this over and believe that it would be better to deal only with those items on which ceiling prices have been filed. We will probably go to Pittsburgh one day this week on this matter. The next question is, who is going to take care of the arrangements with Massena or Pittsburgh on such things as tags, reels, lengths, etc. Rudy is preparing weights for some sizes, just on Neoprene.

R.A.S.: I am also preparing specifications for accepting conductor.

Ross: There are also the matters of reel policy, put-up, cartons and finally the question of publicity. I have asked Gerry to work on an outline of an announcement. At the meeting in Pittsburgh I hope that we will both agree on a letter.

C.H.E.: We might start on an outline of the arrangements with Massena.

Ross: I have asked Max to prepare the details on sizes he will ship down, so that we can take advantage of any open capacity in March.

R.A.S.: Publicity would have no bearing on what we are doing, since we are already buying conductor from them.

[fol. 5002] Ross: This month I think we would probably use our tags. Jack should check on lead time on tags, bills of lading, shipping documents, etc.

Ross: I think Holcomb should hop down here this week and determine who should handle these matters in his organization.

C.H.E.: I would like to see it set-up in the form of packaging specifications.

R.A.S.: I think we need specifications on the put-up that they ship to us I think it would be better for us to go up there for that. Could we arrange for 'Mac', and Gus and maybe Jack Kell to go up and talk over specifications?

Ross: I don't want to send more that four. Whoever is going to do the ordering should go up there. I would like to see the whole thing coordinated in some way. I believe that Pittsburgh's problems and Rome problems should be handled either by Sales or Administration.

C.H.E.: I think Holcomb and I should act as contact. Rudy and I should sit down and delineate the fields in question. I don't know what they know about finished packages.

R.F.: I think they would want that information from here.

G.E.R.: The sales would arrive at the package size, etc.

C.H.E.: I think that the question of the size to get here is a production problem.

R.A.S.: It also involves questions of where we can permit welds.

Ross: Suppose I talk to Ralph Davies this afternoon and tell him that we would like to have them designate someone to talk to Charlie and Rudy. We should prepare information for all sizes as to what our shipping package is, coils, size reels.

G.E.R.: Their reels don't match ours at all.

Ross: There is a question whether they will provide us with reels.

I would think that in the initial set-up that we could use our own tags, bills of lading, etc., just stamping something on them.

G.E.R.: I don't think we can. We haven't room on our tag.

[fol. 5003] Ross: How does their tag read now on shipments they send down?

C.H.E.: I think it reads in poundages.

R.A.S.: The specifications will cover lengths of lay, direction etc.

Ross: That is very important and also the question of diameter. Remember when we figured that over-diameter of one millimeter cost us 80,000 pounds of copper. Glenn suggested that we might buy the conductor, just for convenience in handling the accounting for such things as scrap.

R.A.S.: We will have to follow ASTM as to specifications.

G.E.R.: That won't be enough when it is a question of getting down to minimum.

R.A.S.: That's right, I meant on an average.

Ross: There experience is in selling by the pound. That is the way they will sell to us. We will sell by the foot. That means diameter is a vital factor for us.

G.E.R.: Every product except triple braid will be sold by the foot.

C.H.E.: Is there any possibility of handling it on a pound price, as we have discussed, in weatherproof.

J.H.D.: Couldn't they sell to us by the foot.

Ross: They could not do it on solid.

R.A.S.: We plan to set up specifications based on ASTM. Then we will have the laboratory inspect as if they were raw materials coming in. If they run heavy we will have to work out an arrangement with them.

Ross: That should be made definite in talking to them. Glenn, Max Noyes gave Fred a book. I would like to find out what we would have to do to sell ACSR that they manufacture.

G.E.R.: We would have to get an allocation from the Aluminum Division.

Ross: Can't we act as sales agent for the Aluminum Company?

G.E.R.: How do they want test reports handled, on Rome Cable forms?

[fol. 5004] Ross: This is a good point—will you make a note of that.

On publicity we have heard that someone learned that Aluminum Company had a second quarter allocation of

250,000 pounds for insulated wire and that some person objected saying that Aluminum Company only had capacity for insulating about 60,000 pounds. An Aluminum Company representative put a hypothetical case to NPA and got the answer that approval of a toll arrangement would not be necessary. There might be some considerable backbiting if the publicity is not handled correctly and even if it is. We certainly have to make an announcement to our sales personnel and also to our supervisors. Should we make an announcement to the trade papers? Glenn would you want to take over with Gerry working out a possible joint announcement?

C.H.E.: Isn't the announcement really that the Aluminum Company is going to sell insulated wire?

R.A.S.: In the first few months we won't have any aluminum to sell; we won't have any ACSR,—does it need any more than a simple announcement that they are making insulated line wire. That was my understanding.

Ross: It's not just limited to that and I would not limit ourselves that way. Putting yourselves in the position of a reader—wouldn't they ask how long this arrangement will continue.

C.H.E.: I understand that we will make any type that they want.

Ross: I made a definite statement at the Directors' meeting last Friday that this would stall our own aluminum project.

Ross: I judge that the sense of the meeting is that there should be a public announcement by ALCOA and that we would follow-up with an announcement that we had made arrangements for the sale of ACSR. I would think that the announcement would say something such as—that there was a great demand for aluminum products and that to meet the demands arrangements had been made for us to make the products for them.

C.H.E.: It could also say that this would be in line with the policy of making better use of existing equipment.

[fol. 5005] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 75

Aluminum Meeting Held March 10, 1952

Present: Messrs. A.D.R. Fraser, C.H. Ellis, J.H. Dyett R.A. Schatzel, F.S. Marks and G.A. Weiss.

Ross: This meeting is for the purpose of bringing the story up-to-date.

Glenn and I had a very satisfactory meeting Friday. They concurred in the arrangement we proposed, with the exception of paragraph 4, which was the one requiring that the Aluminum Company take all their requirements from us. Their lawyer refused to agree to this. They also asked for a longer time on revision of prices upward and we agreed to thirty-five (35) days. We tried to get them to go on a price in effect at time of shipment. They would not do it and explained that this was because it would be inconsistent with their present invoice policy. So we may have a little trouble on that point.

We both initialed the same memo. Jack has additional copies in the files. I would suggest that only those portions relating to the respective departments be kept in the department files.

We will prepare copies of their announcement to their people. They accepted our letter with two changes. The release time will be Friday. Charlie will handle the meeting with Jack with the Supervisory and Management Bonus groups.

In the statement I would suggest that we read first our letter then their letter. I would also like to see a statement like this—Rumor has come to us that the Aluminum Company was going to buy Rome Cable. State emphatically that there was never any conversations of that sort merely a fabricating arrangement. I think it would be well [fol. 5006] if Rudy Schatzel and Charlie Ellis said a few things about the advantages in this arrangement. There should be mentioned somewhere that we will have the opportunity to get into production of aluminum wire more quickly than otherwise would be possible.

We are going to handle the arrangement on a Toll Basis exclusively. That leaves one problem, what happens to scrap? In the figures that we had, we assumed that we had to buy the equivalent of 6% more of aluminum. That was assumed in calculating conductor costs, so we had scrap in the costs. Under this arrangement there will be a reduction in costs. Now we don't know whether they are going to ship us 106 or whether we give them footage production by 94%. I would presume that they expect to ship 106 and we to ship scrap back to them.

We told them that for two or three months we would try it and then see how things look and then we would make an adjustment.

R. A. Schatzel: They want to know what they are going to do with the scrap.

F. S. Marks: We are sending them some tomorrow.

Ross: I would suggest to Manufacturing, Research and Engineering that the individual cost cards be rechecked, having in mind what changes in production can be made; if we have cheaper neoprene; in running speed; and generally what changes can be made all along the line. Let's not forget that with Kaiser's price approval we will have quite a "rat race". Any improvement to reduce cost is extremely important. (Read revised schedule of sizes and types on the first 50,000 pounds). That the amounts are not good running amounts. If you want these can be varied. [fol. 5007] Coffin should be contacted. I have put a copy in Ken Murray's hands so that he can see what it will do to the operating schedule.

R. A. Schatzel: We have started some data on engineering specifications.

Ross: There have been no prices filed on Polyethylene by size. Calculations of price purely by formula results in prices higher than Neoprene, except in two cases. We will use the same prices as Neoprene.

Rudy, in the light of what has been done on reduced diameters on Neoprene, can something be done on Polyethylene.

I expect this afternoon to go over with Fred and Ken Murray the formula basis we have used in arriving at prices, so should there be ceilings filed we will have the mechanics here to produce the prices.

Gerry, in the light of the toll arrangement should we file prices?

G. A. Weiss: Yes.

Ross: We might try a hypothetical question on this.

I have told them that for the next two or three weeks they should call Jack Dyett, Charlie Ellis and Fred Marks.

During the trial period let's have suggestions on improving procedure.

R. A. Schatzel: Massena said they did not know what to do with scrap.

Ross: Coffin was sure they had a means of taking that off with some kind of buffing, some way of stripping Polyethylene and Neoprene off.

How long will it take to set up new standards on Polyethylene?

[fol. 5008] R. A. Schatzel: A.S.A. have new standards which I think are in line with what we gave you, but we don't know about commercial standards.

Ross: Keep Jack posted on all developments.

[fol. 5009] In United States District Court

Plaintiff's Exhibit 76

This Copy for Mr. E. J. Holcomb

Internal Correspondence

March 14, 1952.

From: Philip T. Coffin, Pittsburgh Office.
To: All District Sales Managers.

Re: Covered (Weather-Resistant) Conductors

Mr. Wilmot's memorandum of February 28, 1952, stated that further information would be forthcoming on the subject of covered conductors. We know that you are all anxiously awaiting details of our plans, and that with the exception of the next paragraph the following information will be gratifying to you.

Plans for acquiring necessary manufacturing equipment and plant space have been actively explored, and a number of engineering studies and cost estimates have been made. The difficulties of establishing a new plant under present

conditions together with alternative solutions to the problem have prompted us to drop plans for a new plant for the time being, at least.

In order to enter this field immediately we have just consummated what we believe will be a very happy arrangement with Rome Cable Corporation of Rome, New York. Under this plan we will manufacture bare aluminum conductors and ship them to Rome where coverings will be applied in accordance with our requirements. This arrangement is to continue for a period of not less than two years.

There are several good reasons why we are working with Rome Cable Corporation. We regard Rome as a "high quality" manufacturer. We believe that their products are the best, or equal to the best, in this field. Also, Massena and Rome are fairly close neighbors—a matter of about 130 miles by either road or railroad.

There is nothing in this arrangement which prevents us from deciding at a later date that we should have covering equipment of our own, and this has been discussed very frankly with Rome Cable. We will reappraise this situation from time to time and discuss with Rome Cable [fol. 5010] Corporation the advantages or disadvantages to both parties of an extension of this arrangement.

The covered wire and cable products for the overhead secondary distribution applications which we will obtain by this method will be shipped from both Rome and from Massena. In either case they will be strictly Alcoa products in so far as markings on reels and coils are concerned; Rome will become another Alcoa shipping point. Shipments from Rome will be managed by Massena. Of course, there will be no secret about the fact that we are having Rome apply the coverings for us. In fact, we should brag about this because Rome Cable Corporation is our choice for the best product.

It is well to bear in mind also, that Rome Cable Corporation, like many other wire and cable companies which have previously concentrated on copper conductors, is now making aluminum covered and insulated conductors. Therefore, Rome will be manufacturing similar covered aluminum conductors, and selling under their own trademarks, Roprene, Rolene, etc. Since Rome will be obtaining aluminum

products from us for manufacturing into their own line, it is obvious that Alcoa and Rome will be selling some identical products. Rome also makes and sells many insulated wire and cable products which we do not propose to sell at the present time. The products which we will sell as Alcoa products are for the present limited to the so-called weather resistant types for overhead secondary distribution applications. These include Neoprene, Polyethylene and textile type coverings, or in some cases, combinations.

Due to Government limitations and to the newness of this project, our initial program must necessarily be rather small. For the second quarter of this year we plan to have Rome cover not exceeding 200,000 pounds aluminum weight of conductors. We have indicated to Rome that we will [fol. 5011] take in the second quarter only a rather limited range of sizes in either all aluminum or ACSR, both Neoprene and Polyethylene covered. However, we expect the program to be larger in the third quarter, and still larger in the fourth quarter.

The surplus capacity which Rome will have for our conversions naturally depends to some extent on the pattern of business which we obtain. We are assured, however, that their capacity can be increased in any reasonable quantity which we might sell, provided we give them adequate notice. For the near future the limiting factor will probably be the allocations which we can secure from NPA for the covered conductor program.

Rome Cable Corporation will supply us with technical data, specifications, etc. on their coverings. These will be issued to the Sales Offices together with our sales prices in the near future.

It is impossible to give you complete details in this memorandum, and we know that many questions will occur to you. These will be answered later.

Rome Cable is sending a copy of this letter to all of its District Offices. The counterpart of this letter, written by Rome Cable, is attached.

Philip T. Coffin.

PTC ek

cc: Assistant District Managers, Resident Managers, Product Managers, Electrical Conductor Salesmen, Electrical Conductor Supervisors.

Messrs. R. A. Hunt, I. W. Wilson, D. Wilmot, M. M. Anderson, G. W. Cameron, R. V. Davies, L. E. Hickman, J. R. D. Huston, T. D. Jolly, F. L. Magee, R. B. McKee, P. F. Bergstresser, J. H. DeKlyn, V. C. Doerschuk, J. P. Haight, A. P. Hall, H. L. Hall, E. J. Holcomb, B. H. Hosler, V. L. Kattau, J. V. Kohler, E. D. Mairs, D. L. Mayne, J. M. Mitchell, C. F. Nagel, Jr., A. B. Norton, G. B. D. Peterson, M. M. Schratz, A. J. Stewart, N. L. Tressel, H. T. Wilder, J. W. Wilson.

[fol. 5012] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 77

Date: March 14, 1952.

To: All Salesmen.
From: G. E. Ralston.
Subject: Expanded Activity in Aluminum.

You well know the rapid increase not only in demand for insulated and covered aluminum conductors but also that more manufacturers are entering this field. Our production and sale of these classes of products has been and continues to be limited by the allocations that are given to us by the Aluminum Division of NPA.

For many months we have not only been experimenting with various types of insulated aluminum conductors but have also supplied many of your customers within the limit of those allocations to us. This increasing demand has also presented a good potential market to the primary aluminum producers and some aluminum fabricators, who in general had no facilities or experience for applying insulated coverings. On our part we have had no aluminum rolling, drawing or stranding capacity and only a limited experience.

In conversations with the Aluminum Company of America from whom we have been getting our bare conductor they indicated a desire to enter the aluminum covered wire field. As a result of several very friendly meetings we are, therefore, pleased to advise you that an arrangement has been made with ALCOA wherein we will insulate their bare aluminum and ACSR conductor with various types of insulations and coverings.

During the earlier stages of this arrangement, the products which we will cover for them will be limited to the various types of overhead service conductors, including fibrous, neoprene, and polyethylene line wire and triplex self supporting secondary and drop cables. As more conductor metal becomes available, it is quite possible that additional types of wire mill products with aluminum conductor will be added to those mentioned above.

[fol. 5013] These products will be sold by the Aluminum Company and will be shipped out on their reels and with their tag markings, shipping papers, etc. Actual shipments in their name will be made from Rome as well as from a stock in Massena, N. Y. We are going to provide complete technical information concerning the characteristics of our insulations and coverings to ALCOA, and they will in turn furnish their entire field selling organization with this data.

We will naturally continue to supply our present line of insulated wire products with aluminum conductors. This line will be expanded depending upon additional availability of aluminum. We will purchase conductor for our insulated aluminum wire products from ALCOA, thereby assuring us of the highest quality of aluminum conductor, and we will be able to take advantage of their broad experience in the field of drawing and stranding aluminum wire.

We believe that this arrangement is of mutual advantage to both companies, and its administration in our field sales activity will not present any major difficulties. Our high regard for ALCOA's reputation for quality can be capitalized in assurances to our customers that the ALCOA conductor plus our insulations presents the best possible finished wire product available to the trade.

In order that there will be no misunderstanding we assure you that in making this arrangement and the contemplated increased sale of aluminum by our own sales force we anticipate adequate facilities to service your insulated copper requirements.

We are attaching a copy of ALCOA's announcement to all of their sales personnel, which indicates their viewpoint of this arrangement.

[fol. 5014] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 78

This Copy for Mr. E. J. Holcomb, Massena

November 11, 1952.

Phillip T. Coffin,
Pittsburgh Office
Mr. John W. Hood,
Pittsburgh Office

Re: Weather Resistant Covered Aluminum Wire and Cable

I am a bit tardy in commenting on your letter of October 24 to Mr. Chapman. I refer specifically to paragraph 2, page 2. While I think you and I both understand our arrangement with Rome as we discussed it over the telephone, I nevertheless wish to re-state the arrangement in as much as it is not precisely in accordance with the paragraph in your letter to which I refer.

Unless there is an out and out "boner" there should never be a case where a shipment by Rome Cable Corporation would show both Rome Cable's name and our name on the product, the invoice or the shipping papers. In short, so far as our customers are concerned, if Rome Cable makes a shipment in our behalf as a result of having covered the conductor on a toll basis the product is strictly Alcoa's.

Rome Cable, on the other hand, purchases from us from time to time EC wire and cable which they themselves cover for their own account. The resulting product is strictly a Rome Cable product and should under no circumstances show Alcoa's name on the marker, the invoice or the shipping papers.

I am sure that all of our people at Massena understand this matter, but I think it is advisable for record purposes that the paragraph to which I refer be clarified.

Phillip T. Coffin.

PTC ek

cc: Mr. M. E. Noyes, Mr. P. H. S. Chapman, Mr. E. J. Holcomb, Mr. D. L. Mayne, Mr. R. T. Myer.

[fol. 5015] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 79

Meeting on Aluminum Program for Rome Cable Corporation Held April 3, 1952

Present: Messrs. A. D. R. Fraser, G. E. Rolston, C. H. Ellis, R. A. Schatzel and J. C. Ward, Jr.

Ross Fraser opened the meeting by stating that we should proceed to investigate the general aluminum program and the Rome company independently of the new Alcoa agreement. He pointed to Lawrence's article in today's paper which concludes that our economy is in a most uncertain and potentially dangerous position for business. The changing condition with respect to metals was also discussed. It was, therefore, felt that this was the time to raise again question of installing the Properzi equipment and the aluminum drawing equipment. In respect to a question Ellis stated that roughly $235,000 had been appropriated for the entire program including the new Vaughn copper drawing machine which freed the old Elevator Supplies equipment for aluminum wire drawing.

Schatzel: What are the commitments that have been made to Alcoa that we need to consider?

Fraser: We have made no statement to them or commitment with respect to our own manufacturing. The agreement is that we are to get all of the aluminum requirements from them that we will insulate for their account. Alcoa knows of our plans for manufacturing rods, wire and ACSR. Tentatively Alcoa may make all of the ACSR for Rome account. However, since Rome adds nothing to ACSR this creates a problem under the Robinson-Patman [fol. 5016] Act, if Rome is to receive a better price than its competitors. The same news affects the prices for bare conductors, rods, etc.

The commitment to Alcoa is 200,000 lbs. by June 30, 300,000 lbs. for the third quarter and 400,000 lbs. for the fourth quarter, or 900,000 lbs. for the calendar year to be insulated for their account. For 1953 the allotment increases until at the final quarter it is at a 3,000,000 lb. annual rate with the total for the year 2,600,000 lbs. To do

this Alcoa has been told that Rome will expend $50,000. for new equipment. Should their demands prove greater than those stated above then we have 90 days to decide whether Rome will expand further.

Fraser also suggested to Alcoa that their might be a mutual interest in setting up a combined property elsewhere using the Properzi equipment and the drawing equipment which could be made available to be moved on the assumption that Rome could get all of its conductor for its own account here at Rome from Massena. His impression is that Alcoa would prefer to have their own plant for rods and wire also. At present they are short of capacity in the east which includes the territory as far as Davenport, Iowa, but they are long on capacity from their mill in Vancouver for the far western territory. He, therefore, felt it unwise to pursue such a line of discussion with Alcoa at this time.

Schatzel: Then we are clear to set up the Properzi equipment for our own experiments here?

Ellis: I am not clear on some of the economic aspects involved. I have been given figures on costs from Alcoa for rods and wire. Are these firm? Such figures were practically identical to Rome figures for finished strand taking advantage of the Properzi equipment. Had we known this originally we should not have put in the [fol. 5017] Properzi request.

Fraser: If it turned out to be advisable we can always sell the equipment that we have already ordered.

Ellis: I would not want to absorb into mill operations the cost of experimental work on the Properzi machine.

Fraser: Perhaps we may want to tread water for a bit until the picture is clearer.

Ellis: From work done in the last several days with Bob Fraser and Ward we could set up the Properzi equipment for experimental work and save $20,000. over our schedule and we could make available the variable speed drive for our insulating machine thus making savings equivalent to $30,000. Then with six months notice we could restore the program to its original plan if it seemed advisable.

Schatzel: But how could we learn anything from the Properzi equipment without drawing the rods to wire which we would not be able to do in accordance with this plan?

Ellis: If necessary we could use the Elevator Supply equipment for aluminum drawing by putting in $2,000 more for a dip system.

Fraser: On a 6¢ rod differential it is estimated the Properzi equipment saves 3¢. On this basis the regular Alcoa price to Rome is approximately the same as Rome's costs on the Properzi equipment with a difference of not over 5% to 8% on a few sizes.

Rolston: But what about the present Westinghouse flat sizes that we already need and are committed for? Alcoa can only furnish the rods in very small packages.

Ellis: We should order them anyway.

[fol. 5018] Schatzel: We have already sent up to Alcoa 28" reels for them to try. These give 1,000 lb. copper packages.

Rolston: But we already have 65,000 lbs. of ⅜ rods here now.

Schatzel: Perhaps we would rather send them back—to which Rolston agreed.

Ellis: Do the finished sizes run as for copper between small and big sizes?

Rolston: Yes, practically the same and we are still due 35,000 lbs. more rods for our first quarter requirements and another 100,000 lbs. for the second quarter.

Ellis: It isn't economics in this case as much as bull block capacity. We are late in getting the size distribution.

Rolston: I feel that the present system is too inflexible and we need more control over our own manufacturing.

Ellis: However, this is all a very short range picture that we are discussing.

Fraser: I understand that when Rome made its prices we were 16¢ high on Magnet Wire for Westinghouse. Westinghouse states that the aluminum is working out very well from their experience to date.

Rolston: Yes, we are also 10¢ high on copper Magnet Wire. Margins are very good and the question is, can Westinghouse afford to buy outside as against their own plant at Buffalo?

Fraser: Precisely, and how good is this business then?

Rolston: It is as good as for flat copper. Westinghouse assures us that they are going to use the output of our two glass insulating machines. When Buffalo made Sharon's

flat wire requirements about a year and a half ago they also made aluminum flats. He believes that they secured ⅜" rods and drew them and rolled them down.

[fol. 5019] Schatzel: With Properzi equipment Rome would have the advantage of getting the desired lengths in one piece, saving scrap.

Ellis: Alcoa must equip themselves to supply us with lengths in order to save scrap. We may have guessed in advance too high a percentage of small sizes.

Schatzel: To break even on the Properzi equipment what poundage per month must we make?

Ellis: Say 300,000 lbs. The question of capacity of strand equipment is completely apart from the ACSR program.

Schatzel: So far there seems more hesitancy by Alcoa to supply solid sizes in place of 7-wire strands. It was concluded that this may be inexperience.

Ellis: Our big capacity in Rome is in Larmuth and we have approximately 5,000,000 ft. capacity still available or aproximately 200,000 lbs. per month.

Schatzel and Rolston. That will be plenty up to 4/0. As far as solid vs. strand is concerned Alcoa will find that this will be specified by their customers.

Schatzel: Recent conversations confirm the fact that the use of aluminum wire and cable has been taken out of the hands of utility engineers by higher executives. Orders are out that wherever there is a 10% differential in price aluminum must be substituted for copper. The engineers feel that connectors and other problems have not been satisfactorily solved for such a decision.

Ellis: Feels that Rome has reasonable capacity for stranding needs and that this makes the Properzi process more interesting. It must be remembered that shortage in copper had a part in the original decision to fill in with aluminum. Therefore, said he, why swing from one posi-
[fol. 5020] tion to the other and feel that this is the time for all of us to agree to make a thirty day decision.

Fraser: Does this mean we do not need new stranders?

Ellis: Not necessarily, but ACSR should be left alone for the present until we see how far utilities will go in substituting aluminum for copper. Then too there is the question of mill flexibility with respect to such things as

flats. Alcoa, for instance, might not be willing to put up with the sudden shifts that we are required to meet for our customers.

Fraser: On 1,000,000 lbs. per month we estimated Properzi saves 3¢ per pound. How much can we save on 300,000 lbs. per month?

Ellis: Purposely I cannot say. At Davenport Rudy and I concluded that we could make a saving of more than 3¢. We can run on one shift as a basis if we desire and manufacture a lower output. However, we believed that we could get customers for rods in additioin to our own requirements.

Fraser: If so we may kiss Alcoa good-bye. We couldn't compete with Alcoa if they pared down their prices.

Schatzel: Nevertheless, we should operate the Properzi equipment to see what we can do and save.

Fraser: On 300,000 lbs. per month should we do it?

Schatzel: Do not feel that Rome should be so tied up with Alcoa that we lose control of our own production.

Fraser: We have two big gambles at present. One is the Sendzimer proces for galvanizing at Torrance. Second is our need to get into aluminum. Then came along the Alcoa agreement which must be taken into account. It is now obvious that there is no good rod source in the middle western area.

Rolston: This is all pre-supposed on the fact that we [fol. 5021] would not be eliminated from doing our own business. For instance, we get inquiries that we could not expect Alcoa to furnish.

Fraser: In any case we feel that getting the Vaughn machine was a good acquisition. We should set up the Elevator Supply machine for wire drawing though it is fully depreciated.

Schatzel: We seem to divide the aluminum manufacturing problem into two parts:

1. Drawing and stranding
2. Casting and rolling rods.

In any event we should commit ourselves to doing the first.

Ellis: Based on the fact there is reduced copper available we have a good chance of producing 5,000,000 lbs. of

copper excluding the use of the bull block. Theoretically we could produce 8,400,000 lbs. If we allow 1,200,000 lbs. for the bull block we can do 5,000,000 lbs. without the Elevator Supply machine and possibly 7,200,000 lbs. Believes that the Elevator Supply machine should, therefore, be set up in the new location for aluminum wire drawing in the simplest manner possible. This would not lead us into minimum cost processing but could be considered a transitional approach which seems desirable since every thirty days conditions seem to make a change in the picture. We must bear in mind that if we had unlimited copper and with the use of the new Vaughn drawing machine we could use all of the available stranding, in which case the transitional approach could be wrong.

Fraser: This serves to show how my mind is not fully clear what to do and I would like to hear from each one present in turn.

Rolston: I think we cannot operate properly unless we can draw and we can strand our own aluminum wire.

[fol. 5022] Fraser: But what about Properzi?

Rolston: I don't know. Perhaps do nothing unless you wish to find out what can be done with it.

Ward: It may be well to keep in mind that the Properzi equipment can be installed for approximately $20,000 or less based on the figures worked up in the last two days with Bob Fraser. This is $24,000 less than for the original set-up including the accumulator for continuous drawing and the variable speed drive, etc.

Ellis: Perhaps we can install the Elevator Supply machine for aluminum drawing in the "as is" condition for $5,000.

Mr. Fraser then called on Schatzel.

Schatzel: We should have our own aluminum drawing and stranding. Furthermore, it will take six months of experimental work to get the Properzi unit operating properly. Therefore believes it should be set up at this time.

Fraser: Perhaps we should wait two or three months but agree now on doing our own drawing and stranding of aluminum wire.

Schatzel: But if we can save 3¢ on the Properzi equip-

ment why not take advantage of it. I agree we should draw and strand aluminum in any case.

Mr. Fraser then called on Ward.

Ward: I would put the Properzi machine in the designated location in a simplified manner. I would also put the drawing equipment in the simplified installation. Perhaps this could be called a temporary solution as opposed to the long term solution for reasons that have already been brought out. This would permit us to use a transformer on order for the rubber mill, saving the purchase of a transformer for the new lead press. Charlie Ellis also desires a variable speed drive and, therefore, this [fol. 5023] could also be used at a saving elsewhere. As to the Aluminum Company objecting, it is my opinion that the agreement would prove to be a bad one in such an event and, therefore, I doubt that this would come about. Furthermore, the history of Rome shows that the business is continually developing and not standing still and that with this long term objective the desirability of installing purchased equipment in the simplest fashion possible seems to be desirable and in line with best policy. Now that Rome has factories in more than one location it is too early to say where this equipment ultimately may go. In any event the assigned location is not ideal, is limited in area and under tentative plans worked out by Mr. Ellis there might be more efficient and desirable locations in the period ahead here at Rome also.

Therefore, to sum up, I would install the Properzi equipment and the Elevator Supply machine in the designated location but in the simplest and most inexpensive fashion possible feeling that the long range picture will develop as time goes on and that the least will be committed by this solution.

Mr. Fraser then called on Ellis.

Ellis: I would do the same. I get scared when I consider the Alcoa forecast on their volume.

Rolston: I question the Alcoa's market reserve. This is too big a share for Alcoa when you consider the total available market and all of the competitors.

Fraser: I agree that it is optimistic. Their claim is, however, that their market analyses people historically are within 2%.

[fol. 5024] Ellis: I am satisfied with the program at least for the next thirty days.

Meeting adjourned.

J. C. Ward, Jr.

JCW:AS

[fol. 5025] In United States District Court

Plaintiff's Exhibit 80

To: All Salesmen.
From: T. S. Marks—Rome.
Date: June 5, 1952.

Subject: Covered Aluminum Orders and Inquiries.

We have been informed that there is a very good possibility that Aluminum will be decontrolled for the third and subsequent quarter of this year. We do not know exactly how this will be handled at the present, but in view of this, we want to outline our policy on the subject of orders and inquiries for covered Aluminum.

Effective at once, please feel free to talk with your customers about our ability to supply covered Aluminum. We have in the past had such a small allotment that many of us probably have told some of our customers that we cannot handle any sizeable amounts for them. This is not true any longer, and we suggest that you furnish quotations and accept orders for the third quarter and later on the covered Aluminum products which we announced we would produce. We repeat these products below so that there will be no question:

Knitted or Braided Aluminum Line Wire
Neoprene Covered Aluminum Line Wire
Polyethylene Covered Aluminum Line Wire
Neoprene Insulated Self-Supporting Service Drop
Polyethylene Insulated Self-Supporting Service Drop

We cannot at this time definitely tell you to accept orders on Aluminum Building Wire, Service Cables or RR Power Cables without asking you to contact us. As soon as this decontrol policy is definitely announced, we hope to estab-

lish our policy regarding the manufacture of these three products, but in the meantime suggest that you contact us if you have any inquiries. One of the deciding factors will be the quantities involved because we canhot set up to manufacture small runs, and we are not yet in a position to produce these items on schedules.

The purpose of this memorandum is to release you from any restrictions on acceptance of orders and quotations for the products that we definitely announced we will manufacture and also to encourage you to discuss freely with your customers our ability to make these products.

Our delivery at the present time on the Line Wire and Self-Supporting Aluminum Service Drop is August.

Yours very truly, F.S.M.

FSM:dr

[fol. 5026] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 81

Minutes of Meeting Saturday Morning—January 24, 1953

Whither goest Thou

Present: Messrs. Barnard, J. H. Dyett, Ellis, Rolston, Sarles, Schatzel with A. D. R. Fraser presiding.

ADRF opened the meeting by again stating that he wanted a very frank discussion on as many of the approximately twenty subjects he had previously outlined and that he expected to act largely as moderator. Many of the questions that he might ask largely to bring out the discussion might very well not even reflect his views.

The first subject for discussion was "Shall we continue the Alcoa agreement?" ADRF outlined the many complaints from quite a number of people in the organization on methods of handling the Alcoa business. In view of the fact that the contract will be about a year old by the end of March and Alcoa themselves will probably be reviewing their position he felt it wise for us to know where we stood because we had promised to give them at least a year if we decided to give up the agreement.

Glenn opened the discussion centering first on the competitive situation and the problem of our selling to the same customer. He outlined in some detail the difficulty of getting Alcoa to think as we do. For forty five years they have largely done as they pleased in the sale of aluminum. Their sales or pricing policies have been extremely loose. They have had very arbitrary distribution policies in the past and until the last five years have never sold through jobbers, at least through electrical wholesalers. It is quite obviously difficult for them to accept an established policy for selling. He feels that he is beginning to get somewhere in conversations so that they have some better appreciation for the problem. They have a different policy on selling from consigned stock. In summarizing the competitive phase GER felt he could live with the differing policies between the two companies.

ADRF had asked him to check with Alcoa on publicity covering expansion at Vancouver which might have indi- [fol 5027] cated that they were expecting to put in covering equipment at that point. He reported that the Vancouver development is only expansion of their drawing and stranding departments. They now have drawing and stranding and ACSR capacity at Massena, New York, Lafayette, Indiana, Vancouver, Washington.

GER reported that Alcoa was interested in our furnishing them with a larger quantity of Triplex, probably about double the quantity we have allocated to them.

This subject was also discussed at the time of our going over equipment plans for fiscal year 1953 and we authorized another Tripler. There was some discussion as to duplicating or modifying the present type that we have. In any event, a Tripler was approved and I can report that at a meeting of our technical group earlier this week that it was agreed that we should not duplicate the present equipment but modify the design considerably. This is going to delay getting the additional capacity because there will probably be about three to four weeks of design work necessary.

Coming back to the meeting we then discussed the subject of routine handling. Here things have been in bad shape. This is the place where we have had the most complaints. We had a very thorough discussion about this

and ADRF suggested the possibility of having a committee composed of those who headed up the various sections of our company in the handling of the Alcoa business during the past year and that they come up with a procedure which to them would be ideal, which I agreed to take up with Pittsburgh. Some members of the committee felt this was advisable but others felt sufficient progress had been made so that this would be unnecessary. All of this discussion was generated from GER's remarks out of which his conclusion was that we should certainly continue the agreement, RAS was next in line and he started his discussion as follows.

[fol. 5028] One year is too short a time on which to base a decision as important as this. He feels that Rome is always going to be a customer of Alcoa for some type of product. He feels that Rome definitely needs ACSR. He stated that Kaiser, Anaconda, General Cable, Reynolds, Southern and American Steel & Wire have ACSR as well as some others and they are able to offer both ACSR as well as covered aluminum. This, of course, then brought out the fact that we were penalized in not having ACSR to include with our covered aluminum so that jobbers could get the advantage of carload rates by combining the two products. ADRF then indicated that when he went to Pittsburgh in March he would again bring up the subject of their providing ACSR on some basis. It was agreed that it might even be to our advantage in the interim period to consider a possible consigned stock here from them and our handling it without remuneration in order to service our customers and get the advantage of net carload to jobbers.

The results of the very considerable discussion were that ACSR was necessary if we are going to continue in the aluminum business, or at least expand in the alumium business.

Charlie Ellis then held the floor and said he hoped that we could continue to keep this volume production in the plant as it was an excellent thing for us. We had gained much experience in the last year. We had volume runs that we would not otherwise have had. The three other members of the group seconded the expressions of opinion previously made and as a result I feel that the objections

which were many, even though small, are going to be faced more constructively in the future.

Aluminum—Properzi and Drawing Equipment

ADRF then introduced the subject of Properzi and drawing equipment in Rome. The Properzi equipment had just started operation earlier in the week. CHE said even on such a limited operation he was very bullish on the Properzi [fol. 5029] running without as many of the difficulties as some of our competitors have had. We certainly were benefiting at least up to this point on seeing Anaconda equipment running and getting the benefit of their advice on what pitfalls to avoid. ADRF asked whether, or how soon, we might be able to indicate from our initial experiments we might be ready to consider volume production because the matter of supply, not to mention where we were going to sell such volume, should be discussed and planned.

RAS asked that we be given about two to three weeks before we answer the question of when Engineering, Laboratory and Production Departments felt we might consider production for sale. This was readily agreed to.

It was brought out that the initial 30,000 lbs. that we had on consignment from Alcoa was 99.7 with .3 Boron. ADRF indicated from discussion with Phil Coffin of Alcoa that this particular grade was not only more expensive but was also scarcer. Alcoa thought that we should be looking toward the use of 99.55. It was agreed that RAS would investigate this and see what the possibilities were of our using it. There seemed to be an agreement that production at the rate of probably 1200 pounds per hour was easily possible. (Original estimate was 2000 pounds per hour.) Indications pointed to a production of about 250,000 pounds per month to operate efficiently. This presents problem of supply, particularly if 99.7 is required. ADRF then asked where the Sales Department would dispose of 250,000 per month and GER stated that we could use 125,000 per month in covered wire and 125,000 per month in bare drawn for other fabricators. Going beyond this, and to use the greater capacity of the Properzi equipment, ACSR would be the main outlet. CHE indicated that we had some capacity to do some steel stranding, or ACSR stranding rather, and we would supply the individ-

ual conductor from our own drawing. He will again review how much of this is available. GER will review potentials of ACSR from Rome.

[fol. 5030] "Whither Goest Thou"

I opened this discussion and used the strange quotation above in order to get an expression of opinion from the group as to how they personally felt about where we were heading in Rome Cable. The importance of our determining just what our best thinking was on this subject would determine whether we stumbled into the future or whether we planned for it. I also indicated it could have quite a considerable effect on the group as individuals as well as the Company. Were we interested in carrying on our meteoric rise which might even be considered as potentially continuing if we listened to the estimates of the future or were we interested in staying just a medium sized Company maintaining all the current high standards and keeping up to date but, of course, sacrificing volume. I particularly stressed the ever westward growing center of population, the very important factor of freight, as well as a number of other factors which penalized a plant having only one location. I also brought into discussion HTD's mention at various times of the potentialities of a branch plant located at Texas. I further indicated that certain preliminary studies had been carried on regarding locations in Texas. I also indicated that certain freight studies were in process of compilation and review. HWB expressed himself that if we expand he did not feel that Rome was the place and that if we stopped growing we would probably slip backwards. He preferred to reserve his decision or recommendation until more facts were available. Rudy indicated that he did not feel we could stop growing, that we should continue to grow in Rome, that our entry into the utility field was important and that that line could be further expanded. If we go outside of Rome that should only be done after a very considerable study. We must determine whether we are going to meet competition all over. He brought out that Magnet Wire expansion cannot be done in Rome, aluminum expansion cannot be done in Rome, and Electronics, particularly in the communication field, cannot be done in Rome. He felt that being the kind

of company we are that both expansion in Rome and at [fol. 5031] some outside point or points was a natural evolution.

I called on Glenn Rolston next. He indicated he was more of a conservative. He did not feel that the use of kilowatt hours as a growth factor is going to continue to be proportionate in the use of wire and cable, that utility central stations did not use as much wire and cable as they did years ago. He favored consolidating our position here in Rome and that as he viewed the competitive picture there were probably some products in our present line that we may have to discontinue making, but he also added that there are other types of products that will probably use that equipment and that proper studies should be made accordingly. With particular reference to the utility field he indicated that Bare and Weatherproof were going to be unprofitable in certain districts and that we would probably have to retire from competition in those districts. We should concentrate, therefore, on power cables and other specialized items. We should promote aluminum, assuming that Rome is the place to do so. He felt that not only as far as products were concerned but we should consolidate our position as far as individuals were concerned. He felt that in the rapid pace we had been traveling in the last few years that of necessity we had all lost a considerable touch with certain important phases of the operations. He dreads the thought of expansion other than at Rome. He urged greater reworking of our product. On ACSR he thought that if we were limited to Rome we would only be able to do a job in a very limited area. He questioned expansion of facilities. We should improve methods and reduce costs.

Charlie Ellis was next and he said that if past history was any criterion he does not believe that the basic dynamic spirit on which we were founded and have exhibited since the start could be changed. We will have difficulty in saying "no" to opportunities that are thrown at us. He agreed that we would carry on refinement in our present product line and attempt to improve. His bet was that we will expand. He also felt that we must look toward still making big outlays of cash for equipment to take care of changes in product mix or improve production methods.

[fol. 5032] More and more as we have established our reputation will the kind of opportunities be offered to us which are a challenge and which we probably will not be able to resist.

Jack Dyett indicated that on the basis of past experience, that while we thought we wanted a relatively small company, we seemed to have had expansion whether or not we wanted it and he cited Torrance, aluminum, Spiral 4 as examples of this particular point. He personally is for normal expansion, urged that in keeping with our earlier meetings that we get our organization in shape to meet the future so that we might be better prepared if opportunities develop. We should view the immediate future considering timing as being one of the important parts of it. He felt that perhaps we might continue our expansion trend possibly two or three years from now. He urged that we look at expansion but, like Glenn, that we consolidate first.

Jay Sarles indicated that there was gold in the hills in the expansion program that we have had and have carried on for some time. He stated that he preferred one operation here on wire and cable with better cultivation of our present facilities. Summing it up, he favored modified expansion here at Rome.

In summing up the views it must be borne in mind that these views were expressed without any supporting data on freight or profits or any other information. It was merely my questioning them about what their thinking was regarding their hopes or thoughts for the Company in the future. Summing it all up, they agreed that Charlie and Rudy were more inclined to expansion outside of Rome, while agreeing that we should consolidate our position in Rome. Rudy, of course, indicated that there were quite some considerable places for expansion here in Rome on our present line. Glenn, Jack and Jay were more inclined to modified expansion in Rome. Harry, as indicated, desired to reserve his vote.

In any event, discussion brought out that we were not going to exactly stand still so I then asked whether any of them had any thoughts of what we should do regarding [fol. 5033] our organization in order to prepare ourselves better for what seemed to be our future destiny. Jack suggested that on students where we had agreed in our

organization audit that we needed more, that we should start earlier and provide opportunities. Charlie felt we needed more assistants for top people. Glenn was somewhat worried about our method of training men. Harry thought the President needed more assistants. The President felt that there should be more attention paid and the staff built up to handle such things as public relations, administrative assistance, market analysis, sales promotion, expansion of internal sales, expansion of interpretation of reports and that we plan our training program better for employees and for supervision.

The meeting adjourned at 1:45 'til 9:30 Sunday morning.

Meeting—Continued January 25, 1953, Sunday Morning Session

Before we started on our main subjects for Sunday morning I introduced the subject of excess profits tax money. I indicated that we had embarked on a program with Cornell and started a movie and certain other projects, having in mind carrying on the investigation during this particular period hoping that results would be forthcoming or at least trends indicated by the time the Excess Profits Tax expired. I stated that we all believed that taxes would undoubtedly be high for a considerable period of the future and that we should possibly explore any other items that would fall into the same category as those previously started. I particularly brought up whether we should expand our outside research contact. Rudy answered promptly by saying that expansion must not mean dilution. A strong central core is necessary for research. He felt that we should draw on outside services for the "dreamer" type of research. He is not interested in a divorsed central research. He further expressed himself as feeling that we should not tie our-
[fol. 5034] selves wholly to one university, that there were many opportunities for specialized work with other fine technical institutions. In fact, he brought out that Dr. Winding in his work with us was also using the technical facilities of certain other institutions in order to get the best help on some of our problems.

The only other remark made at this point was that Charlie Ellis felt that if we were carrying on any expan-

sion program or looking for expansion in some other location we might carry on some of the engineering work and get some outside help so that if the decision was ever made to actually do the expansion all of the preliminary work would have been done.

Capital Expenditures for 1953 Fiscal Year

Charlie Ellis than took the floor and said that in presenting the report we could look at the minimum recommendations of the Rome Engineering Department for that plant at somewhere around $450,000, but they also had a program that would run as high as well over $1,800,000. He then reviewed in detail the recommended items on the smaller program. Copy of the detailed report is attached. As you review the maximum total suggested I think you will be impressed, as I was, with the very sizable amount of buildings and the relatively small amount involved in increased capacity. The items marked "X" on the exhibit were the ones recommended for prime consideration in the new fiscal year. Going down the line on "Class 1—Primary Capital Items" you will note an item of $106,550 to get a new superstructure in Building 1. This is the present Shipping Room which is in bad shape and calls for some building out over the tracks. The third floor office section expansion over Building 15, the present Conference Room, Production offices and Laboratory, has a counter-suggestion of making a separate Laboratory and turning the present Laboratory over to Production offices and other uses. As a means of providing room suggestions were made in lieu of this suggested expansion program that some of the Laboratory be [fol. 5035] moved over to the old office which would relieve some congestion. I also suggested the use of certain portions of the Spiral 4 offices which would not be used with the reduced schedule there. The program calls for 14 new fine wire machines which would give us about 80 to 100% of our present capacity with new fine wire equipment. Our costs are high on this particular product, as you know. It was also brought out, however, that many of our present fine wire customers had installed their own fine wire equipment and that we might not have as sizable a market in the future and that study should be given to this. A more intensive study of Cooke annealer should also be done.

When we reached discussion of the Laboratory it was brought out that the current list as submitted did not contain the requested items for the Laboratory for 1953. This would add some $20,000 to $25,000 more. When we came to the Compound Department I think I told you that certain special recommendations were being made on that but which had not been resolved so that will await future developments. Likewise, it was brought out, as I mentioned in the Aluminum report, that Alcoa now wants a million feet per month of Triplex wire. This would mean adding another Triplex machine. Discussion ensued during the morning as to the type of machine. I have already brought out that we need modifications on the present type and that the Engineering Department will design a new machine. This, however, will delay our increasing our capacity by several months.

On "Class 3—Capital Items of Experimental Character", Charlie included the Synthinol project of replacing 50 h.p. motors with 100 h.p. motors on Plastic Extruders #4 and #5 and replacing a 20 h.p. motor with a 30 h.p. motor on Extruder #65-3. This would cost $24,000 and was included in the overall total of minimum expenditures. This program alone would save $50,000 a year.

The controlled temperature feed for C.V's and plastic compound powder mixing and extrusion also included under [fol. 5036] Class 3 were recommended for inclusion in our program.

"Class 4—Capital Items for Future Consideration" carries the recommendation of $100,000 for 10 Vaughn fine wire machines as worthy of consideration in the new fiscal year. I have given you our discussion on the ACSR and you will note that that involves an expenditure of $285,000. I believe that while our other discussion indicated the necessity of having ACSR in our line, we had other considerations brought out that should be explored first before any decision is made.

After Charlie finished we had a general discussion and I mentioned that I felt the trend was going towards need of more cabling equipment and that we didn't have proper ranges. We either had good equipment for small or good equipment for large, but that we were out of the competitive picture on certain intermediate items. Rudy brought out

that more tank test room was needed and that three new sparkers, Entwistle type, at an estimated expenditure of $15,000 were quite essential. We urged that a good floor area study should be made with particular reference to the demands for the Spiral 4 building. We discussed the advantages of closing Henry Street and connecting Spiral 4 with the present Insulating building. I asked that the factory and plant engineering check with both research and development engineering as well as the Sales Department as to new products and added capacity for present products in their viewpoint for the future.

We next tackled the question of Torrance requirements for fiscal year 1953. Their original request amounted to $151,000 which we cut down to about $35,000 as items that should be considered for the new fiscal year. We definitely felt that any other expenditures should await the results of the actual production of the hot dip rigid.

As you can well see from the above and the perusal of the items submitted this was quite a session in itself.

[fol. 5037] Subject: Torrance

I opened the discussion on Torrance by referring to our Organizational Audit meeting wherein we had very thoroughly discussed the question of top management at Torrance. Various names were suggested in the event of an emergency in that meeting.

I stated I wanted to have a very complete discussion of Torrance problem because I knew it was thought of by some as "Fraser's Folly". I indicated I planned to go to Torrance early in March and read copies of both Art Andersen's and Gil Woodill's letters of reply to my letter of January 2nd. I expressed the feeling that if the production troubles on rigid were reasonably well in hand by that time I saw very little problem about coming to some agreement that would make everybody's life much easier. I stressed the size of the investment which we had there and regretted that we had no projected costs on rigid to indicate potential profits. These are being prepared and should be in my hands by the latter part of the week. These have since been received and are being studied. There is some amount of discouragement in them but also some amount of encouragement. Both Charlie and I feel

that they are ultra conservative. Continuing the meeting Charlie Ellis suggested that possibly some one could be brought to Rome to get further indoctrination in our management policies. He also suggested the possibility of getting a conduit man and integrating him to our policies or possibly getting a Rome man and integrating him to conduit problems. Jack suggested that it might be better to have someone from Torrance coming here more frequently and staying longer. Charlie felt it would be well in their present production difficulties to keep away from there at the present time.

[fol. 5038] I really started some very serious discussion when I asked whether the amount of discouragement that we had had on Torrance indicated that we should sell it. I told them I felt that I could think of at least four people who would definitely be interested. This suggestion was greeted by a resounding "No" from the entire group. Glenn feels that he needs it as a product in order to keep down the overall cost of his Coast operations. Rudy felt that it provided a good base for Coast operations. The importance of improving their quality control was stressed and Rudy reported it is under way. After all the discussion it was felt that the present method of contacting be left as is, but that on production matters, rather than Jack and Gil discussing the differences those should be referred to Charlie and he taking them up with Art.

The difficulties of operating with a three thousand mile space difference were stressed.

I asked how important the lack of sizes above 2" would be. GER said that it will be a big problem on individual projects. I then asked whether we would be interested in getting some one to supply us with sizes above 2" for the West Coast, whether we would be interested in having conduit available in our Eastern operations in making an arrangement with a supplier, whether we would be interested in making the West Coast needs of that supplier, whether we would be interested in selling a portion of our output to someone like Essex for example. I also asked whether we would be interested in production of mechanical tubing.

In answering these questions it was brought out that as far as not having the sizes above 2" are concerned we

are always dealing with the jobber and we would only get a certain percentage of his business anyway. O. I. Lewis is going to the Coast for a trip in about three weeks and he expects to evaluate this question.

[fol. 5039] On the question of manufacturing for another on the West Coast GER felt that he would prefer to capitalize on our location ourselves. He does not want to manufacture for Essex.

The question of mechanical tubing is being studied but to date he felt our costs had been out of line.

Before adjourning the meeting on Sunday morning I stated that I had several answers to my letter of January 2nd wherein suggestions were made to reinstitute the old Planning Committee as such. Perhaps with not as frequent meetings but to get together in the larger group. I pointed out that in the past while all the members of the Committee indicated that they would make suggestions for an agenda, generally the agenda was left entirely up to me and in many cases we were educating quite a group on various company matters and that in doing so our progress and our results were frequently slowed up. I had also had the criticism some people had resented the feeling that they were being placed unnecessarily on the spot before too large a group of people. The Executive Group at the meeting felt that the smaller group was much better and it was their responsibility to see that their assistants were kept informed, rather than adding that to my responsibilities. Noble resolves were made in that direction.

Meeting adjourned at 1:45 with the general expression from every one that the group meetings had been highly successful and they were ready to tackle the other sizable number of questions as soon as a mutually convenient time could be arranged.

[fol. 5040] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 82

April 7, 1953.

Mr. Ralph V. Davies, Vice President,
Aluminum Co. of America,
801 Gulf Building,
Pittsburgh 19, Pa.

Dear Ralph:

This is the first opportunity since I got back to sit down and summarize some of the things that we talked about last Wednesday. I will not attempt to cover Messrs. Rolston and Schatzel's visit to your Kensington Laboratory, but I do know that they were very much impressed and felt the trip was very worthwhile. I, too, can say that about Wednesday's visit.

As you recall I opened the discussion with the desire for the usual frankness regarding our mutual agreement. I believe we both recognize that up to the present time it has not been as profitable as it can be for either party. I think we both entered the agreement with the thought in mind that there would be a period of experimentation, with our getting acquainted with the running of aluminum and your getting acquainted with the covered wire and cable industry.

We recognize that your organization must of necessity keep abreast of developments in our industry and it is our job to sell you on our ability to manufacture your requirements on a profitable and friendly basis for both parties.

I gathered from expressed opinions that you had no immediate idea of embarking on your own manufacture and that the present agreement did not require another extention and was adequate for our present needs. The volume as estimated by Phil Coffin would run somewhere near 3,000,000 pounds of bare conductor for the current calendar year, which is the same as was estimated a year ago. He brought out that his sights had been raised on Triplex to approximately 1,000,000 ft. per month, which would need from 80,000 to 100,000 pounds of bare aluminum and he estimated Neoprene Line Wire at 150,000 to 200,000

pounds of bare aluminum. He indicated that just as we have found the situation he was more pessimistic about Polyethylene. We discussed the possibility of our furnishing you a special textile type that might run to several carloads per month for American Gas and Electric or similar customers. I indicated that we would probably give you a price on textile covered aluminum that would obviate your operating your small department at Massena, should you so desire. On the subject of Building Wire you indicated that because of its manner of distribution this was a field where we should do the developing and selling and that you had no intention of entering that field at the present time.

We brought up the subject of the heavy stock and large amount of our shipping space now presently used in carrying that stock for you. Phil indicated that you expected to release half of that stock stock from Rome and will try to plan to keep the stock at about 2,000,000 ft. in the future. While we were on the subject of supplying material we raised the question of extreme scarcity of Neoprene. If we find we are unable to better our supply we will get in touch with you in an effort to get some allocated to us for your needs.

[fol. 5041] We brought up that we still did not know the real evaluation of the scrap which was on hand at Massena and Phil promised to follow through and get us some decision on that.

We discussed the matter of longer lengths on reels as supplied by you and we understood that there is some possibility of your sending us 30" reels but that the investment for larger supply reels would cost $25,000. We did not attempt to cover details in the larger meeting but touched on certain problems that we had had on deliveries, damaged shipments, specifications and a number of other misunderstandings. Out of all this there came an indicated need for a good liaison man for ALCOA, first talked of as being located at Massena but later in the afternoon suggested as one possibility for Rome. We indicated that we would be glad to do everything possible to train such a man in the practices of the industry.

At lunch I brought up the subject of ACSR and out of that came a very considerable discussion. 1) by the use

of the Properzi equipment we could make a limited quantity ourselves. 2) a toll arrangement similar to the covered toll arrangement you have with us might be worked out in reverse.

I then brought up the fact that perhaps if we operated from pig on consignment using the Properzi rolling and our drawing equipment with longer lengths plus certain other changes that we were making in our covered processing we might be able to come up with a packaged proposition on covered wire, which would be more profitable for both parties. We are making some preliminary studies on this possibility and will get in touch with you when they are completed.

We discussed the matter of a long term contract for pig and after learning its purpose we agreed to send in our contract and estimate that it will run from 250,000 to 350,000 pounds per month.

We had some other discussions regarding your being able to supply us with a conductor to compete with a new Kaiser product, similar to Aldrey, being used in self-supporting cable and Phil Coffin and Max Noyes went over the matter with Rudy and Glenn and suggested a program involving certain samples from you.

I think this about covers the main items that we discussed. Again, thank you for a nice lunch and a very pleasant and constructive day.

Sincerely, —— ——, President.

ADRF/m

[fol. 5042] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 83

May 4, 1953.

1952

Research and Engineering

During the year progress has continued in the improvement of our products and wider acceptance in utilities and important industrial fields. While the shortage of metals have sometimes handicapped, we have attained a recognition in the chemical and petroleum field which promises to de-

velop. Our Laboratory has made excellent progress in the investigation of the many new synthetic Polymers and in adapting them to our uses, as well as to investigate and adopt new processes for our production. Among these, while still under development, we may mention cold feed of rubber compounds with the elimination of warm-up mixing, the continuous casting and rolling of aluminum rod, and the powder mixing of plastics. This year has also seen our production of Silastic insulated wire and the completion of extending our range of sizes of glass covered Magnet Wire to smaller sizes as well as the production of considerable amounts of aluminum glass covered Magnet Wire. We make no prediction of the future growth of aluminum in this field, but we are prepared to explore and take advantage of any trend.

Our department has supplied Sales and Manufacturing with Technical Service in the form of data, Sales Bulletins, etc. We acknowledge the excellent cooperation received from all departments. A few of the more important items are listed below:

1) Aluminum—Continued expansion of sizes and types of products. The initial development of continuous casting and rolling of aluminum. This is still in the pilot plant stage. Development and production of glass covered Magnet Wire. Obtained approvals of Service Drop Cables from REA.

2) Rome 60—Completed development of rubber jackets and insulation to comply with low-temperature requirements of Air Corps and obtained approvals under Military Specifications. Offered and accepted business (Lincoln Electric) on lower cost Welding Cable. Extended Rome 60 (CV) to include 4 conductor #12 AWG.

3) Magnet Wire—Extended range of glass covered Magnet Wire from #14 through #22 AWG. Cooperated with and obtained approval of ASESA for Glass Magnet—Aluminum Glass Covered Magnet Wire.

4) High Voltage—During the year signed a license to operate under patents on Strand Shielding (License under Peterson Patent). Recognition of our RoZone insulation was continued as evidenced by our supplying in a wider area both Control and Power Cable up to 15 KV ungrounded [fol. 5043] neutral.

5) New Processes and Equipment—We completed an investigation of our recovery of copper from Rod Mill wash water with the assistance of our Research Consultant at Cornell University. Recommendations for installation of equipment were made in cooperation with our plant Engineering department. When complete the savings in copper will be sufficient to pay for equipment in about a year and at the same time overcome a troublesome problem of stream pollution.

Our Properzi Continuous Casting equipment was installed by our plant Engineering department, and has been operating as an experimental development unit by our laboratory. Much time and study were given to the selection of equipment and its installation by Mr. Fraser and Mr. Fitler of the plant Engineering Department. Because of this and the cooperation of Anaconda in permitting our men to study and witness the operation of similar equipment in their plant, we have been enabled to greatly reduce the time of actual reduction to practice. There are still many problems to be solved, and improvements in the way of refinement and instrumentation to be made. The equipment is producing and it is planned to turn it over as a production unit on July 1.

The installation of new continuous lead press is complete and operating. Its use will permit extending our lengths of lead covered cable, and reduce the patching of larger sizes of rubber sheathed cable with a consequent improvement in quality and cost.

We have been investigating the Cold Feed process as developed by Western Electric Co. for about two years. This has required changes and development in equipment, in processes, and in the compounds used. Through the use of this method a step in the processing of rubber, warming up, is eliminated with elimination of rolls and floor space, It also permits close control of dimensions and consequent saving in material. Our first unit is now in limited production.

6) Among the new products developed and approved are some which as yet have not entered our commercial picture to any extent but bid to do so during the coming year.

Underwriters' approval of an all plastic type of Barn Wire (RoBarn) has been obtained on a design developed

and submitted during the year. This is lower in cost than our present RoBarn. At the May 18 meeting of NFPA it is expected this type will be approved as a new type of underground feeder (Type UF).

[fol. 5044] Approval of Government departments has been obtained on the four most popular sizes of High-Frequency (RG) Radar Cables. A new multi-paired Polyethylene insulated Telephone Cable line for pipe lines and certain REA uses was completed and approved.

7) We would like to again mention Spiral 4. While the volume of this product has decreased, we have maintained a high standard of quality and efficiency. This has recently been recognized by the Signal Corps in accepting a Manual of our inspection prepared at their request, and in placing Rome Cable on reduced inspection. We are proud that Rome Cable is one of the first companies manufacturing any product for the Signal Corps which has been accorded this recognition and confidence.

General—With the elimination of controls we are already conscious of the increased tempo of competition, both in costs and quality. Increased supervision and facilities in our inspection department, have been provided or are planned. Many new suppliers of established materials or of new materials make their appearance. While there have been two suppliers of Polyethylene, plans are now completed so we know we will have seven producers. Other companies are entering the field of Silastics. With the turning over of synthetic rubber to private industry new problems will be presented. Our laboratory is alert to these developments, and plans to cope with them. In this field we have the assistance of our Consulting arrangement with Dr. Winding of Cornell.

During the year an Industry Standard for Butyl Rubber insulation was adopted by IPCEA. We are prepared to furnish in accordance with this; while there was efforts made at standardization of several other specifications, progress has been disappointing. The years ahead will be one of even greater activity in this direction.

Two years ago the Industry (ASTM and IPCEA) adopted specifications for moisture-resistant rubber which appeared in Rome Cable specifications first in 1946. In our high-voltage specifications in 1947 we were the first to in-

clude a requirement for corona-level requirement, by equipment developed by our engineers. During the year we have been pleased to see this method adopted and advertised by the largest electrical manufacturer and one of the principal utilities, so that it is gaining wide recognition by producers and users alike. An industry committee has been formed to draw up a recommended Standard of Corona-level testing.

Rome Cable Manual published in 1947 has gained nation-wide recognition, and is known in many countries. Plans are under way to revise and bring this up to date for publication early in 1954.

[fol. 5045] We have had one patent No. 2,635,136 for Sparking Equipment issued in 1953. We have issued a license for a manufacturer to make an improvement on continuous vulcanizing equipment on which a patent is pending.

R. A. Schatzel.

RAS P

[fol. 5046] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 84

ROME CABLE
CORPORATION

ROME, N.Y.

REPORT SUBMITTED TO THE BOARD OF DIRECTORS OF ROME CABLE CORPORATION AT THEIR MEETING SEPTEMBER 2, 1953

I present herewith net sales and earnings by fiscal years up to March 31, 1953, the April-June quarter of this year and also the month of July:

Fiscal Year Ended	Net Sales			Earnings
March 31, 1937	$ 1,798,092			$ 1,436
March 31, 1938	4,957,103			71,087
March 31, 1939	5,370,665			245,036
March 31, 1940	6,080,902			297,736
March 31, 1941	9,465,851			431,501
March 31, 1942	11,631,785			592,135
March 31, 1943	12,712,333			367,654
March 31, 1944	16,909,735			446,709
March 31, 1945	22,796,218			486,653
March 31, 1946	16,975,009			398,973
March 31, 1947	18,436,305			1,359,593
March 31, 1948	25,202,853			1,152,579
March 31, 1949	26,088,523			1,115,960
March 31, 1950	19,602,984			302,209
		Add: Portion of metal profits set aside in prior years to offset copper loss		150,000
				452,209
March 31, 1951	35,142,901	Net	$1,922,136	
		Transferred to earnings retained	150,000	1,772,136
March 31, 1952	42,657,848			1,753,651
March 31, 1953	54,632,976			2,008,321
April - June Quarter	13,858,372			528,190
July	3,289,935			91,481
Total 4 months	$17,148,307			$619,671

It will be noted that the sales for the first four months are at a lower pace as compared to last year. The uncertainty overhanging the copper market

[fol.5047]

ROME CABLE CORPORATION

is apparently a deterring factor and our customers appear to be holding down orders until prices appear firmer.

Torrance P and L figures for the first quarter of this year show a net loss of $12,926, but with July sales of $402,903 a small profit of $1,446 was made. Sales in August were particularly disappointing. More about this situation later.

The breakdown of sales April to August 31, 1953, with August figures estimated, are given below:

	April-August 1953	April-August 1952	% Increase or Decrease
Rods	$2,583,000	$2,317,035	11.5%
Bare	3,137,000	2,285,832	37.2
Weatherproof	1,330,000	1,319,617	.8
Magnet	1,369,000	1,371,017	-
Rubber Covered	8,355,000	8,050,407	3.8
Torrance - E.H.T.	1,106,000	1,211,362	(8.7)
T.V. Mast	234,000	-	-
Spiral 4	2,781,000	6,211,024	(55.2)
Aluminum	936,000	523,802	78.6

Figures on investment and net return on investment are shown for the last three years on both the Rome and Torrance Plants as follows:

	March 31, 1951	March 31, 1952	March 31, 1953
ROME PLANT			
Investment	$10,474,000	$10,578,000	$10,808,000
Earnings	1,798,000	1,614,000	1,993,000
% Return	17.2%	15.2%	18.4%
TORRANCE PLANT			
Investment	$2,206,000	$3,496,000	$3,821,000
Earnings	124,000	139,000	15,000
% Return	5.6%	4.0%	.4%

Inventory investment at our Torrance Plant is shown below, which indicates a growth of nearly $600,000 in inventory valuation since July 31, 1952.

	July 31, 1953	March 31, 1953	July 31, 1952
Cold Rolled	$529,159	$459,807	$381,944
Hot Rolled	737,461	626,741	349,710
Zinc	117,819	106,748	67,480
Other materials, Labor & Expense, etc.	316,297	302,544	337,264
	$1,700,736	$1,495,840	$1,136,398

In addition to the above inventories we have authorized consigned stocks of $260,000 of E.H.T. and $258,000 Rigid, a total of $518,000. I am told that these stocks are necessary under present conditions in order to promote sales.

[fol. 5048]

ROME CABLE CORPORATION

The backlog of orders is as follows:

		Quantity-Pounds	Value
January 30, 1953	Wire & Cable	13,966,000	89,290,000
	Aluminum	878,000	753,000
	Spiral 4	1,407,000	8,775,000
	Torrance	-	266,000
May 31, 1953	Wire & Cable	10,971,000	7,039,000
	Aluminum	660,000	483,000
	Spiral 4	963,000	5,406,000
	Torrance - EMT	-	3,600
	Rigid	-	219,600
	T.V. Mast	-	42,000
August 15, 1953	Wire & Cable	6,388,000	5,116,000
	Aluminum	567,000	502,000
	Spiral 4	735,000	4,110,000
	Torrance - EMT	-	113,000
	Rigid	-	107,000
	T.V. Mast	-	44,700

Although the copper supply situation appears solved with most suppliers offering nearby shipment, the price confusion continues to exist. Chile has accumulated approximately 85,000 tons of copper which have been offered to the American Government at the world market price of about 29 cents a pound. However, the fabricators of the two large American companies with Chilean properties must still pay the 36.50 cent level. In this Country the producers are charging 30 cents a pound while copper can be purchased from the smelters at 29 cents and under that from certain foreign sources. After an unexpectedly low opening of the London Exchange on August 5th steady European buying has firmed the price to figures approaching our domestic quotations. In the United States, however, fabricators during the past two months as well as for September are keeping their copper purchases to a minimum.

The maintenance of high copper prices throughout the summer in the face of lowered demands has been surprising. After the Chilean stockpile is sold and its current production enters the market, I feel we shall experience lower prices. In view of this our purchasing policy continues to be conservative with all our copper on contract being bought on an average monthly figure or price in effect on date of shipment.

As a result of small rigid conduit production for the past two months, our third quarter steel orders are more than sufficient to fill our needs through December. Fortunately, most of our steel in inventory was purchased before the last steel price increase. All other materials are in ample supply to meet current requirements.

[fol. 5049]

ROME CABLE CORPORATION

Factory payroll statistics for Rome and Torrance are presented below:

	Week Ending	No. Employees	Total Payroll	Average Weekly Wage
ROME	Sept. 14, 1952	M 1032 F 169 1201	$87,985.40 3,781.98 91,767.38	$85.03 57.88
	Feb. 1, 1953	M 1008 F 118 1126	85,954.74 5,460.17 91,414.91	85.27 46.28
	Aug. 16, 1953	M 1019 F 93 1112	81,260.41 5,473.59 86,734.00	79.75 58.86
TORRANCE	Sept. 13, 1952	149	13,753.67	92.31
	Feb. 7, 1953	153	11,611.82	81.20
	Aug. 15, 1953	150	12,686.04	84.57

E.R's approved since our last Board meeting are as follows:

	E.R. No.	Description	Amount	
ROME	1583	Purchase one Model 1250 Multilith	$2,011	
	1584	Purchase and install an additional concentric taping head on multiple taping machine #61-23	1,600	
	1585	Construct and install two paper humidifying cabinets for Magnet Wire Dept.	800	
	1586	Purchase and install one band saw in Carpenter Shop	1,400	
	1587	Purchase one portable centrifugal gas driven pump	400	
	1589	Purchase and install 5 brazing units for stranders	1,000	
	1590	Purchase and install one electrically heated vacuum drying oven in Laboratory, Item #3	400	
	1591	Purchase and install electrically heated vacuum drying oven in Laboratory, Item #4	400	
	1592	Purchase and install three electric hoists	1,330	$9,341

[fol. 5050]

ROME CABLE CORPORATION

E.A. No.	Description	Amount	
TONAWANDA			
C-204	Make expenditures for 1953 Furniture & Equipment	$2,000	
C-205	Purchase a 9,000 CFM zinc dust exhaust and collecting unit	5,390	
C-206	Purchase one 1951 used "Krane Kar" mobile Swing Boom Crane Model AY	8,755	
C-207	Purchase spray showers, etc. to be installed along the electro-plating line	1,500	$17,645

The following Additional E.A's were also approved:

ROME			
1546-A	Provide for an additional appropriation on cold bend test box	$ 200	
1568-A	Purchase and install 14 Vaughn Fine Wire Drawing Machines	154,000	
1510-A	Extra for high pressure pump and motor	977	
1556-B	Additional for Edmunds High Speed Planetary tripler	725	
1563-A	Additional for two test tanks in Bldg. #20	6,300	
1569-A	Additional to cover cost of a spare blower for bar furnaces	323	$162,325

PROPERZI CASTING AND ROLLING EQUIPMENT

This equipment according to C. H. Ellis, is giving us reasonable satisfaction with a running speed of approximately 1450 lbs. per hour although it was anticipated at the time of purchase that we would secure 2000 lbs. per hour. However, we have ordered equipment to convert our unit to the #5 type which should give us 2000 lbs. per hour capacity. This total change will cost about $2600 including the wheel and changes in the rolling equipment. It is quite possible that we may have to order a larger electric motor for the enlarged production. I believe that as we gain a little more experience in the operation of this equipment we will be able to improve the quality of the product as it comes from the casting and rolling operation.

The Robertson lead press, according to C. H. Ellis, has proven to be mechanically sound but we are having operating difficulties which we find some of our competitors are also experiencing, but we hope will be overcome by technical developments by the Robertson company. The quality of the product from the extruder is excellent.

[fol. 5051]

ROME CABLE CORPORATION

TORRANCE PLANT

In my report to the Board on September 4, 1952 I spoke of the many troubles that had occurred at our Torrance Plant due to delays of furnishing equipment, necessary changes in design and at times lack of steel. In our Annual Report March 31, 1953 I stated, "Evidence is now available that we should begin to get fulfillment of our hopes in production of high quality Rigid Conduit by our new process in the current quarter". I am sorry to have to report that our difficulties encountered in getting the Sendzimer process into satisfactory operation have been varied and many. I will not attempt to go into details. Latest information from conversation that Ross and Charlie had with Art Andersen on August 31, 1953 is indicative of progress and they are both of the opinion that they fully expect by late this week or next week that we will be in production of Rigid Conduit of an entirely satisfactory quality. In fact, Art states that we will have a better quality than any of our competitors and that the cost will, in his judgment, be below the cost estimated by Jay Sarles after his recent trip to Torrance. I appreciate some of these many difficulties and think that Messrs. Andersen and Ellis are entitled to our appreciation for the ingenuity that has been displayed in overcoming some of the difficulties.

The Sendzimer process has never before been put in successful operation on pipe. Insofar as we know we are the only licensee of this process for galvanizing pipe. Our sales have been very low for months past and we have been put in a bad light with our customers owing to our past difficulties. I hope that we will soon be producing such quality that our Sales Department will accept the challenge with enthusiasm and get enough business for us to run at a reasonable profit.

ROME PLANT

Again may I stress that I believe this is a golden time for us to account efficiency, cost and quality, not only of product but of service. Let us leave no stone unturned to overcome some of the difficulties that seem to be particularly inherent in our present rubber production. It seems apparent to me that we have been trying to do too much copper and aluminum insulated cable business in the limited space available for this enlarged production.

FUTURE PLANNING

This seems a very opportune time to press our consideration of what we should be planning to accomplish in the balance of this year and the next fiscal year to overcome some of the difficulties above mentioned by attempting to secure additional space and such equipment as is necessary in order to bring about not only greater efficiency but lowered cost of production. A comprehensive study should also include area market opportunities and a study of the effect of transportation charges to each important sales area on the percentage of profits which might be expected on the various products.

BUSINESS OUTLOOK

Since the first of the calendar year we have been steadily cutting into backlogs and in no week since then has the volume of incoming orders equalled out-going shipments. We believe the lowest level was reached in mid-August, with the unsettled price situation for raw copper and predicted lower prices

[fol. 5052]

for that metal it is natural that policies dictating buying only for immediate needs should prevail. The break in insulated wire prices in July and late August produced further hesitancy until it is determined that the market has reached its bottom level. We expect that business in the last four months of the year will be off by at least 10 to 15 per cent from the first half levels.

WIRE PRICES

Early in July base prices on bare, weatherproof and magnet wire were reduced from 32.10 cents to 30 cents copper base to recognize the change in availability of copper at the 30 cent level. In the same month prices on most standard sheet price items in insulated products were reduced approximately 7 to 8 per cent, with 2 to 3 per cent representing actual copper price reductions. Some of these price reductions ran as high as 15 per cent.

On Monday, August 31, we met further industry reductions of 7-1/2 per cent on most building wire items and 10 per cent on non-metallic sheathed. We believe this is the outgrowth of certain vicious practices, such as extra discounts, price protection, etc. offered to get a larger proportion of the reduced amount of going business.

ALUMINUM

It will be noted our aluminum sales for April-August 1953 as compared with a like period last year show a gain of 78.6 per cent. I would expect that with the present price differential between copper and aluminum that this business should continue a steady growth.

We had a visit from Ralph Davies, Vice President in Charge of Sales for the Aluminum Company, and it was indicated that we would probably continue to manufacture their insulated products at least until the end of March 1955. He indicated that their business for the balance of the year on insulated products would be off about 40 per cent from their original expectations. From their studies they continue to be optimistic for the future on a long term basis on a continued upward use of insulated aluminum products. I believe we should do everything possible in our own equipment layout to bring our costs in line on the production of aluminum insulated products.

INVENTORY

Greater availability of material, unsettled price structure and vicious unrealistic pricing practices of competitors generated the usual demand for increased consigned stocks during the last quarter. As a result of a careful investigation by the Sales Department we accepted their recommendation in the amount of 2,200,000 lbs. of copper in order to maintain our distribution. It is quite obvious in this transition period from a controlled order economy to stock item shipments that our inventories will have to be increased.

SPIRAL FOUR

On April 23, 1953 we filed with the Army Emergency Facilities Board a claim for right to use True Depreciation in our Spiral Four contract, a claim totalling $820,531.18. We have had a visit from three officials from the Pentagon designated

[fol. 5053]

to act as a Board of Inquiry into all claims on Signal Corps facilities and are hopeful to get their decision in the near future. No action as yet has been taken on Renegotiation and our total voluntary refunds and price reductions to date on Spiral Four, under our redetermination clauses, total $4,179,467.30. We still have at issue the matter involved in the claim mentioned earlier, the handling of accelerated amortization.

Our most recent checks with the Signal Corps on Spiral Four indicate that they have funds available in the new budget to cover operations for at least nine months additional or until December 1954. There is some possibility that they may eliminate some of the less efficient contractors. In such case we have been advised that we would have further extension into 1955 but it is doubtful if any increased level of operations can be expected.

LABOR RELATIONS

Our contract with I.A.M. Local No. 1875 representing maintenance workers at Rome Plant required reopening negotiations on April 3, 1953. Due to economic conditions at that time an agreement was mutually decided upon to start our negotiations about August 1st. However, the company offered a wage adjustment which was accepted July 13, 1953 including a five per cent increase to the base rate schedule in lieu of the former 4.46 per cent cost-of-living increases. In addition a 6-cent per hour general increase was accepted. The negotiations eliminated a further reopening clause effective December 3, 1953 so that the present supplemental wage contract remains in force until August 3, 1954. Labor relations continue in a satisfactory, friendly condition.

I am advised that absenteeism in our regular factory, not including Spiral Four, for the year ending June 1952 averaged 2.8 per cent, which figure was continued to the end of June 1953. The regular factory portion of absenteeism due to sickness was reduced approximately 10 per cent last year as compared to the prior year.

MEDICAL DEPARTMENT

Certain minor changes in our Medical Department enabled us to provide for cardiographic equipment, eye examination and hearing tests by audiometer.

CAFETERIA

The quality and variety of food furnished by the Slater System in our Cafeteria has been improved during the past year.

COPPER RECLAIMING SYSTEM

With a total capital outlay of approximately $7,000 we hope to save $40,000 per year on reclamation of copper scale in the new settling system and a saving of about $4,000 per annum in the cost of water.

MOVIE FILM

We had the first showing of our movie film a few days ago and our Sales and Engineering Departments expressed their approval of this film as a good vehicle to use with customers and utility engineers. Might I suggest that we give some thought to obtaining a shorter film, perhaps fifteen or twenty

ROME CABLE CORPORATION

minutes duration, to be used for public relations, such as share owners meetings, etc., etc., which would not go into some of the detail shown in our present film but would give a better impression of the type personnel in our plant and the size and scope of our plant and products.

ROME CABLE FOUNDATION

We have invested $70,561.90 in securities under the advice of Carl M. Loeb, Rhoades & Co. They were very generous and cooperative in advising there would be no charge for this service on account of the fact that Rome Cable Foundation is a charitable organization.

BONUS

I suggest that the list of individuals who share in the bonus be discussed and approved at this meeting and that action on partial payment of the bonus should be left to the judgment of the Finance Committee.

EXECUTIVE BONUS GROUP PLAN

In my report to the directors on June 17, 1953 I suggested that the Executive Group Bonus Plan be studied with the idea of making certain changes in same and that the Committee making such study should report at this Board meeting. The study is still continuing, but I feel under present conditions that it is wise not to undertake any revision at this present time and that probably we will take no action during this current fiscal year.

EXCESS PROFITS TAX

Excess Profits Tax expires under present laws, at the assurance of our legislative leaders, on December 31, 1953 so that we will have the benefit of our last quarter without the penalty of this tax. I believe that this tax in the second quarter of our present fiscal year will cost about 45 cents per share. It has been a very heavy drain on us.

LONG TERM DEBT

Our long term debt now stands at $2,104,000 at September 1, 1953. With the enlarged investment due to consigned stocks and the carrying of more staple stocks in our own warehouses it is quite evident that we may be called upon to do some short term borrowing in the not distant future.

SALES MEETING

Our Sales Meeting will be held on September 16, 17 and 18. I think it comes at a particularly fortunate time in order that we may bring our Sales Department up to date with our thinking and stimulate them to obtain a larger share of the going business wherever possible. I feel that with positive assurance of satisfactory quality of Rigid Conduit and the consigned stocks of E.M.T. that we have already given we should be able to secure sufficient conduit and E.M.T. business to put our Terrance plant on a good profitable basis. That is one of our most important immediate jobs in my opinion.

[fol. 5055]

ROME CABLE CORPORATION

DIVIDEND ACTION

I suggest dividend action be taken at this meeting on our Common Stock, payment to be made to stock of record at September 10, 1953, payable October 1, 1953 at the rate of 35 cents per share of Common Stock outstanding.

Appropriate action should also be taken at this time on employees dividend in accordance with the Employee Dividend Sharing Plan.

Respectfully submitted,

R. P. WIGHT
Chairman of the Board

[fol. 5056] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 85

Rome Cable Corporation

1953 Sales Conference

Our Future in Aluminum—G. E. Rolston

Under this subject Mr. Rolston indicated that within the last year some of the companies that intended to use aluminum for different applications had found that it was not feasible from a cost standpoint. This was especially true in the Magnet Wire field and we have experienced a slowdown in demand for this particular product.

However, the use of aluminum as a conductor for overhead use has increased tremendously and by comparison he stated that in 1946 twenty-two million pounds of aluminum was sold for this use as compared to 1952 when some 192 million pounds was sold for overhead use. This growth is exceptional and, while some of it was due to copper shortages, most of it was due to a changing trend of the utilities of the country. ACSR for overhead use has been well accepted and the demand for this product will continue to grow. The demand for aluminum Triplex has increased very sizeably and in view of this we have installed a new high-speed tripler and also a new cold feed CV machine. On this subject Mr. Rolston said there were still too many different types of this particular cable being offered and he asked that we all talk about Rome Cable's standard product and steer our customers toward it. The fewer different constructions we have, the better off we are.

We have announced our activity into the bare aluminum field and, as previously outlined, have necessarily restricted this product to States where the freight is now prohibitive. We are prepared to offer for sale all the distribution sizes in ACSR which includes #4/0 and smaller and all sizes up to 1,033,500 CM-61 strand all aluminum. This should give us a fairly rounded line of bare aluminum and ACSR to offer to our customers. At present, we are limited to .062" as the smallest solid wire that we can draw which means #6-7 strand is the smallest stranded size. We are not in a position to offer aluminum conductor in EC-H26

temper as yet. We will, however, consider selling in any part of the United States if the balance of the job is attractive to us. This will have to be decided by Rome.

Mr. Rolston spoke of the activity in aluminum conductor as far as Building Wire and Cable applies and indicated that the activity in this particular line of products has been limited. Aluminum was first introduced as an electrical conductor for insulated products in 1947 as a Building Wire, but due to lack of connectors and the lack of know-how in handling, it was an unsuccessful adventure. Some manufacturers were burdened with stocks that they could not sell and its popularity was at a minimum. While there has been some activity in the aluminum Building Wire field the demand must be a good deal greater than it is for us to announce this product as one of our line.

[fol. 5057] Aluminum conductor used in Type USE Cable is becoming more popular and may be with us sooner than we think. A few competitors have published price sheets on this product and it will bear watching and he asked for all and any information regarding increased interest from the field.

We are interested in attractive inquiries for any insulated products employing aluminum conductors and these inquiries should be referred to Rome for consideration.

Mr. Rolston recounted briefly the pricing history of Wire and Cables with aluminum conductor and stated that it was more stable today than it has ever been. We have price sheets in our customers' hands on bare aluminum and ASCR, RoLene and RoPrene Weatherproof and also Triplex Cables and he said that when we use these price sheets we should use them correctly and maintain the terms and conditions and discounts as outlined thereon.

With regard to price, Mr. Rolston said that competitive reports show that there is very little consistency in pricing of high voltage cable with aluminum conductor. Our policy is still that we price this material on the basis of substituting aluminum for copper and we think this method of pricing is correct and realistic. However, some of our competitors apparently do not agree with this and we should be prepared for severe and unrealistic competition when dealing with this particular product.

Competition

This subject was discussed in an informal session with a panel consisting of the following District Managers, the text of their remarks is as follows:

Mr. A. K. Buckenmaier—Detroit

Mr. Buckenmaier said that the last few months have been hectic and there have been extra 5 percents and the usual price concessions floating around in his territory. During these times it is especially important to be close to the customer and talk quality and Rome Cable as a company rather than price. It is important that you sell yourself, your company and your product; and it is the only way to overcome price concessions offered by fringe companies.

[fol. 5058] In United States District Court

Plaintiff's Exhibit 86

E. Mark Wolf

Aluminum (Bare) and Magnet Wire Developments

Bare Aluminum and A.C.S.R. Conductors

You will receive within a few days a new Product Bulletin covering our new line of bare aluminum and A.C.S.R. conductors. This bulletin covers the size range and constructions which we are prepared to supply at the present time:

1. Solid Hard Drawn Aluminum, #14—2 AWG
2. Stranded Class A Hard Drawn Aluminum, #6 AWG —1,000 MCM
3. A.C.S.R., #6—4/0 AWG

All aluminum wires used in these constructions are Grade EC-19, produced by our Properzi continuous casting unit.

All three types are manufactured in accordance with appropriate A.S.T.M. specifications as shown in the bulletin.

In the case of stranded all-aluminum, we have listed Class A strandings only, and have shown those CM sizes which

we believe will be most popular. In most sizes we can also supply Class AA and Class B stranding if necessary, and also we can manufacture certain intermediate CM sizes if required.

In the case of A.C.S.R., our steel core wires are made with standard A.S.T.M. weight galvanizing. The two heavier weights of coating covered by A.S.T.M. specifications can be supplied upon request.

The range of sizes we are presently offering in ACSR does not cover the sizes generally used for long cross-country transmission lines. They are mostly the sizes used for distribution.

Magnet Wire

1. 3/4 Lap Single Paper

This class of magnet wire has grown in use to the point where it is a major part of our magnet wire production. It is replacing both 2-paper single cotton, and 4-paper constructions. We are currently studying our equipment in the light of this trend, and hope to develop modifications which will improve both quality and efficiency.

In this class of magnet wire there has been some confusion as to the meaning of the Price Sheet statement that 1% shall be added to the price for Bonded Paper. Bonded Paper Magnet Wire is a separate class of paper magnet wire which we do not manufacture. We do, in most cases, use an adhesive to keep the paper from slipping on the conductor, but this is not Bonded Paper.

[fol. 5059] 2. Within a few months you will probably receive an announcement from us relative to manufacturer's identification of our product. We have been working with one of our customers for about two years in an effort to develop a means for identifying our product as material made by Rome Cable. We now have on order equipment for indenting the copper with the letters "RC" at six inch intervals. We believe this is a feature which all of our customers will appreciate, and, therefore, plan to so identify all covered rectangular shapes and all covered square wire larger than #8 AWG. You will receive a notice to this effect when we are ready to go.

3. Glass Magnet Wire—Small Sizes

In response to many requests from you over the past several years, we notified you on May 7, 1953 that we were prepared to supply Round Glass Magnet Wire in sizes down to #22 AWG, thus extending our previous limitation of #14 AWG as the smallest size we could supply. This required a great deal of work by Plant Engineering, Laboratory, and Production, and also required building and installation of new equipment. We have yet to receive our first order for magnet wire to utilize this new equipment, and it is standing idle. We believe you should try a little harder to get us orders in this size range.

4. Silicone Glass Magnet Wire

This class of magnet wire was first introduced by us in 1950. It is rated as a Class H material, suitable for use subject to "hottest spot" temperature rating of 180°C. This compares to 130°C for standard glass magnet wire, which is a Class B material.

The use of Class H equipment is growing slowly. There are many problems faced by equipment manufacturers in construction of Class H equipment, and suitable magnet wire is only one of them. Our Silicone Glass Magnet Wire is a product we can all be very proud of. Based on my own personal observation, I believe it is the best on the market. By use of the best varnishes available, applied carefully, and with proper control of the bake, we are supplying a product not yet equalled by our competition. We have one or two large users who will buy this class of magnet wire only from Rome Cable.

5. Aluminum Magnet Wire

Engineering studies by several transformer manufacturers a few years ago indicated that the use of glass covered aluminum magnet wire should make possible savings in the manufacture of dry type transformers. One of our customers went into the manufacture of dry type transformers using rectangular aluminum with glass covering, on a large scale. One or two others are either studying the application or trying it on a small scale. At the present

time, these manufacturers have found that additional fabricating costs in their plants may equal or exceed the anticipated savings. This is largely due to the techniques now necessary for making electrical connections and the need [fol. 5060] for more mechanical support of the coils. The manufacturer who was in large scale production has, for the present, abandoned this production in order to study the matter further. We do not know whether or not this product will find a permanent place in the electrical field. In the meantime, you should remember that we have made more of this material than any other supplier, and are ready to produce it if required. We have accumulated a fine background of experience with this product which is available to your customers.

6. New Materials

There are many new covering materials for magnet wire being offered and discussed. Most of them are for Class B or Class H applications, are supplied in tape form, and are quite expensive. Such materials as Mylar, and Quintena-Mylar are being strongly promoted by some manufacturers. We are familiar with these materials and in many cases have made samples of magnet wire for test. In the case of Quintena-Mylar, we have supplied small quantities to one customer. In discussing these materials with our major magnet wire customers, we have not found any promising applications as yet. Please keep in mind that we are trying to keep up to date on these matters. If you learn of interest in these materials keep us posted and if you need information on them, let us know.

[fol. 5061] In United States District Court

Plaintiff's Exhibit 88

ROME CABLE
CORPORATION

ROME, N.Y.

REPORT SUBMITTED TO THE BOARD OF DIRECTORS OF ROME CABLE CORPORATION AT THEIR MEETING MARCH 3, 1954

I present herewith net sales and earnings by fiscal years up to March 31, 1953, and by quarters for the current year and the month of January:

Fiscal Year Ended	Net Sales	Earnings
March 31, 1937	$ 1,798,092	$ 1,616
March 31, 1938	4,957,103	71,027
March 31, 1939	5,370,665	245,036
March 31, 1940	6,080,902	297,736
March 31, 1941	9,465,451	431,501
March 31, 1942	11,631,785	592,135
March 31, 1943	12,712,333	367,654
March 31, 1944	16,909,735	466,709
March 31, 1945	22,798,218	486,653
March 31, 1946	16,975,009	398,973
March 31, 1947	18,436,305	1,359,593
March 31, 1948	25,202,853	1,152,579
March 31, 1949	26,088,523	1,115,960
March 31, 1950	19,602,984	302,209)
	Add: Portion of metal profits set aside in prior years to offset copper loss	150,000) 452,209
March 31, 1951	35,142,901 Net	$1,922,136
	Transferred to earnings retained	150,000 1,772,136
March 31, 1952	42,657,848	1,753,651
March 31, 1953	54,632,976	2,008,321
April - June Quarter	13,858,372	524,190
July - September Quarter	10,732,248	409,129
October - December Quarter	10,262,761	325,676
Total Nine Months	34,853,381	1,258,995
January 1954	3,159,076	80,567

[fol. 5062]

ROME CABLE CORPORATION

EARNINGS

While our earnings for the third quarter dropped $84,000 below the prior quarter we must recall that the July-September quarter was improved by $120,000 due to reduction of tax rate to 65.5%. Sizable price declines in building wire items adversely affected any comparisons for the prior periods.

Despite the increased sales in January net earnings for that month just equalled December due to further price declines and the fact that in December we included a sizable inventory pick-up in Spiral 4. Therefore earnings will show a drop in the current quarter due to reduced volume and poorer prices. Our earnings for the year should approximate $3.00 per share compared to $4.01 in the prior year and $3.58 in the year ended March 31, 1952.

Looking ahead for the first six months of the new year, while we will run out of the Spiral 4 program in the first quarter, we should see considerable improvement in the Torrance picture and our tax percentage will drop to 52% compared to 65% in the current year. If we assume continuation of the present volume, we will not produce as satisfactory earnings for the first six months of our next fiscal year as in the same period of 1954.

SALES

While January showed about a 10% increase in sales above the low of December it was expected that the total for the quarter will run about 10% behind the October-December period, with a total for the year approximating $44,000,000 or 20% behind the previous year. More than half the decrease is accounted for in difference in Spiral 4 sales in the two years. Lower prices for insulated products account for several hundred thousand dollars more.

The breakdown of sales for the past ten months compared with a like period in the previous fiscal year shows the following:

	April 1953 Jan. 1954	April 1952 Jan. 1953	% Increase or Decrease
Rods	$ 4,273,337	$ 5,637,747	(24.3)
Bare	5,355,194	5,027,825	6.5
Weatherproof	2,248,070	2,765,402	(18.8)
Magnet	2,656,949	2,855,951	(7.0)
Rubber Covered	15,216,317	17,390,208	(12.6)
Torrance -E.M.T. (Incl. T.V. Mast)	2,213,848	1,793,250 [EMT]	23.5
" -Rigid	453,499	805,895	(43.8)
Spiral 4	5,293,894	10,699,954	(50.6)
Aluminum	1,993,541	1,327,892	50.1
Total -Rome	37,037,302	45,704,979	(19.0)
" -Torrance	2,667,347	2,599,145	2.6
GRAND TOTAL -	$ 39,704,649	$ 48,304,124	(17.8)

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[fol. 5063]

ROME CABLE CORPORATION

BACKLOGS

Our backlogs continued to decline throughout the entire year 1953 and continued so into January of 1954. This condition has been reversed in February and we are pleased to report that on wire and cable and aluminum items incoming orders to date have exceeded shipments for the first time in seventeen months.

Backlog figures of a year ago, August 31st and the latest figure for the current year are shown below:

		Quantity	Value
February 21, 1954 -	Wire & Cable	4,026,000 #	$ 2,406,000
	Aluminum	578,000	312,000
	Spiral 4	197,000 pcs.	1,100,000
	Torrance	1,090,000 ft.	127,001
August 31, 1953 -	Wire & Cable	7,417,000 #	4,705,000
	Aluminum	466,000	388,000
	Spiral 4	678,000 pcs.	3,782,000
	Torrance	3,339,000 ft.	381,420
February 21, 1953 -	Wire & Cable	11,592,000 #	8,585,000
	Aluminum	1,148,000	920,000
	Spiral 4	1,298,000 pcs.	8,112,000
	Torrance	1,695,000 ft.	275,439

COPPER

Despite our feelings to the contrary the price of copper has continued at around the 30 cent level. Informed opinion seems to feel that it will stay around that level until late March, owing to the fact that the Chilean Senate failed to ratify contract for sale of approximately 100,000 tons to the United States stockpile and tax agreement with the United States companies on new production. We continue to feel that the price of 30 cents is too high and reduction to around 25 cents should stimulate business.

OTHER MATERIALS

We are overstocked with steel for Rigid at Torrance owing to production not living up to earlier schedules because of difficulties of the hot dip furnace. It will take several months to bring this into balance. Steel is now available on near-term shipment. This condition also prevails with all of our other materials.

INVENTORY

We are bending every effort towards bringing our copper inventory into balance of approximately 11,100,000 pounds, which is our LIFO base.

Physical inventory was taken at the Rome plant at the end of January and preliminary reports indicate satisfactory results.

[fol. 5064]

ROME CABLE CORPORATION

LABOR

Figures covering factory payroll are shown for representative weeks in the last year as well as total number of salaried employees for the same period.

	Week Ending	Employees	Total Payroll	Avg. Wkly. Wage	Avg. Hrs. Worked	Number Salaried Emp
ROME	2/21/54	M 958	$ 70,879	$ 73.99	38.4	
		F 69	3,912	56.70	35.6	418
		1027	$ 74,791	$ 72.83	38.2	
	8/23/53	M 1017	$ 83,003	$ 81.62	41.1	
		F 93	5,560	59.79	37.0	
		1110	$ 88,563	$ 79.79	40.8	411
	2/22/53	M 995	$ 90,718	$ 91.17	45.4	
		F 119	6,950	58.41	37.4	
		1114	$ 97,668	$ 87.67	44.5	397
TORRANCE						
	2/13/54	149	$ 12,216	$ 81.99	38.3	30
	8/22/53	148	$ 12,528	$ 84.65	38.3	34
	2/14/53	141	$ 11,073	$ 78.53	38.5	28

You will note from the above the drop in average hours worked at Rome of over 6 hours per week from a year ago and a drop of about $14, as well as a decline of almost 100 in number of employees at Rome. Our number of salaried employees, however, has increased from 397 to 418 and we believe that this is a subject for very careful review in the light of current conditions.

CAPITAL EXPENDITURES

E. R. 's approved since the last meeting of the Board of Directors:

	E.R. No.	Description	Amount
ROME	1601	Provide appropriation for Furniture & Fixtures for Rome Plant, second half F. Y. 1953	$ 5,000
	1599	Purchase a parcel of three lots on the southerly side of Henry St. and also a parcel of three lots on South Jay St.	33,000

[fol. 5065]

ROME CABLE CORPORATION

CAPITAL EXPENDITURES -Cont'd

E. R. No.	Description	Amount	
1600	Purchase a parcel of four lots on westerly side of South Jay Street	$ 17,000	
1603	Purchase and install laboratory abrasion tester	800	
1604	Purchase and install two micro welders for use at the payoffs of the continuous vulcanizers	1,000	
1605	Construct and install mechanism for revolving pans of cable back of lead extruding machine	1,500	
1606	Construct and install a takeup for tubed rubber fillers	2,500	
1607	Purchase and install double extended tuber and drive to replace similar equipment on C. V. Mach.	10,000	
1608	Make improvements and additions to Cabling Machine and install in Bldg. No. 28	9,000	
1609	Purchase one modulus test machine and one cavity test specimen mould	1,100	
1610	Purchase one thermocouple potentiometer	200	
1611	Purchase one double portable bridge	300	
1612	Construct and equip enclosure for handling of fine chemicals in Compounding Dept., etc.	5,000	
1613	Purchase and install three micro limit control gauges on tubing machines	7,500	$93,900
TORRANCE			
C-211	Construct a Maintenance Shed	985	
C-212	Purchase and install Thermo-Couple actuated temperature controller in flame heater portion of the Hot Dip	1,000	
C-213	Construct stairs, railings and catwalks in degreasing and enameling pits on lacquer dip	1,180.94	
C-214	Purchase and install flourescent lighting fixtures over lacquer dip inspection table	425.86	

[fol. 5066]

ROME CABLE CORPORATION

CAPITAL EXPENDITURES - Cont'd.

TORRANCE Cont'd

E. R. No.	Description	Amount	
C-215	Purchase Sheet Metal Safety Guards	$ 1,149.65	
C 216	Enclose sides and top of lacquer dip conveyor assembly	817.23	
C-217	Purchase and install fence	256.00	
C-218	Purchase one Vinco Model B-1 Angle Tangent to Radius Grinding Wheel Dresser, etc.	755.00	
C-219	Purchase one "Skil" Radial Saw	675.00	
C-220	Purchase material and install additional power service to Bldg. No. 2	4,400.00	
C-221	Construct one End Reaming Machine	6,100.00	
C-222	Construct a "Wire-Pulling" Machine	550.00	
C-223	Purchase one used "Bliss" Punch Press with motor	772.50	
C-224	Purchase one "Besler" Superheater and Flow Motor	9,000.00	$28,067.18

Additional E. R. 's approved:

ROME

1548-A	Additional for reclaiming copper from Rod Mill descaling and cooling water	$ 55,000.00	$ 55,000.00

TORRANCE

C-166-A	To complete installation of speed control	535.00	
C-207-A	Complete installation of emergency showers	582.74	
C-211-A	Electrical wiring and cabinet work to complete the Maintenance Garage	500.00	
C-197-A	Complete one broaching machine for removing flash from all sizes of Rigid Conduit	4,750.00	$ 6,367.74

[fol. 5067]

ROME CABLE CORPORATION

For the current fiscal year our capital expenditures will approximate $650,000, while total depreciation of $540,000 and accelerated amortization of $161,000 should total $701,000. As of March 31, 1954 we will carry over in approved expenditures approximately $135,000 to be paid for in the first quarter of the new fiscal year.

Our problem today is to review carefully the requests of both plants and discuss a program for the new fiscal year. Our factory managements at both Rome and Torrance have answered our request for potential requirements, and they have indicated a need for approximately $567,000 at Rome and $65,000 at Torrance. This is within the yearly depreciation and accelerated amortization accrual. However, there is much that should be discussed on expenditures that would improve layout, reduce costs and provide some additional capacity where needed for the future.

With the expiration of the Spiral 4 contract in May best utilization of that building can only be had by closing Henry Street and joining the Spiral 4 building to our present insulating building. We have had under considerable investigation a new scrap disposal proposition and have carried on some investigation of potential volume in telephone wire. I believe we should hear from our three Vice Presidents, Messrs. Ellis, Schatzel and Rolston as to the urgency of some of the matters suggested for executive consideration in the factory management requests for capital expenditures. In any program of going beyond our depreciation charges consideration must be given to providing new money for this purpose. The Mills plan requiring payment of 90% of our tax bill in the first six months of our new fiscal year creates a heavy drain upon our cash and could well mean short-term borrowing. I would like to have a full discussion of this subject, particularly regarding the form or means of raising the money as well as the wisdom of embarking on such a program at this time.

I believe it is imperative that we proceed with a request to the City Administration to close Henry Street. Preliminary conversations with Mr. Hinman of Rome Strip Steel have not been entirely satisfactory and he may not be very cooperative.

I feel that at the present time, we should stop, look and listen before committing ourselves to the larger expenditures indicated in C. H. Ellis' first report headed - "For Special Executive Decision." I believe that between now and our next regular quarterly meeting, we shouldhave more knowledge on several very important matters, including the answers to such questions as:-

(1) Will ALCOA continue on a satisfactory basis with us?
(2) Will the City approve closing Henry Street?
(3) Will price of copper be stabilized?
(4) Has the situation by then sufficiently clarified so that we may know whether we are facing a larger recession than I now anticipate?
(5) Is our Torrance operation on a satisfactory basis?

[fol. 5068]

ROME CABLE CORPORATION

CAPITAL EXPENDITURES -Cont'd

I believe that we can judge the balance of 1954 fairly accurately within the period between now and our next quarterly meeting. Until the above matters are clarified, I would hesitate, in fact, I would not be in favor of the larger program mentioned in Mr. Ellis' report. After these matters clear up, and I have further knowledge re financing and more information on certain parts of the expenditures, I shall then be prepared to vote such amounts as seem proper under the circumstances.

LONG TERM LOAN

With our payment of $206,000 on our long-term loan, on January 1st, the debt was reduced to $1,899,000. Because of the indicated very heavy drain on cash in the new fiscal year and possible needs arising out of potential capital expenditures, Mr. Fraser explored with J. P. Morgan and Co. the possibility of increasing the loan by $1,000,000. They in turn checked with Connecticut Mutual and had a prompt response that they would be very glad to arrange for such an increase.

PRICES

The highly competitive price situation reported in my last letter shows further deterioration. Two additional price cuts on building wire items since our last meeting now bring the accumulative total to approximately 40% on many items since last July 1st. Most items of building wire are now being sold below cost, with reports reaching us that additional discounts are being offered as well as other special inducements, such as price protection for extended periods. Price reductions have extended into other fields such as power cable, and we have found it necessary to review manufacturing practices and margins on all sizable inquiries in order to maintain our customer relationship and proportionate volume.

ALUMINUM

Our aluminum volume continues to grow satisfactorily. Sales for the first ten months of the current year are 50% better than a year ago. Dollar volume of our own sales in the two periods was up 43% and our toll 28%. In the calendar year 1952 we processed approximately 1,600,000 pounds of aluminum which figure climbed to over 3,500,000 pounds in the calendar year 1953. At the January rate of shipment 1954 could exceed 5,000,000 pounds. Copper contents of insulated products shipped in November, December and January totalled 3,600,000 pounds and aluminum a little over 1,000,000 pounds, or approximately 3,000,000 pounds of copper equivalent. If our shipments of copper insulated products should return to more nearly normal levels and aluminum should continue its growth, it is quite evident that our insulating capacity would soon be taxed to its limit, and this matter should be given consideration at this time in our review of capital expenditures at this meeting.

In the calendar year 1952 we used 824,000 pounds of aluminum for ALCOA and in 1953 this climbed to 2,010,000 pounds. In January the total aluminum content of shipments equalled 278,000 pounds. I believe it is important that we should make an early review with ALCOA as to their current thoughts, and we should be prepared to come up with our best prices and ability to perform to meet their needs since I feel this is desirable business.

[fol. 5069]
ROME CABLE CORPORATION

ALUMINUM -Cont'd

We have produced over a million pounds on our Properzi equipment. Production was coming along in quite satisfactory fashion until November when a variety of troubles on both the casting and rolling equipment beset us. Important design changes have been made during this time, and we hope to resume experimental runs this week. During this down period we have been purchasing rods from ALCOA to meet our own requirements.

TORRANCE

Many things have happened at Torrance since my last report. First, Art Andersen has resigned as Vice President and General Manager of the Torrance Plant as of December 31, 1953. Mr. Gilbert Woodill was appointed Acting Manager, and I am pleased to report excellent cooperation by the organization at Torrance as well as a good approach to the solution of many of its problems. Steps have been taken that will provide competent administration for the plant in the near future.

On February 1st hot dip galvanizing unit was shut down to make the necessary changes for efficient production. These have been completed, and trial runs are being made at the time of the writing of this report and will be reported verbally at the meeting. Satisfactory arrangements have been made with Pittsburgh Standard Conduit Co., Pittsburgh, Pa. to sell us sizes larger than 2", which gives us a complete line. This is a further incentive for our Sales Department, and with the high quality of our product our sales should climbsteadily. Efforts can now be further directed at cost reduction and maintenance of quality. We have added a sales promotional man, Mr. Ufer, formerly head of the Underwriters' Laboratories inspectors in Los Angeles which should help our Sales Department.

Electric Furnace Company paid us $20,000 to cover work we had done to complete the furnace. We have also had one meeting with Electric Furnace and ARMCO Steel representatives having in mind potential development of the Sendzimer process, including some potential patents that we may have, that should eventually raise the standards for rigid conduit and be beneficial to all three companies.

Facilities are badly needed for warehousing finished material at Torrance, and I hope we can have a preliminary discussion on this subject. However, such a major expenditure should be deferred until our manufacturing problems on rigid are finally solved.

SPIRAL 4

Much has happened regarding Spiral 4 since our last meeting. At that time we had expected to be continued in the program at approximately the same rate as the then current production of approximately 4,000 lengths per month. As of now, when we complete the present contract in May our part of the program ends. Briefly the story is this.

[fol. 5070]

ROME CABLE CORPORATION

SPIRAL 4 -Cont'd

In late December the Signal Corps asked all six contractors to bid on portions of a total program about equivalent to ours alone. We were awarded half of that program. Before actually receiving the order the schedule was cut in two and new bids asked. Other contractors having had our prices made available to them under-cut us by approximately $2.50 per length. Despite the fact that we had refunded or reduced prices to the extent of over $5,000,000, or 20% of our original contract, and had the best record on quality and delivery performance of any of the contractors, according to the Military, we were dropped as a supplier. We are making a vigorous protest to Washington concerning the unethical handling.

Steps are being taken to get disposal of the equipment and integrate the building into our other operations. We are very proud of the job that our organization has done on this important development of a part of our Country's defense requirements. We sorely regret the necessity of breaking up an organization that made so many fine records and whose productive results earned the esteem of all who came in contact with it, except evidentally the Procurement Officers of the Signal Corps. If the handling of our Spiral 4 contracts is representative of what is happening on other large programs for our defense it is a frightening thought.

Our President went to Washington on Monday and conferred with General Conrad, head of Procurement for the Signal Corps, on the future of Spiral 4 requirements. He was advised that no further program is contemplated for the current year, so we should proceed with the removal of Government facilities as soon after the contract is completed as is practical.

REDERMINATION

We have finally received modification letters from the Signal Corps on our Spiral 4 contracts agreeing to fixed prices on all of the contracts, which we agreed to accept in lieu of our True Depreciation Claim. Messrs. Sarles and Weiss are to be highly complimented on their excellent and alert handling of this matter.

RENEGOTIATION

Our comptroller, J. T. Sarles, has had a first meeting with the Renegotiation Board in Boston and has been asked to prepare additional data. We plan to pursue this vigorously in an effort to get all renegotiation cleaned up at least through March 31, 1953.

INVESTMENT IN SYNTHETIC RUBBER PLANT

In December we were approached by Simplex Wire & Cable Company to join with several other wire companies and other rubber fabricators to organize a potential company to make a bid on one of the RFC Synthetic Rubber Plants. This is just in the process of being organized. After careful study by the Executive Committee it was decided that protection of the supply of synthetic rubber was important for our future planning and that we should carefully analyze the proposal which could mean an investment of approximately $100,000 by us.

[fol. 5071]
ROME CABLE CORPORATION

MOVIE

Our movie has been completed and has had several showings with very favorable results. This movie is largely for use by our Sales and Engineering Departments. The present movie runs approximately 45 minutes and is too long for general public showing. We have been working with Loucks and Norling and have their proposal on a 20 minute version of more public relations appeal. An outline of the script has been submitted to us and looks favorable, and I recommend that we authorize the production of such a movie at an estimated cost of approximately $20,000.

ADVERTISING BUDGET

The quality of our advertising has steadily improved, and we spent approximately $200,000 in the current fiscal year. A budget for the new year of approximately $225,000 will be presented to the meeting for consideration. The major portion of the increase will be spent for product promotion.

ROME CABLE FOUNDATION

In our 1951 fiscal year we appropriated $50,000 to found Rome Cable Foundation and added another $75,000 in the next fiscal year. Total contributions, including $7400 for scholarships, will run about $40,000 through March 31, 1954, leaving us about $85,000 at the end of the current fiscal year of which approximately $70,000 is invested. Our program on scholarships will expand still further during the current year. In line with our desire to build the Foundation so that income could carry on a goodly portion of its work I recommend that we discuss amount of appropriation for the current year and that instructions be given to the Finance Committee to act before March 31st.

CONSULTANTS

For about two years we have had an arrangement with Dr. Winding of Cornell University to act as Consultant on special research on rubber. This has been highly satisfactory. For about the same time we have had an arrangement with J. C. Ward, Jr., now President of Vitro Corporation, which has also been stimulating and productive. In January we engaged Dr. T. Fuller, retired Chief Metallurgist for General Electric Company, who will give us three to five days per month in the field in which he is so well versed - metallurgy.

DIVIDENDS

For several years it has been customary at this meeting to consider declaration of an extra dividend when earnings warranted it. For the entire fiscal year to date we have been on a regular rate of 35 cents per quarter, which if the same rate was declared at this meeting would make payment of $1.40 in the current fiscal year. We consider in view of current business conditions it to be unwise to declare any extra at this time but feel that the payment of $1.40 for the year is modest in relation to the expected earnings and so recommend payment of 35 cents on March 30th to holders of record March 10th. Payment should also be made to the employees under the Employee Dividend Plan at the same time.

[Vol. 5072]

ROME CABLE CORPORATION

EXECUTIVE BONUS

We disbursed $100,000 of the Executive Bonus for the year in December. I recommend thatmother $100,000 be paid after this meeting and depending upon the conditions prevailing and results of February operations and inventory check-up that another $50,000 be left discretionary with the Finance Committee for payment before March 31st.

OUTLOOK

While many of the national indices continue to decline our incoming orders seemed to reach the bottom of the decline in the latter part of December and since that time have been showing an encouraging up-trend. I believe that volume in the first quarter of our new fiscal year should show a 10 to 20% increase above the last quarter of this fiscal year, in physical volume but not dollar value.

Respectfully submitted

H. T. Dyett
CHAIRMAN OF THE BOARD

[fol. 5073] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 90

To: H. T. Dyett
From: R. A. Schatzel
Date: June 7, 1954
Subject: Engineering—Research and Development

Dear H. T.:

This year has been characterized by a rapid change in supply of materials and in intensified competition to sell those materials, as well as competition in our own field. More critical demands of quality and service have been paralleled by the impact of the introduction of new or improved materials, the result of Research in many fields.

On the whole our company has met the challenge and in some areas assumed a position of leadership. In none have we lost a position of contention.

Engineering

Increased recognition of our company among Engineers in the many fields our products enter, such as utilities, industrials and Government, including the Air Force, Navy, and Signal Corps has continued.

Within Industry Technical organizations such as IPCEA, ASTM, ASA, and Underwriters' Laboratories, many new specifications for materials and methods were adopted by Committees representing both Consumer and Producer on which our representatives were in most cases Chairmen, or took a leading part. These are mentioned as evidence of acecptance of our company's position in the Technical Field we are part of.

Research and Development

We are continuing a program of development on Synthetic Rubber under Dr. Winding at Cornell. This is a fundamental study and development of broad background for development. In our own laboratory careful screening of new materials and where warranted, intensive investigation has been carried on.

Butyl Rubber insulated cables have become a regular product and extended application is rapidly progressing.

Silastic insulations have been improved and are being recognized in the industry.

Plastics with improved properties have been developed and find their application in oil fields, appliances and industrial uses. Typical of these are new products—FlexAll a plastic underground cable and Building wire as well as Cathodic Protection Cable and Polyethylene Mine Power Cable.

[fol. 5074] A few years ago hot and cold Arctic Rubbers were a somewhat humorous curiosity; during the year considerable cable was made and approvals received on a broad group of Government constructions.

New and improved form of Polyethylene is extending its use in the Power and particularly the communications field. Expanded Polyethylene for Communication Cables challenges old uses of paper.

With the extension of Automation which has been going on for many years, Control Cables are the nerves of such a system. We are established in this field. Our real participation in it depends on our ability to furnish multiconductor types.

Many new requirements are presented to us, and new tools for their evaluation developed. Radio-active isotopes are becoming and important tool in industry for investigation and control. We have followed this development for some time, and are having personnel trained in the techniques of handling, and familiarity with the use of such materials.

Aluminum—

Much could be written on this. Aluminum is established in the insulated electrical conductor field and it is fair to assume its use will grow rapidly, particularly in those applications where space is not a primary factor.

Our development of casting has progressed satisfactorily. Control of metal purity, determination of proper temperatures and their regulation; selection of materials and methods of operation all have been improved. Fur-

ther improvement is required, but at this date we believe two conclusions can be made:

(a) The Properzi Casting Process is practical.
(b) A product meeting the requirements of industry can be made.

Improvement in design of equipment, furnace, casting wheel and rolling mill is to be expected and required, for a completely satisfactory production unit.

[fol. 5075] Patents

Results of prior development have resulted in patents issued to us and several other applications in prosecution. We have licensed The Standard Machinery Company on a Splice Box for extrusion machines covered by a Rome Cable development.

The Duffy patent on Spark testing of cables has been issued and several companies are interested in licenses.

We are working with Armco and Electric Furnace Co. to obtain coverage of our Torrance process of producing Rigid Conduit.

Student Training

While this may not properly be a part of this report, I believe it pertinent. Due to extreme competition for technically trained graduates and the fact that the supply of G.I. students has run out, difficulty in recruiting suitable candidates is increasing. A review of our practice in training will be necessary. It is probable that the supply of technically trained personnel will not improve until after 1960.

Quality and Inspection

As previously mentioned, a higher level of quality and service has been demanded by our customer. This is a buyers market. We cannot inspect quality into a product —it must be built there. More stringent inspection has been exercised and increased product evaluation testing has been instituted by our Inspection Dept. With the full cooperation of Production and, at their request, an exten-

sion of the statistical quality control program, so well worked out in Spiral 4, is being made to our insulating processes. The general level of quality in the industry has been raised. Rome Cable has maintained a high ranking for dependable quality, despite a few instances where the appearance of our products were criticised. These have been corrected.

Very truly yours,

R. Schatzel.

RAS P

[fol. 5076] In United States District Court

Plaintiff's Exhibit 91

7/8/54

HTD:AS

Meeting July 7, 1954

"Whither Goest Thou"—Continued

Present: Val, Glenn, Jay, Charlie, Jack, Harry, Rudy, Ross and myself.

With a few opening remarks by H.T., Charlie was called upon to explain the program which we will consider today. He carefully went over the proposed changes in the department and indicated his hope that we erect a new building of approximately 100,000 sq. ft. at an estimated cost of $450,000 to be used for shipping and storage. The building will lie east of Bldg. #20 and west of South Jay Street. This will give us excellent trucking facilities and keep our trucks far from congested areas. This would release Bldg. #20 so that the upper floor could be used for an additional manufacturing space for the Rubber Wire Department. This space would permit of approximately a 40 per cent expansion in our rubber manufactured output. The essential equipment that we would plan to order at the present time contains the following large items:

Lead Extruder	$80,000
One large extruder for either rubber or synthetic	35,000
One Larmuth	40,000

Drawing machine for copper, releasing one of the present copper machines to be used for aluminum	40,000
Cabler	70,000

It is Charlie's opinion that the total equipment to be ordered would be approximately $700,000. With this equipment and rearrangement we would be able to increase our capacity by at least 10 per cent, mostly in power cables. He figures an annual saving due to rearrangement of the department, largely accounted for in our traffic, at $300,000 to which would be added the additional profit due to enlarged operations of $100,000, or a total before taxes of $400,000.

[fol. 5077] After considerable discussion by everyone in attendance Rudy finally made the comment, "The program looks good. We must make larger sizes and longer lengths to satisfactorily serve our customers. Control cables are a growing market. The tendency is towards higher voltages, particularly in the use of improved plastics." In the comparatively near future he sees the prospect of greater use of Butyl. He definitely believes that Butyl will eventually supersede oil base cables. All manufacturers at present are having trouble with Neoprene. The percentage of plastics compared to rubber insulation is constantly growing.

Charlie brought up the question of a large closer and a six wire bay for 16 inch reels—approximate cost $70,000. Rudy: The above would be desirable on communication cables.

Rudy: Magnet Wire—The use of Magnet Wire in electronics, flat, square and down to #30 will continue to grow. He stated that he believes we could make and offer a plastic insulated Magnet Wire with a two mil insulation which would equal enamel and double cotton.

Charlie: Should we attempt to go to one million C.M. C.V. cure? He stated that General Electric are extruding wire vertically which overcomes certain difficulties on the larger sizes. It was thought that we should attempt to go to 500,000 C.M. if possible.

Ross and Glenn discussed P.D's shipping bare wire on 1,000 lb. reels. If we determine to do this we would have

to purchase from 200 to 400 reels. Glenn says there is a strong customer demand for larger packages.

Ross spoke of the pricing situation on ACSR and asked the question whether we should consider ACSR in connection with our Properzi equipment. Glenn thought that we might be able to dispose of 250,000 lbs. of aluminum wire per month. Ross said we should like to be able to offer ACSR. Glenn: Yes, on a limited basis and up to 500 C.M. it would help our sales picture as we could then offer ACSR with insulated aluminum cables in car lots. This he believed would enable us to eventually work up to [fol. 5078] 250,000 lbs. per month of aluminum wire to be used in our own aluminum sales.

Glenn discussed control cables which are a big factor in industrial plants today. The plants are buying through jobbers. They are not conscious of quality. The trend at present is towards plastic. The prices are below the prices we are offering. We should strive to manufacture Butyl on C.V. equipment at least up to 4/0, or possibly up to 500 C.M. All our competition is C.V. insulated. We are "behind the game." The trend towards Polyethylene is very fast. We have experienced so much of delays, reruns and repromises that our boys in the field have taken a hell of a beating and their morale is very low.

Ross raised the question, is aluminum building wire out? Glenn: Do not expect it will grow unless the splicing difficulty is solved. Rudy: Says he believes sizes #1 and larger are okay because they would be installed by expert electrical contractors, but the smaller sizes where the plant electricians would handle them would cause trouble and all thought we should not offer them for sale.

Rudy said he believed our building and equipment plans should be approved. Harry stated he thought the cost of our plan was justified if we can improve efficiency and cut costs. Glenn made the statement that 62 per cent of our sales last year were in New York and contiguous states. Jay thought for a short time perhaps we could defer building. Charlie explained why he did not agree with this and felt the building was essential.

H. T. asked the question, are any new products in the minds of any of you? Jay: How about assembles? Char-

lie: From our past experience I think it is out of our line. Jack: How about plastic pipe? Rudy: At present no standardization. ASTM are studying the matter. Believe we should keep our eye on it, but not favorable at present. Glenn: Thought we should look into armored cable up to 3 inch diamenter. Equipment is made by Sleeper-Hartley. He suggests we get cost on equipment. This was discussed [fol. 5079] at some length and it was agreed that this was worth looking into. Ross: How about some of our products on which we have lost ground? What can we do to build back? Charlie: Spoke of instrument wire and thinks we can get costs down to make us competitive. Glenn: We are about 7 per cent high on instrument wire. Unless we get costs down we will lose business. Last year amounted to about $700,000. Charlie: Think we can bring our costs down. It was decided Charlie and Jay should study costs and labor rates. Glenn: Airport Lighting Cable. Our speed of insulation is from ½ to ⅔ the speed of our competitors which makes our cables high priced. He thought we should check very carefully on what we could do on 5,000 volt airport lighting cable. Jay to estimate costs. Rudy: Think we should take order for experience. Large orders are being placed. Glenn: Brought up Navy cordage. We are losing out because of prices. H.T. Fundamentally he thinks it bad business to lose our position with good customers like Boston Edison and people of that type. As a general thing it has been his experience that when a plant runs fairly full it makes money even if it has to take some business at exceeding low prices. At a time like this he felt it wise to meet the situation and keep in the customers' good graces and work towards bringing our costs down. He thought it was very important not to slip on any of our good products. Ross: We are meeting competition as far as possible.

Ross gave a little discussion on the loan that we are in the process of making, stating that the cost of the plant changes were estimated at $1,100,000. Our depreciation is now running $700,000 which would provide all but $400,000 or $500,000 over the depreciation for the proposed building and rearrangement. Our finances are satisfactory. He thinks that the rearrangement of the plant is very vital.

Upon each person being called on to vote approval or disapproval the vote was as follows:

Rudy	Yes
Jack	Yes
Charlie	Yes
Ross	Yes
Harry	Yes
Glenn	Yes
Val	Yes
H.T.	Yes

[fol. 5080] H.T. then discussed the fact that "merger" seemed to be in the air and a good many companies were merging or considering it because they desired to get greater diversification. He suggested that we give some thought to this matter at this meeting in a purely informal way and state if we so desired both the advantages and the disadvantages. He thought we should consider it very largely from the stockholders angle, as we were the trustees for the stockholders and we should carefully study in our own minds what effect future action might have on their stock.

Ross: He is aware of the difficulties of even one extra plant. We have learned that at Torrance. He thinks that it would be much easier to operate as we are rather than to go into a merged company with one or two other organizations. Glenn: Thought we could build up some of our present lines more than we have. He brought up the question of the flat business he hoped we can develop with the Rome-Turney Company. He thinks we can expand our own business along our present lines. By good hard sales and engineering we can aid our position with a number of our customers.

Ross asked, how about aluminum? Glenn: Said he did not think we could build our ACSR sales very large from Rome plant. He thought Chattanooga was a much more favorable location. Rudy gave his ideas very clearly on the idea of merging with anyone by the statement he had never seen a merger "without a lot of indigestion." Val said, let's stay as is. Jack: Think we all do not care for merger. We might, if the opportunity offered, take over a small plant some time which would not upset our own

organization. Charlie: Think we will find plenty of opportunity in our own business. Harry thinks we should listen but go very slowly.

[fol. 5081] It was very evident that the feeling was quite unanimous that we have plenty of opportunities in our present business and that it seemed undesirable to give any thought to merging our business by joining other companies.

[fol. 5082] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 92

ROME CABLE
CORPORATION
ROME, N.Y.

REPORT SUBMITTED TO THE BOARD OF DIRECTORS OF ROME CABLE CORPORATION AT THEIR MEETING SEPTEMBER 8, 1954

The figures on net sales and earnings for all prior years ending March 31, 1954, as well as the April-June quarter, the month of July and estimated figures for August are given below:

Fiscal Year Ended	Net Sales			Earnings
March 31, 1937	$ 1,798,092			$ 1,616
March 31, 1938	4,957,103			71,027
March 31, 1939	5,370,665			245,036
March 31, 1940	6,080,902			297,736
March 31, 1941	9,465,451			431,501
March 31, 1942	11,631,785			592,135
March 31, 1943	12,712,333			367,654
March 31, 1944	16,909,735			466,709
March 31, 1945	22,798,218			486,653
March 31, 1946	16,975,009			398,913
March 31, 1947	18,436,305			1,359,593
March 31, 1948	25,202,853			1,152,579
March 31, 1949	26,088,523			1,115,960
March 31, 1950	19,602,984			302,209
		Add: Portion of metal profits set aside in prior years to offset copper loss		150,000
				452,209
March 31, 1951	35,142,901	Net	$1,922,136	
		Transferred to earnings retained	150,000	
				1,772,136
March 31, 1952	42,657,848			1,753,651
March 31, 1953	54,632,976			2,008,321
March 31, 1954	44,114,825			1,637,787
April - June Quarter	9,641,198			235,299
July	2,213,645			8,197
August (Est.)	3,211,000			82,000
July-Sept. Quar. (Est.)				210,000
1st & 2nd Quar. (Est.)				445,000

[fol. 5083]

ROME CABLE CORPORATION

The breakdown of sales before deduction for discount and freight for April to August 31, 1954, with August figures estimated, are given below:

	April-August * 1954	April-August 1953	% Increase or (Decrease)
Rods	$2,068,000	$2,614,631	(20.9)
Bars	2,226,000	3,127,486	(28.8)
Weatherproof	961,000	1,325,569	(27.5)
Magnet	1,648,000	1,378,221	19.6
Rubber Covered	4,174,000	8,449,579	(26.9)
Torrance - E.M.T.	751,000	815,720	(7.9)
T.V. Mast	180,000	262,547	(31.4)
Rigid	684,000	192,318	255.7
Spiral & Aluminum	823,000	2,781,094	(70.4)
	891,000	956,849	(6.9)
	$15,806,000	$21,903,954	(27.8)

Torrance figures are presented below: (* August 1954 figures estimated)

	April-August * 1954	April-August 1953	% Increase or (Decrease)
E.M.T.	$719,151	$783,955	(8.3)
Elbows	6,257	6,757	(8.0)
Mechanical Tubing	33,835	25,048	34.8
Rigid - Elbows & Couplings	14,527	1,377	955.0
Rigid - Conduit	665,643	191,655	247.3
T.V. Mast Tubing	166,666	262,546	(36.5)
	$1,606,079	$1,271,338	26.3

The operating figures for Rome and Torrance are noted in the tabulation below:

	April-July	August Est.	April-August 1954 *	April-August 1953
Rome Plant				
Net Earnings	$232,175	$68,000	$300,175	$814,066
Less Metal Profits transferred to Reserve	-0-	-0-	-0-	65,000
Net Retained	$232,175	$68,000	$300,175	$749,066
Torrance Plant				
Net Earnings	$11,321	$10,000	$21,321	($30,086)
Reserve	-0-	-0-	-0-	-0-
Net Retained	$11,321	$10,000	$21,321	($30,086)

[fol. 5084]

ROME CABLE CORPORATION

OPERATING FIGURES (Cont'd.)

	April-July	August Est.	April-August 1954	April-August 1953
Company				
Net Earnings	$243,496	$78,000	$321,496	$783,980
Less Metal Profits transferred to Reserve	-0-	-0-	-0-	65,000
Net Retained	$243,496	$78,000	$321,496	$718,980

I point out the fact that this year our July operations included an unusual two weeks vacation.

The backlog of orders shows a marked drop from January 30th to May 31st, particularly due to "Spiral Four".:

			Value
January 30, 1954	Rome - Wire Products		$2,155,000
		Aluminum	274,000
		Spiral 4	1,269,000
			49,860
	Torrance - BMT		1,980
		Rigid	130,500
		T.V. Mast	$3,818,220
May 31, 1954	Rome - Wire Products		$2,318,000
		Aluminum	298,000
		Spiral 4	100,000
	Torrance - BMT		3,920
		Rigid	27,400
		T.V. Mast	-
			$2,747,320
August 7, 1954	Rome - Wire Products		$2,206,000
		Aluminum	394,000
			25,600
	Torrance - BMT		154,000
		Rigid	39,750
		T.V. Mast	$2,819,350

In addition to the above we have received a contract of $1,845,000 for "Spiral Four", shipments to begin April 1, 1955 and to continue through March 1956.

ORDERS AND SALES

The order picture continues to improve. Total copper contents without considering "Spiral Four" order are about 20 per cent ahead of July a year ago and brings the total for the first eight months to about 8 per cent behind the same period a year ago. It is our belief that incoming orders for the calendar year 1954 will exceed 1953.

I deplore the suffering and loss caused in New England due to the hurricane of August 31st. We are receiving rush orders for wires and cables to help restore electric services in the stricken areas. These rush orders, largely for Weatherproof, will probably result in increasing our sales in the month of September by approximately $200,000.

[fol. 5085]
ROME CABLE CORPORATION

ORDERS & SALES (Cont'd.)

Because of the two weeks vacation shut down sales hit a low point of the year in July. August level will run approximately average for the first quarter, but September should run over 20 per cent above that. The present quarter, however, as a whole will be about 7 per cent below our first quarter of this fiscal year. Excluding "Spiral Four", sales in the current quarter should about equal that of a year ago, with indications that the following quarter will exceed a year ago.

ROME PLANT OPERATIONS

Sales have been on a much reduced scale but in recent weeks are showing evidence of an improving trend which I hope will continue for the balance of our fiscal year.

PRICING SITUATION

There have been four small price changes in the badly affected building wire items. Net overall effect is an increase of 7-1/2 per cent from the low reached in June. To accomplish these there have been four separate price rises and with each rise the loss from raiding of consigned stocks is a very considerable item.

MATERIALS

With the 16 day Kennecott strike having been settled and several other companies having signed labor contracts, we expect to have sufficient supplies of copper to meet our customers' requirements. Even if the Anaconda strike continues, we should be in a comfortable position with nine active suppliers. Aluminum is in very plentiful supply and other materials are readily obtainable.

CAPITAL EXPENDITURES

The following E.R's have been approved since the last meeting of our Board:

E.R. No.	Description	Amount
1631	Purchase from Signal Corps an Air Compressor	$ 3,030.69
1632	Purchase from Signal Corps a Power Distribution System	26,969.31
1633	Purchase five room air conditioners	1,420.00
1634	Purchase 22 Friden Calculating Machines	9,518.00
1635	Purchase and install 4 Bunch Stranders with payoffs	30,000.00
1636	Purchase and install plastic cubing equipment	10,000.00
1637	Purchase and install a Robertson Lead Extruding Machine	82,500.00
1638	Purchase and install preformers	3,600.00
1639	Purchase and install dome type vulcanizer	31,500.00
1640	Purchase and install a lead stripper	15,000.00
1641	Purchase labor and materials to clear site for Bldg. No. 22, etc.	61,300.00

[fol. 5086]

ROME CABLE CORPORATION

CAPITAL EXPENDITURES (Cont'd.)

E.R. No.	Description	Amount
1642	Purchase and install a built-in Corona Level Equipment	$ 7,500.00
		$282,338.00

PAYROLL STATISTICS

Payroll statistics are given below and show the effect of reduction in hours and the end of our "Spiral Four" contract. We regret that this "Spiral Four" contract was not carried out as we had been led by the Military to believe it would be. This closing necessitated the loss of a number of valued employees.

Factory payroll statistics for Rome and Torrance are as follows:

Week Ending	No. Employees	Total Payroll	Avg. Weekly Wage	No. Salaried Employees
ROME				
9/27/53	M 989 F 88 1077	$80,150.93 5,272.13 $85,423.06	$81.04 59.91	412
2/1/54	M 961 F 71 1032	$71,992.95 3,526.01 $75,518.96	$74.91 49.66	417
8/1/54	M 838 F 27 865	$63,313.84 1,621.32 $64,937.16	$75.55 60.12	419
TORRANCE				
9/26/53	141	$12,600.49	$89.37	34
2/6/54	147	12,229.28	83.19	30
7/31/54	130	12,003.77	92.34	30

TORRANCE PLANT OPERATIONS

Glenn Kogar has been at Torrance for about two months now and we are very pleased with the manner in which he is taking hold.

Torrance sales in the current quarter will set a new record and should run better than 25 per cent above the last quarter.

It would be nice to be able to report that all of our troubles are over there, but I think it best to say that excellent progress is being made. There has been very little trouble with the furnace. It now has a capacity beyond the current production rate of the tube mills. Rehabilitation and replacement of rolls on the tubing equipment were found necessary owing to a poorer program of maintenance.

[fol. 5087]

ROME CABLE CORPORATION

TORRANCE PLANT OPERATIONS (Cont'd.)

Gil Woodill has found some interesting potential prospects for industrial tubing, which if realized should very substantially improve operational results.

LABOR RELATIONS

Effective August 9th we granted a voluntary five cents hourly increase to all hourly workers and an equivalent amount to salaried workers in addition to improving hospital allowances from $9.00 to $10.00 per day. These allowances were approved by the Executive Committee at a meeting held on August 5, 1954.

We are still negotiating with I.A.M., Local #1875, representing maintenance workers, to complete a new contract. The expiration date of the old contract was August 3rd.

On August 26, 1954, the National Labor Relations Board supervised a consent election for production workers in the Rome Plant to determine recognition with I.A.M. to represent them through their Lodge #157 in Utica. The Union lost the recognition election by a vote of employees 557 "No" and 116 "Yes" (or 82.7 per cent of total vote). Only one vote was challenged and one vote voided out of a total of 701 eligible employee voters. Conditions prior to and during the election were quiet, and good relationship was maintained and is still being maintained with the employees and the labor organization.

I think the result of the voting of our employees mentioned above is a great tribute to Ross Fraser, Charlie Ellis, Gerald Commerford and our supervisory staff in the factory. It shows that they have continued to cement the pleasant relationships that have existed with our working people over the last eighteen years.

HENRY STREET CROSSING

The Henry Street raising project is proceeding rapidly and provided the weather holds out it should be completed within two weeks. This will effect the level cross-over connection between Building No. 15 (Rubber Covered) and the new Shipping and Storage Building No. 22.

The new Shipping and Storage Building No. 22 is estimated to be completed and ready for occupancy the early part of December. Bids are now being received which indicate the cost of the 90,000 sq. ft. building should not exceed $400,000, including installation of the railroad section within the building, the black top entrances and parking area for truck loading and standby, both within and outside the building.

CAPITAL EQUIPMENT PROGRAM

The capital equipment program and rearrangement of departments should proceed along the following schedule:

All purchases and delivery of new equipment by April 1, 1955.

Departmental rearrangement should be concluded by late 1955.

[fol. 5088]

ROME CABLE CORPORATION

"SPIRAL FOUR"

On August 4th we were notified by the Philadelphia Office of the Signal Corps that on our bid of $102.50 per quarter mile length we had been awarded three-quarters of the total procurement for the year April 1, 1955 to March 31, 1956, or a total of 18,000 units with a total value of $1,845,000. The opportunity to bid on this changed our plans regarding storage of equipment and delayed finalization of contract. The Signal Corps have agreed to pay us $26,000 per year for storage of equipment with charge when equipment is activated, to be on a proration of value basis. Officials of the Signal Corps will be here September 13th to review the details of the rehabilitation contract.

A ruling issued last week by the Office of Defense Mobilization presents what should be more attractive possibilities to cover strategic standby facilities such as ours. These matters will be discussed with the Signal Corps on their next visit.

RENEGOTIATION

The Renegotiation Board has asked for additional data so that final determination is in the same status as the time of my last report.

CONSULTANTS

By mutual consent our arrangement with Mr. J. C. Ward, Jr. has been discontinued. This is due entirely to the fact that Mr. Ward, now President of Vitro Corporation, is so immersed in the details of his business that he would not have the time to give to our affairs.

RESEARCH

Our Research Department is continuing to work closely with the Air Force and has recently been asked for a study of a suitable connector for a cable with Polyethylene sheath replacing Neoprene. Several orders have recently been received for a new cable, Coaxial Flame Resistant Polyethylene. With all the new materials available it is necessary that continuous study be made to keep abreast of the times.

AMERICAN SYNTHETIC RUBBER COMPANY

There have been no further developments on the American Synthetic Rubber situation, except that Essex Wire has been added to the wire mill group. We do not expect to know how successful our bid will be until early 1955.

EARNINGS AND DIVIDENDS

At our last Board meeting I presented figures covering the five years ending March 31, 1950 to and including March 31, 1954. Average per year net earnings were $1,524,000 while dividends averaged $486,000, or 31.2 per cent. While our earnings during this present quarter will touch a low point, we believe that the third and fourth quarters of our present fiscal year will show steady improvement in sales and earnings.

I recommend the continuance of our present rate of 35 cents per share on the Common Stock payable October 1, 1954 to stock of record September 17, 1954, following which the usual action should be taken on the Employee Dividend payable at the same time at the same rate per unit.

[fol. 5089]

ROME CABLE CORPORATION

ALUMINUM SITUATION

Our aluminum business has grown in importance, the year ending March 31, 1954 exceeding the prior fiscal year by approximately 30 per cent. We believe this growth will continue for some time in the future. The aluminum officials have advised Mr. Fraser at a meeting held in April that they had no present plans to go into the insulated aluminum cable business themselves and assured us that if their policy changed they would try to give us one year's notice. I have the feeling that our business with them will probably not continue indefinitely and that we should carefully study whether or not it is to our ultimate advantage to continue such an uncertain situation indefinitely. This subject is one of great importance to us and should be given our most careful consideration.

BONUS PLAN

At our last Board meeting I appointed a new Bonus Committee and anticipate we shall have a report from them at this meeting. I am confident it will be of great interest as your Committee, consisting of Messrs. Fraser, Collins, Kroeger, Jack Byett and A. D. Berning, has studied this matter not only very carefully but they have had full advantage of all the studies on this subject that have been made in our office during the past year.

LONG TERM LOAN

Our Company entered into agreements with J. P. Morgan & Co. Incorporated, The Connecticut Mutual Life Insurance Company and Massachusetts Mutual Life Insurance Company for $4,000,000 to be repaid by serial notes over a period of fifteen years. Morgan participated to the extent of $1,000,000 payable in semi-annual installments of $125,000 each commencing February 1, 1955, interest 3 per cent per annum. The insurance companies each participated in $1,500,000 to be repaid at the minimum rate of $250,000 annually on each August 1st during the period 1959 to 1968 and the balance of $500,000 maturing August 1, 1969 with interest at 3.9 per cent per annum.

After the payment of a $1,000,000 short term loan on September 15th we will have no other borrowing indebtedness.

THE FUTURE

I quote the following from a letter of August 13th signed by Mr. Fischer Black, Publisher and Editor of ELECTRICAL WORLD:

> "Practically unanimous is the agreement that the inherent growth probabilities of the industry indicate a doubling of its business by 1964 and a tripling by 1970."

Respectfully submitted,

H. T. DUNN
Chairman of the Board

[fol. 5090] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 93

9/13/54—HTD:AS

Memorandum of Conversation at My Home with Ralph Davies, R. Murray Willard ("Jess"), J. H. Dyett and Myself.

I asked Ralph if he felt that our company was giving full cooperation and he said "so far as I know. I should say that the cooperation between the two companies were perfectly satisfactory with, of course, the little usual troubles on each side." I asked him if they had any plans or were contemplating making a study of doing their own insulating. He said he had not heard a word on this subject, he did not think it was being investigated in any way and he assured me that if it did become of interest he would estimate that from the time he told me that they were giving it consideration that it would probably take them six months to make a thorough study and one year to get their equipment into operation. He promised me that he would notify me the moment they started to investigate equipment. He quite appreciated that we were entitled to all the time that they could give us if they reached a determination to go ahead with their own insulating.

He then spoke of the Southern Electric Company as the bad boy that was causing quite a little trouble. He had heard rumors that one or more of the principals in the company wanted to sell. He did not believe that they were operating at a profit at the present time. He thought they had continuous trouble on their rolling mill and so far as he knew they had not solved this trouble yet. He seemed to agree with me that Al Tessmann was a good man. He asked what I thought of the other principal and I replied that I did not feel that I knew him well enough to say much about him. I, therefore, did not express any opinion. However, I think he was able to get the impression which I feel is mutual that he would not make a desirable man to tie up to. He felt that the Southern business had been built up from the start by price cutting and he believed under the present

management it would probably continue along that line. Ralph said he hoped that if they sold that that would sell out and fall into strong hands who would cooperate. I rather thought that this might be some little indication that his *could* would not be adverse to our stepping into the picture there.

Ralph asked how the Properzi equipment was operating. I expressed my own individual opinion that we had made quite a little progress in the last few months but I thought it would continue to be little changes here and there that would eventually produce high quality at a reasonable cost. I made the remark that if the Properzi turned out to be very satisfactory and if Alcoa continued their present policy of selling aluminum at a delivered price all over the country that there might come a time when, if our relationship with their company continued, we might discuss with them the desirability of a small Properzi wire drawing and insulating plant somewhere in the south or the west. I asked him if he had ever given this any thought and if so I would be interested in his thinking regarding a location that might be of interest. He mentioned their new Texas aluminum plant was opening this summer and thought that that would be a very desirable location.

Ralph asked me what I thought about the price of copper. I told him Jack knew a good deal more about the copper situation than I did but between Jack and myself we gave him the understanding that we expected a price drop in copper in a year or two. We did not believe from what we had heard it was liable to have a serious effect on the price advantage now enjoyed by Aluminum Company.

[fol. 5091] Jack asked him what effect they expected at Massena due to the proposed state development of power. Ralph stated that as the work progressed that they would lose their cheapest power development on the St. Lawrence and that it would be a very harmful thing to the Aluminum Company. After talking it over I made the remark that it seemed that the only fair thing to do was to attempt to assure Aluminum Company that they would be given at least the opportunity to contract for the same amount of power they were not using at the present cost price that they now enjoyed. Ralph made the significant remark that the build-

ing industry was now accounting for about 18 per cent of all the aluminum sales.

Ralph could not have been friendlier and before he left he urged me to come down to Pittsburgh with you some time and see the transformation that has taken place in that city.

[fol. 5092] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 95

To: R. A. Gray
From: E. Mark Wolf
Date: March 17, 1955
Subject: R. E. Uptegraph Mfg. Co.

CC: R. A. Schatzel, F. S. Marks, G. E. Rolston, J. R. Woods

Dear Dick:

The question of aluminum vs. copper for electrical conductors is doubtless going to spread to other fields as the spread in price between the two metals increases. Fortunately, in the case of transformers, we have a pretty good background to work from because of previous work with Westinghouse and Moloney.

The magnet wire coverings which we supply and the equipment which we use are not sensitive to the type of conductor involved. All of these coverings can be applied equally well to copper and aluminum, and the quality of the coverings will be about equal in either case. We have noted no significant difference in bonding of glass coverings between the two metals.

Because of design considerations involving size and weight, the economics of the situation up to the present time have not justified the use of aluminum conductors in liquid cooled transformers. In the case of air cooled transformers, however, the economics apparently looked interesting when copper was 30¢.

In actual production trials certain unforeseen increases in time and labor largely nullified any apparent advantage with aluminum. The people I have talked with generally have felt these problems could be solved with experience.

Aluminum magnet wire apparently winds more easily

than copper. However, because of its lower mechanical strength it is desirable to depart from dead soft wire and increase hardness to the point where windability is affected. This point is reached at about 17,000-21,000 lbs./sq. in., which is only about ½ the tensile strength of soft copper. More blocking and supporting of the coils is necessary with aluminum because of its lower strength, but this problem is readily solved.

The major item which involves increased cost is joints. In the past aluminum to aluminum joints have been made by inert-arc welding, which is a more expensive operation than the usual carbon block brazing employed with copper. Aluminum to copper joints have required silver plating of the copper. We think other methods of joining may be developed to solve this problem.

While delivery problems are not in my department, I have talked with F. S. Marks, who advised that promises may run 1 to 2 weeks longer than copper magnet wire.

E. Mark Wolf

EMW/jbb

[fol. 5093] In United States District Court

Plaintiff's Exhibit 96

Meeting Held May 3, 1955—Subject: Aluminum

Present: Messrs. A. D. R. Fraser, C. H. Ellis, G. E. Rolston, R. A. Schatzel and J. H. Dyett.

C.H.E. advised that we could have a 600,000 lb. monthly capacity on a two-shift basis. He has received recently encouraging reports both technically and manufacturing-wise. An additional furnace would be required but this should improve costs and give us insurance against shut downs.

R.A.S. pointed out that in order to arrive at one-half million pounds minimum monthly we would have to make certain assumptions that we would have the following product list:

1. 3/8 and 7/16 rods in coils (or reels).
2. H.D. wire H19 sizes .061 through 2.
3. Solid or Stranded H26 size 14 through 500 M Stranded.
4. Triplex and line wire.
5. Insulated building wire and RR to 500 M.

In his opinion we can continue to use an electric induction furnace if we can be sure of getting the same purity aluminum. We have had no trouble since the metal has been cleaned up. Spout trouble has ceased. Mr. di Lustro of Anaconda stated that if they were independent and could get Alcoa metal he would recommend putting in a 30,000 lb. reverbatory furnace. Holding the metal would be necessary. Revere is planning on going to a 30,000,000 lb. capacity monthly. Reverbatory furnace is cheaper but we should have 2,000,000 lbs. a month. Consequently, Mr. Glesmann has recommended that an electric furnace would be better for us. Nichols is using two Ajax furnaces and two 5,000 lb. swindle ladles. He expects to have one hour's holding time for 2500 lbs. an hour.

We must get assurance of Alcoa first that they can continue to supply the pure metal which comes in as EC 99.55 but actually is considerably purer. We set the specification on what we are receiving but Alcoa says that if we actually specify 99.70 we would be charged one cent additional and two cents additional for 99.8. It was pointed out that we should prepare for 1,000,000 lbs. a month. A.D.R.F. said that he would present the problem to Messrs. Davies and McGee, telling them that they have developed a metal which is good for the Properzi and wondering if we can get more. A.D.R.F. wondered if we could offer to pay a premium. According to R.A.S. he did not know whether or not we could use other materials with the swindle ladles.

C.H.E. pointed out that the Properzi cost was 6.22 per pound in March as compared with 6½ cents cost of rod from Alcoa. That 6.22 cost is with no piece work. In producing 12,800 lbs. in eight hours the cost should be reduced to 5½ cents, while on a two-shift basis it would go to 4.7 cents per pound. Overhead is 7 to 1 on 6.22 cents, 6½

to 1 on 5½ cents and 5¼ to 1 on 4.7 cents. A.D.R.F. pointed out that this was still high. C.H.E. agreed on this but pointed out the power load. With a large 5,000 lb. package only 30 per cent man load on the Elevator Supply. We can get 2,000 lbs. of aluminum an hour on size 8 with this man load. We could use one or two more machines. C.H.E. stated that we could take one of our old heavy intermediates, which however is hard to pry loose, and a light intermediate which we have already set aside. He feels we are inadequate in drawing at the present time.

[fol. 5094] R.A.S. thought that we should stop producing building wire at size 6. According to C.H.E. we should give the Sales Department a chance to sell at the rate of 2,000 lbs. an hour before we spend any money on new machines. G.E.R. said that .077 for #4 strand is the biggest size required. C.H.E. thought we could be competitive with a small capital expenditure.

It was R.A.s' opinion that we should have two furnaces in any event. Mr. Glesmann knows of three on the west coast ready to be uncrated at about $19,000 each. To this would be added the installation cost and the labor. Our present furnace cost us about $70,000. Mr. King at Vancouver favors the reverbatory furnace.

The question of selling rods is a new problem to G.E.R. Fabricators cannot afford to pay 28 cents for rods and compete on ACSR (there are only 16,000,000 lbs. a month of this sold in the country, and only 2,200,000 lbs. a month in covered aluminum wire). Simplex can't buy aluminum and supply Triplex and break even. At the present time we are accounting for about 10 per cent of the covered aluminum wire in the country. We might possibly get some rods from Okonite. G.E.R. pointed out that we would only get 40 per cent as much on the covering of aluminum building wire as do for copper owing to a bad pricing situation.

In view of the sales picture C.H.E. thought we should emphasize lower costs with minimum expenditures for the next three months. A maximum of $15,000 should be spent for drawing, in his opinion. A.D.R.F. will plan to see Ralph Davies on May 9th. G.E.R.'s best guess would be about 50,000 lbs. a month use at Okonite and Hazard.

(Other subjects.)

On reverse lay R.A.S. stated that we would have to sign a license for $5,000 before we could get into the Okonite plant to see the operation.

C.H.E. recommended that we go from 70 to 95 units of Spiral Four a day and run out the contract two months early. This should provide lower costs. According to A.D.R.F. this sounded satisfactory but J.T.S. should be consulted.

JHD:AS

[fol. 5095] In United States District Court

Plaintiff's Exhibit 97

A. D. R. Fraser
R. A. Schatzel
May 3, 1955
1954

Activity in the field of Research, Development, and Engineering affects most products and processes, as well as the evaluation (testing) and application of our products for useful purposes.

In expectation of the transfer of rubber plants from Government to private operation, many companies accelerated their research in high Polymers. With the actual transfer having been accomplished, Research activity under private operation has been greatly increased. Many new and improved types of rubber and plastics, as well as compounding agent for modifying the properties of these materials are being turned out at an ever-increasing rate. These are bound to have a great impact on our processes and products. We have a vantage point of contact by our association with American Synthetic Rubber Company.

With the gyrations of the copper market and the relative stability of the aluminum market, as well as its increased supply, a greater interest in aluminum has been engendered. Our development of aluminum from ingot to insulated conductor has progressed well. The problems of quality have been overcome and the problem of cost reduction is now one of volume. Industry studies of safe

operating practices of aluminum conductors are well on the way to completion. Aluminum is now ready to take its place as an accepted conductor for electrical distribution.

During the year we completed another phase of our survey of Airport Lighting Cables for the U.S. Government. The recommendations for an insulated conductor were accepted and we are now completing the final phase, the development of proper means of connection which constitutes a complete system of Airport Lighting Cable and installation means.

The growth in the use of Butyl rubber insulation has increased, as has also the growth in use and supply of Polyethylene; our Laboratory has developed a new plastic sheath—RoSeal—which combines improved mechanical and electrical protection to cables at a reduced cost.

While the Mining industry has been at low ebb, the interest in better cable has been greatly accelerated. This is often true as an industry slows down. As a result of our industry cooperation with the Mining industry, in which we had an important part, new designs of Mining cable were developed, and improved methods of evaluation which will result in greater safety, as well as a more reliable service in this industry.

The developments at Torrance have been largely those of cost reduction. However, several mechanical improvements were completed in the making of Rigid Conduit [fol. 5096] which have resulted in the filing of two patents. We feel confident other patents will result from developments now well under way.

R. A. Schatzel.

RAS P

[fol. 5097] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 98

To: C. H. Ellis
From: R. M. Fraser
Date: August 16, 1955
Subject: Aluminum

Cc: R. A. Schatzel, F. P. Baumler, G. L. McCutchan, G. Pirk, W. Schneible, C. Baker, R. Schiller, Dr. Fuller, L. Fitler, G. Commerford

Yesterday afternoon Messrs. Schatzel, Baumler, McCutchan, Pirk, Schneible, Baker, Schiller, and Dr. Fuller met with you and the writer to discuss the production of aluminum rod and wire.

Charlie Baker reported that present average daily production in a 9 hour day is 15,000 pounds, and at this rate it was estimated that we could produce on a 2 shift basis 600,000 pounds per month.

You stated that we should aim at a production of 1,000,000 pounds per month.

There was considerable discussion regarding the best type of melting and holding furnaces and other details of production. The objection to gas fired reverberatory type of melting furnace is the necessity of purging the melt of hydrogen, which process produces chlorine gas which would be very objectionable—especially at this location, and the neutralization of which would be costly and present many other problems.

Rudy Schatzel reported that he had several discussions regarding this matter with members of other organizations, and in particular reported a conversation with Louis Glesmann of Revere in which Mr. Glesmann recommended for production ranging between 500,000 and 1,000,000 pounds per month the use of electric induction melting furnace with Swindell ladles or holding furnaces. He would recommend the reverberatory type furnace only if production requirements exceed 2,000,000 pounds per month.

I was instructed to obtain quotations on an induction melting furnace having a capacity of 2,500 pounds per hour and 2 holding pots.

We will also investigate other types of electrically heated furnaces.

It was also decided that I should further investigate the Waterbury-Farrel continuous rolling machine.

It was reported that Nichols Wire & Aluminum Company of Davenport, Iowa, have a new Ajax melting furnace with Swindell ladles in operation, and I am to make arrangements for a group to visit that plant in the near future to observe operations.

Assurances were given that the roof of the reconditioned Building No. 1, in which the aluminum operation will be located, would be of suitable height to provide proper ventilation and improved working conditions.

[fol. 5098] Frank Baumler brought up the matter of drawing the additional production of aluminum rods, and he was advised that our budget contained an item of $46,000.00 for a new drawing machine.

R. M. Fraser.

RMF k

[fol. 5099] In United States District Court

Plaintiff's Exhibit 99

Minutes of the Executive Committee of Rome Cable Corporation August 17, 1955

A meeting of the Executive Committee of Rome. Cable Corporation was held on August 17, 1955 at 10:00 A.M.

There were present: Messrs. Bernard, Collins, H. T. Dyett, J. H. Dyett, Ellis, Fraser, Rolston and Schatzel. Mr. J. H. Dyett acted as Secretary of the meeting and read the minutes of the Executive Committee meeting of August 15, 1955 which were unanimously approved.

The following E.R.'s were unanimously approved:

C-249, C-250.

Mr. Ellis explained the savings in this fiscal year's E.R.'s over the estimates and discussed the additional aluminum equipment which would be required to give 1,000,000 pounds a month. He emphasized the insurance factor of another

furnace for production of 500,000 pounds a month. After discussion, upon motion duly made, seconded and unanimously carried, it was

Resolved, that the sum of $165,000 be and hereby is appropriated for the full reconstruction of Building No. 1 as proposed by Mr. Ellis on August 15, 1955.

Mr. Fraser presented a Pension Plan outline to all Executive Committee members with the request for suggestions. There followed a discussion of participation in the Executive Bonus.

Mr. J. H. Dyett presented a proposed salary change schedule and merit increases which would bring total general and merit salary increases to approximately $8,000 a month. After discussion, upon motion duly made, seconded and unanimously carried, it was

Resolved, that the general rate schedule as presented by Mr. Dyett be and hereby is approved, and it was further

Resolved, that the merit salary change as listed below be put into effect on the dates given, for the balance of the fiscal year.

[fol. 5100]

Name	From	To	Effective
B. Palliwade	$328.50	$360.00 Per Mo.	September 1, 1955
J. Reick	338.50	370.00	"
K. Murray	478.50	520.00	"
V. Nacewicz	253.50	275.00	"
T. Neilsen	368.50	400.00	"
F. Rahrig	618.50	680.00	"
M. Shannon	253.50	275.00	"
J. Patenaude	243.50	265.00	"
C. Gerlack	428.50	455.00	"
J. Commerford	315.00	340.00	"
D. Williams	458.50	490.00	"
M. Sleeman	438.50	470.00	"
G. W. Commerford	800.00	850.00	"
A. Keefe	368.50	400.00	"
E. Sees	418.50	455.00	"
J. Duffy	383.50	420.00	"
R. Mumpton	343.50	370.00	"
S. Martin	358.50	390.00	"
R. Rolston	358.50	390.00	"
W. Hojnacki	538.50	575.00	"
J. Thomas	418.50	450.00	"
R. G. Poole	633.50	670.00	"
A. H. Sawyer	428.50	455.00	"
J. H. McCann	668.50	710.00	"
F. G. McKevitt	698.50	740.00	"
M. Bylin	428.50	455.00	"
L. H. Selden	538.50	570.00	"
P. Isom	428.50	455.00	"
K. Pitts	363.50	385.00	"
E. K. Duffy	618.50	670.00	"
R. Frank	283.50	305.00	"
S. Lynch	438.50	475.00	"
G. Marwick	498.50	530.00	"
G. Brodock	508.50	540.00	"
P. Lopushinsky	448.50	475.00	"
F. Henze	558.50	590.00	"
David Smith	408.50	435.00	"
E. B. Jones	383.50	415.00	"
E. Gilmore	408.50	435.00	"
A. M. Mitrovich	588.50	640.00	"
A. J. Dawson	508.50	540.00	"
M. A. Tuohy	253.50	275.00	"
G. E. Rolston, Jr.	478.50	510.00	"
E. Pfizenmaier	268.50	290.00	"
R. T. Edwards, Jr.	538.50	570.00	"
E. C. West	448.50	475.00	"
J. Mitchell	440.00	465.00	"
Florence Sheridan	273.50	290.00	"
J. J. Glenn	468.50	495.00	"
J. S. Scheppach	483.50	510.00	"
R. D. Golly	638.50	700.00	"
T. C. Spriggs	630.00	680.00	"

[Vol. 5101]

Name	Present Rate	To		Effective
John Franke	$383.50	$410.00	Per Mo.	December 1, 1955
C. E. Walden	425.00	455.00		"
Pat Thomas	253.50	275.00		"
G. W. Commerford	(See above)	900.00		"
Pat Wall	243.50	265.00		January 1, 1956
G. June	253.50	275.00		"
N. Wightman	328.50	355.00		"
F. Murphy	438.50	470.00		"
P. Short	438.50	470.00		"
E. Sudol	438.50	470.00		"
J. Boyce	288.50	320.00		"
M. Settle	508.50	550.00		"
L. Fitler	783.50	850.00		"
J. McCormick	383.50	425.00		"
M. Kopchik	475.00	500.00		"
T. E. McCarthy	385.00	415.00		"
C. Scherzi	283.50	310.00		February 1, 1956
E. Palmer	375.00	405.00		"
E. B. Jones	(See above)	445.00		" (To cover field assignment)
R. Terzini	488.50	525.00		March 1, 1956
H. Yingling	508.50	550.00		"

The rates listed above under "Present Rate" do not include the general increase to become effective September 1st.

There being no further business to come before the meeting it was adjourned.

John H. Dyett, Acting Secretary.

[fol. 5102] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 102

ROME CABLE
CORPORATION

ROME, N.Y.

REPORT SUBMITTED TO THE BOARD OF DIRECTORS OF ROME CABLE CORPORATION AT THEIR MEETING SEPTEMBER 7, 1955

I present herewith net sales and earnings by fiscal years up to March 31, 1955, the April - June quarter and by months to date:

Fiscal Year Ended	Net Sales		Earnings
March 31, 1937	$ 1,798,092		$ 1,636
March 31, 1938	4,957,103		71,027
March 31, 1939	5,370,665		245,036
March 31, 1940	6,080,902		297,736
March 31, 1941	9,465,651		431,501
March 31, 1942	11,631,785		592,135
March 31, 1943	12,712,333		367,654
March 31, 1944	16,909,735		466,709
March 31, 1945	22,798,218		486,653
March 31, 1946	16,975,009		398,973
March 31, 1947	18,436,305		1,359,593
March 31, 1948	25,202,853		1,152,579
March 31, 1949	26,088,523		1,115,960
March 31, 1950	19,602,984		302,209
		Plus: Transfer from contingency reserve	150,000
			452,209
March 31, 1951	35,142,901	Net $1,922,136	
		Minus: Transfer to copper reserve 150,000	1,772,136
March 31, 1952	42,657,848		1,753,651
March 31, 1953	54,632,976		2,008,321
March 31, 1954	44,114,825		1,637,787
March 31, 1955	39,186,095		930,879
April-June Quarter	11,687,152		379,847
July	3,838,914		161,738
July-Sept. Quar. (Est.)	13,733,000		450,000
		First Six Months Est.	$ 830,000

[fol. 5103]

ROME CABLE CORPORATION

Breakdown of sales before deduction for discount and freight for April to August 31, 1955, with August figures estimated *, are as follows:

	April-August * 1955	April-August 1954	% Increase or (Decrease)
Rods	$ 2,161,000	$ 2,065,046	4.7
Bare	3,498,000	2,237,319	56.4
Weatherproof	1,299,000	957,224	35.7
Magnet	1,449,000	1,049,407	38.1
Rubber Covered	8,547,000	6,122,922	39.6
Torrance - E.M.T.	1,146,000	764,331	50.0
T.V. Mast	125,000	178,314	(29.8)
Rigid	1,180,000	705,445	67.4
Spiral 4	768,000	822,545	(6.6)
Aluminum	1,416,000	962,131	47.1
	$21,589,000	$15,864,683	36.1

Rome has operated since my June report to the limit possible with available copper. I believe we have been as amply provided for as possible under present circumstances. We hope copper will begin to flow more freely within the next quarter. You will recall that in my June 15th report I stated our budget for the current fiscal year indicated an anticipated 15 per cent increase in the physical volume of sales. In the last five months this figure was 22 per cent compared to an increase of 36 per cent in dollar sales.

Torrance figures are presented below:

	April-August * 1955	April-August 1954	% Increase or (Decrease)
E.M.T.	$ 1,016,000	$ 738,719	37.5
Elbows	10,000	6,399	56.2
Mechanical Tubing	120,000	19,213	524.6
Rigid - Elbows & Couplings	45,000	16,562	171.7
Rigid - Conduit	1,135,000	688,883	64.7
T.V. Mast Tubing	125,000	178,314	(29.8)
	$ 2,451,000	$ 1,648,090	48.7

The profit in July at Torrance was abnormally high because our sales jumped to $814,000, which was double the average monthly shipments. On sales of $400,000 our profit would be about $24,000 per month. However, we expect later this month to make a contract with the Pittsburgh Steel Conduit Company under which they would take their west coast requirements from us, amounting to $600,000 to $1,000,000 per annum. This should have a beneficial effect on our future earnings. While this arrangement will help us at our Torrance Plant it still leaves our company without the ability to sell conduit at a profit in the eastern market. This is something that we shall continue to study and hope for a solution later.

[fol. 5104]

ROME CABLE CORPORATION

BACKLOG OF ORDERS		Value
January 30, 1955	Rome - Wire Products	$2,327,000
	Aluminum	527,000
	Spiral 4	1,865,000
	Torrance - E.H.T.	22,000
	Rigid	32,000
	T.V. Mast	-
		$4,753,000
May 31, 1955	Rome - Wire Products	3,921,000
	Aluminum	623,000
	Spiral 4	1,640,000
	Torrance - E.H.T.	44,000
	Rigid	75,000
	T.V. Mast	-
		$6,303,000
August 20, 1955	Rome - Wire Products	3,438,000
	Aluminum	932,000
	Spiral 4	1,077,000
	Torrance - E.H.T.	365,000
	Rigid	427,000
	T.V. Mast	33,000
		$6,272,000

Incoming orders for the first eight months this year show a 46 per cent dollar gain over a year ago.

COPPER

On August 17th Anaconda Copper Company changed their copper price from 36 cents to 40 cents per pound, and on August 25th they raised their price from 40 cents to 43 cents per pound, shortly followed by similar action on the part of Phelps-Dodge. Kennecott increased its price to the 43 cent figure, effective September 1st. We are not unconscious of the fact that the price of copper is the highest it has been during my lifetime, and we shall carefully bear this high price in mind and try to protect ourselves as thoroughly as possible, so that we do not get badly caught some time in the future. Consumers are paying over 50 cents per pound for nearby copper, but we are staying clear of this premium copper except where our customers request it. Steel and aluminum are both in short supply, and we are having difficulty to protect ourselves fully for anticipated enlarged requirements. I believe, however, we are doing all possible to guard against metal shortages.

ALUMINUM

It is evident that with copper at or near its present price the use of aluminum is going to grow very rapidly. We have done considerable business with Alcoa on a toll basis and while we have no assurance of long continuance of this business, we are hopeful that we may be able to retain at least a very large portion of it. I believe with conditions as outlined that we will

[fol. 5105]

ROME CABLE CORPORATION

ALBRIGHT (Cont'd.)

shortly have a meeting with Ralph Davies, Vice President in Charge of Sales, and his sales manager of wire and cable products, here in Rome - I hope by the end of this month. Our Rome Plant does little or nothing in the manufacture and sale of ACSR transmission cable. This might be a large item if we were located in a portion of the country where large buying of this type takes place and our costs permitted us to compete at a profit. This is a subject of great importance to us for the future. I have thought for at least five years that we were handicapped by having only one wire and cable plant. Present freight rates handicap us in meeting competition in many territories. I believe this is a subject for very serious consideration in the coming twelve months. I think we will gather some very interesting information from Mr. Davies when he is here and that certain information which our Mr. Ellis has secured this past week should be thoroughly discussed at this meeting.

I will ask him, after our formal portion of this meeting is over, to bring up the possibility of acquiring two Properzi units and furnaces at a price of approximately $150,000, which represents approximately 60 per cent of what new equipment would cost. I understand that the above equipment under discussion is the property of Anaconda Wire and Cable Company which has been in service a comparatively short time and is in good condition, and which at present is surplus equipment to them on account of a new very large aluminum rolling mill installed by the Anaconda Copper Company out in Montana. I feel that after you have listened to Mr. Ellis' story that we will be warranted in giving him power to enter into the proposed purchase. Mr. Ellis expects to be able to get the final story on this proposition tomorrow. Therefore, we must consider this matter seriously today.

LABOR SITUATION

The Executive Committee approved an increase in labor rates of six cents per hour to all hourly workers affective August 29, 1955. We also approved certain upward revisions in specified job classifications. Increases to salaried workers to meet these new conditions were made effective September 1, 1955.

The Executive Committee approved a modification of the Employee Dividend-Sharing Plan to include a new Profit Sharing Trust arrangement. They also approved a Pension Plan. In addition improvements were made in the hospital, surgical, medical and accident health programs. The total improvement will amount to approximately a cost of 15 cents per hour. The above improvements were offered to maintenance workers represented by International Association of Machinists, A. F. of L, and accepted by them as containing the improvements in the new contract which will be negotiated prior to October 7th.

All of the above changes approved by the Executive Committee had been thoroughly discussed with our directors at their last meeting and approved in substance. I believe that our present agreement with our workers puts us well in line with other local plants and with our industry in general.

[fol. 5106]

ROME CABLE CORPORATION

Our Company factory payroll figures covering number of employees, total weekly payroll, average weekly wage, as well as number of monthly salaried employees at both Rome and Torrance are shown below:

Week Ending	No. Employees	Total Payroll	Avg. Weekly Wage	No. Salaried Employees
ROME				
9/26/54	M 862 F 22 884	$79,904.19	$90.39	413
2/6/55	M 840 F 22 862	71,500.32	82.95	414
8/14/55	M 854 F 37 891	73,440.79	82.42	419
TORRANCE				
9/25/54	139	14,146.53	101.77	31
2/5/55	136	12,109.35	89.04	33
8/7/55	125	11,641.38	93.13	38

CAPITAL EXPENDITURES

Major equipment already ordered but not received is as follows:

a) One heavy Lamuth strander to improve our production volume - necessitated by higher aluminum cable production.

b) One large lead extruder and dome vulcanizer for same - to expand our product line.

c) One large cabler to expand product line and manufacture cables up to 61 wires. This will be particularly suitable for control cables and will permit us in one operation to put on layers of 6, 12 and 18 wires. This, with the center wire, would give us a complete one-operation cabling of 37 wires.

d) One special reverse lay cabler for aerial cable.

e) One large tripling machine to increase output of Triplex cable.

The above equipment is scheduled for delivery between September 1955 and April 1956.

The Executive Committee at a meeting held August 17th approved the expenditure of $165,000 for the rehabilitation of approximately 34,000 sq. ft. of Building No. 1. This important improvement should be completed within the calendar year 1955. It would transform a very old building to a much better building with higher head room and with an inside railroad track. The new

[fol. 5107]

ROME CABLE CORPORATION

CAPITAL EXPENDITURES (Cont'd.)

building with added height will permit better and safer operation of our Properzi aluminum equipment including electric furnaces. The estimated cost of this building will approximate $5.00 per square foot.

We are presently endeavoring to get accurate estimates for all costs in connection with increasing our equipment for aluminum rod and drawing capacity to a safe million pounds production per month figure. We are now procuring costs for an additional electric furnace and holding ladles and a heavier rolling mill. These additions would give us the possibility of turning out about one million pounds of aluminum per month at lower costs than at present. At present volume we are producing aluminum rod at 2.1 cents per pound under the present purchase price for aluminum rods. We believe that this new equipment will permit us to expand our business and secure competitive costs.

I am attaching to this report a list of the E.R's approved since the June 15th meeting of our Board.

SPIRAL FOUR

Our production on Spiral Four is at the rate of approximately $150,000 per month.

MARKET SITUATION

We expect the heavy demand for wires and cables will continue throughout the current fiscal year. Owing to the very high price of copper we expect a greater and greater interest will develop in the use of aluminum wires and cables.

REARRANGEMENT OF PLANT

The plant rearranging program is proceeding as scheduled.

a) The complete synthetic extrusion department has been removed from Bldg. No. 15 to Bldg. No. 20, including five present machines and an additional new high economy extruder for competitive plastic wires.

b) The complete Reflex department has been removed from Bldg. No. 15 to Bldg. No. 20.

c) Three-quarters of the Magnet Wire Dept. has been removed from Bldg. No. 4 to an improved section of Bldg. No. 1. The Magnet glass wire machines will complete this department move to Bldg. No. 1 by September 15th.

d) Partial movement of the Receiving Dept. from Bldg. No. 7 to Bldg. No. 1 has been accomplished. No further movement in this change will take place until the rehabilitation of Bldg. No. 1.

e) Spiral Four has been removed from the main floor of Bldg. No. 20 to the basement of Bldg. No. 20 for both production and storage.

Of course, all of the above changes were preceded by the erection of the new Bldg. No. 22 for Shipping and the removal of that department from Bldg. No. 1 to Bldg. No. 22.

[fol. 5108]

ROME CABLE CORPORATION

PRODUCTS

At my request Mr. Holston on August 26th presented me with a very thoughtful report listing each major product class and the products under such class which we now produce; also a suggestion of those items which he would consider as suitable for our consideration as additions to our line at some time. I will quote from his report on Magnet wire:

"I believe that the time is rapidly approaching when we will have to give serious consideration to the question of enameling wire, both synthetic and regular type. There are definite indications that enameled types of covering are now gaining favor for transformer work which represents a large portion of our business."

Under telephone wires and cables he states:-

"We have already produced the plastic telephone cable in small quantities and have authorized the purchase of new cabling equipment."

I think we all realize this represents an opportunity with the cabling equipment now on order.

Under aluminum wire he states:-

"Due to the high copper prices now prevailing, very serious study should be given to the use of aluminum in many of the copper products we now manufacture with copper."

POSSIBLE CHANGES

We had a little discussion with the officials of a prominent wire company on the subject of a possible merger, the discussions being confidential and purely exploratory. Since that meeting we have had no definite sign that the party with whom we talked has any great amount of interest in this subject. I personally feel it is exceeding doubtful if anything comes of it.

PENSION AND BONUS PLANS

You are all familiar with the adoption of our Pension Plan which with our Bonus Plan will be subject to full review at this Board meeting.

DIVIDEND ACTION

I recommend payment of our 66th dividend at the regular rate of 35 cents payable on October 3, 1955 to share owners of record of September 19, 1955.

[fol. 5109]

ROME CABLE CORPORATION

LISTING ON NEW YORK STOCK EXCHANGE

I give below the earnings for the first quarter of the present fiscal year and the figures for 1954:

	1955	1954
1st Quarter (April-June)	$ 379,847	$ 235,000

Our estimate for the second quarter 1955 is $450,000 as compared to $177,000 last year. This gives us a total for the six months of $830,000 compared to $412,000 in 1954. The six months earnings this year are at the rate of $1.63 per share of Common Stock.

Our price structure looks more favorable than last year at this time, and the present indications are that for months to come we can run our plant as full as materials will permit.

I have discussed this matter with our Finance Committee and we are unanimously in favor of making our application for listing. If our Board approves this suggestion, we should authorize our officers to take suitable action.

PRICES AND FUTURE PROSPECTS

Prices on certain products have recently been improved, and I believe that under present conditions we may anticipate a slight improvement in our profit margins, at least for the next few months.

GENERAL

At this meeting it is customary to designate the members of the Executive Bonus Group for the current fiscal year.

This year fourteen students have been granted Herbert Thomas Dyett scholarships, bringing the total number receiving aid in the current fiscal year to 38 young people.

I would like to have Mr. Schutzel, either before or after luncheon, bring us up to date on any new development projects that we will be able to offer after our insulating department is completed late this calendar year, and also to advise of the very important work he has been doing on standardization.

Respectfully submitted,

H. T. Dyett
Chairman of the Board

HTD:AB

[fol. 5110]

E. R's approved since the last meeting of the Board, June 15, 1955:

	E.R. No.	Description	Amount
ROME	1714	Design, construct and install a reverse lay cabling machine	$ 15,000
	1725	Materials and labor to construct a pit furnace with stack connected to boiler house breeching and a steel supported roof over the rubbish collecting dock	7,800
	1726	Purchase and install a band saw in the Reel Repair Shop	1,400
	1727	Purchase one portable electric welding unit	600
	1728	Purchase and install two 50 VS Reliance control units for supplying D.C. Current on Vaughn C.I. machines	9,000
	1729	Construct a new superstructure over portion of Bldg. No. 1	165,000
	1732	Purchase and install suction fan and ducts on roof of Bldg. #11	1,100
	1733	Purchase and install two suction blowers to improve ventilation of basement in Bldg. #20	4,200
	1734	Purchase and install one 100 K.V.A. Lighting Transformer	1,000
			$ 205,100
TORRANCE	C-248	Construct dumping base for special containers to be fitted to Ford Truck, and purchase 10 special containers	$ 732
	C-249	Purchase Westinghouse Air Conditioner	250
	C-250	Purchase and install Par-Air Package Coolers	3,819
			$ 4,801

Additional E.R's approved:

ROME	1688-A	Over-expenditure on 4½" plastic covering unit	$ 785
	1688-A	Over-expenditure on purchase and installation of bins, shelving, etc. for relocated Receiving Dept.	573
	1698-B	Over-expenditure on 4 Roflex paper wrapping machines	575
			$ 1,933

[fol. 5111]. 9/8/55 - H.T.H.:ss

I read the attached statement to the Board and it seemed to be unanimously approved with the exception of Mr. Krueger, who suggested he thought it possible to make a deal with Oronite. I told him this was contrary to what Al Metz had told me in my office and that I personally thought that it was very questionable if he would change his mind in this respect.

I again stated I felt that our organization would be happier running its own affairs and that we could pick up possibly one or two small companies in special lines and add to our own facilities in a new location, so that I felt our organization might not only be happier but our stockholders fully as well off as if we tried to merge with any company.

[fol. 5112]

INFORMAL REMARKS FOR THE BOARD MEETING 9/1/55 - H.T.B.:ss

I have given a great deal of thought to the present merger situation and have attempted to analyse the conditions I foresee if anything comes of the discussion started with one or two other companies. My feeling is that if a merger of three companies of somewhat similar size comes about there are many headaches and perhaps a bit of unhappiness and a political situation started that might be exceeding unpleasant.

I have personally come to favor a very careful survey of what our own Company could do by expansion, possibly picking up one or two small companies who would add to the breadth of our line and would give us another location where we might do a certain amount of insulating at some later time. I believe at the present time we are too concentrated into one location. Freight has become a more and more important factor. I have believed for the last five years that we should have another plant, the location midwest, far west or southwest, to be carefully analyzed by our Sales and Manufacturing Departments before we attempt to reach any conclusions.

I would very much like to have a full and informal discussion on this subject as to whether or no we should keep our own strong, happy organization in control but attempt to broaden our line and to open at least one more factory in some other location.. It is my present thought that such a course holds better and happier promise for our executives and a continuance of our progress for our stockholders. If I find you are in agreement with me it will entail much careful study and analysis before we could begin to arrive at any firm conclusions.

[fol. 5113] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 103

1955 Sales

E. Mark Wolf

Thank you Rudy. Well I'd like just to quite briefly go over some of the things that have happened this last year in the field of our industrial accounts, and in getting into that subject, I want to say what I have thought for a long time, that we've got more to offer potentially in that field than we're finding a place for. I think we've got quite a little to offer to these industrial accounts and electrical manufacturers—quite an impressive list of people that we've worked with, other than Magnet wire users—and in each of these cases we've been able to learn their problems and their processes and work with them—develop special little gimmicks in manufacture that give them what they need and each time we go into a new spot we carry some of that experience with us. I really think we've got a lot to offer to this class of people and it's business that I think all of you would like to work with, once you crack one of these accounts. You end up earning the everlasting gratitude of the people you work with because you've solved their problems; in many cases you're not in a highly competitive field because you're making something specially suited to their needs. That's the way we work with people like IBM, Westinghouse, Singer, General Railway Signal, Louis-Allis—there's quite a long list of them.

Let's talk just for a minute about Magnet wire and some of the things that have been going on—it's a subject I always like to talk about because I think we really have something to be proud of and I say this from my experience in getting around in the plants where our Magnet wire is used and seeing the product that our competitors are furnishing, and I still can say, as I've told you before, that there ain't nobody that makes the Magnet wire as good as Rome Cable does. I wouldn't say that if I didn't mean it. I give you one example of how that thing works out. I went with Jack Woods to an account down near Pittsburgh

a few months ago, where we were not selling Magnet wire, but he knew that they used it and we were interested in seeing what could be done. They were having a great deal of trouble with Silicone glass which is true with many manufacturers of rotating equipment and stationary equipment, and when we got down in the plant it was rather easy to see that the product they were using was in no way comparable to ours. Four different manufacturers were supplying their Silicone glass and, (I'm not exaggerating), I don't think there was a reel in that plant that would ever get out of our Inspection Department; so we started talking with these gentlemen about our Glass Magnet Wire, and when we got through he said, "Well, if your wire is half as good as you say it is, you've got yourself a new customer. Send me a sample." So I came back and had Dave Wright cut about a 15-pound sample off of one of our regular runs and sent it down to him, and it was just about two weeks ago that Jack got his first order from this customer. All he had to do was try our wire and he found . . . . RAG—I believe Mark that company just moved into the Pittsburgh area. EMW—That's right, it's a new development down there, a transfer of an operation into that area. But that sort of thing in one way or another has happened many times.

As you know, all those of you that have Magnet wire accounts, we've introduced this green tracer on our Magnet Silicone Glass Magnet Wire in the last year as a means to help these people identify Silicone glass from the regular glass in their plant. That move got many of our competitors a little sore at us and made all our customers love us, and I think that's the way it ought to be.

[fol. 5114] Glass Dacron is a new product that we've introduced this last year, and as most of you know, the first product of that kind was introduced by Phelps Dodge along about December or January. It's very much like regular Glass Magnet wire, except that instead of putting a 100% fiberglas covering on it, the covering is plied; it's made up of about half fibers of Dacron and the other half fiberglas, and the heat of the baking ovens fuses the Dacron and produces a tighter bond to the copper, a harder, tougher exterior surface—the magnet wire that seems to stand the abuse that is necessary in winding coils for rotating equip-

ment. We're making it, and I think in every way the product we're making is comparable to or better than what's being offered by others. The bulletin that you received from us sometime ago, I think, stated the case fairly well, and everything in that bulletin is still true. We're finding in general, transformer people are not too much interested in it because they're perfectly satisfied with what they've got, and find that people making rotating equipment are interested in it because it solves some of these tough winding problems.

¾ lap paper is another Magnet wire we're very proud of here. As some of you know, the development of the ¾ lap paper Magnet Wire, as we see it today, and as a product that's not too high priced—that development largely took place here. I think we originated the use of the type equipment that all manufacturers are now using for this wire, and just to show you the kind of talent we're able to bring to bear on that, I wanted to tell you one thing that's happened internally here. One of the problems in making this wire is to get this paper on without wrinkles. Wrinkles affect dimensions, and they make the wire more susceptible to damage during winding, and one of the things that is needed in putting this paper on is a proper nosepiece and polishing head on the machine. I don't know how many different types of nosepieces we developed here in an effort to solve the problem. They all improved it a little bit, but none of them completely cracked it. We still were head and shoulders above our competition, but none of us were doing the job that needed to be done. Then one of the operators of our paper machines got interested in the problem; it happened that he and his father had a small machine shop at home, and one morning he came in and handed Dave a nosepiece that he built at home in his spare time and wanted to know whether we could try it. So it was put on the machine experimentally, and while there were some faults in it, it was the first real step that we'd been able to make—it looked like a positive improvement. The thing went through several revisions—all at home in this fellow's shop, and the result was that this nosepiece is our standard piece of equipment now. I wish you could compare ¾ lap paper coming out of this plant now with our competition, there's no comparison. That fellow was

talked to personally by both Charlie and Ross. He's now working in our Industrial Engineering Department. We've got a lot of talent here in the plant and I'm kind of proud of the fact that we're finding ways to use it.

The only other thing I wanted to mention in the line of Magnet Wire was Aluminum, and I'm not going to spend [fol. 5115] much time on it, except to tell you that unquestionably there's going to be a great deal of interest in Aluminum Magnet Wire with this price differential between aluminum and copper. It isn't the kind of product that you can go out and sell until the man that's using Magnet wire says he's interested in it, but if you haven't already heard that from your customers, you're going to hear it. But remember when those requests begin to come in that as of today, we have had more experience in the manufacture of rectangular Aluminum Magnet Wire than anybody else in the country, through the experience of working with the Westinghouse plant down in Sharon for the year and a half or two years when they were actually making aluminum wound transformers. I think that experience is going to hold us in very good stead.

I'm always supposed to mention the subject of complaints. This year I think our situation on complaints has been considerably better. I think our plant has done a grand job in correcting many of the things that needed to be corrected. I thought I'd like to mention a couple of instances that have come up this past year that show that complaint isn't always a bad word. We've had some complaints that I think have eventually worked out to our advantage and of course, to the advantage of the customer. These are complaints of the type where a study is instigated cooperatively between ourselves and the customer; the result in each case has been some improvement in what we're doing here, and a great deal of appreciation on the part of the customer for our co-operation. We are going through exactly that situation down at the Sharon plant of Westinghouse on rectangular copper, where they had a general complaint with all of their suppliers on the quality of rectangular copper. I think the work we've done with them was very much appreciated down there, and we know here that we've gotten a lot of good out of it—we're making a better flat wire today than we ever made. The same thing has

been true up at the Buffalo plant of Westinghouse on rods. We're now in a similar study down at Penn Transformer on the condition of Magnet wire reels and we'll talk a little more about that when we talk about Packaging on Friday, but there again, we've earned the customer's respect and appreciation and we've improved our own lot.

Well I'm not going to take any more time on these subjects, and I think I'll turn the next part of this section of the program over to Lew. He's got several things he'd like to cover. Lew Selden.

[fol. 5116] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 104

Rome Cable Corporation
1955 Sales Conference

"Our Industry—And Us"—A. D. R. Fraser

I feel somewhat apologetic about the fact that I have had to come to this meeting not as well prepared as usual. I hope sometime I will be able to enjoy one of these meetings and spend a little more time with you. There have been a few things going on, however, that have required my attention in other places. It is rather an important thing, I think, that represented at this meeting are 30% of the total shares of the Rome Cable Stock. So I may be a little bit rough in certain respects in some of the things I say, but it is being done in your interest as share owners and your interest as employees.

I would be indeed remiss if I did not very sincerely acknowledge the fine job that Glenn, Fred, Rudy, Mac, Bob, Dwight and several others have done in all the arrangements that were made.

I am a little bit disappointed in this meeting, at two things; one, that we haven't stressed a little bit more on how we are doing and I haven't found as much of the panel discussion as we did have in some of the other meetings. I always got a great deal out of getting information from you at first hand. It seems as though we in Rome have

had to do more of a talking job than in some of the other years. I know you have had a tough year and we had a lot of ground to cover and we have tried certain experiments, but that's just merely my impression.

Coming back to the matter of the figures. You knew about the budgets we made out for the year and the budget for the current fiscal year, that is April 1 to March 31, projected was up 15% above a year ago. Now those figures have been corrected to take care of the price increases, they have been corrected to take care of the copper increases and anything of that nature. Whenever those things happen, figures are corrected. Fifteen percent roughly in volume was expected to be the overall increase for the year. I am very pleased to tell you that we are doing a little better than that on the budget. Up through August, even with the shortage of copper, with all the things that you have heard that have been in our way, we are 3% ahead of that. You know, we don't just accept the dollar figures or the quantity figures on your sales projections. They are carefully reviewed by several here at Rome. We look at it as potential production, manpower, equipment and financial needs. We, as you know, also have an expense budget for each of the main departments this year and when you get all those things together, you may ask, "How are you going to do; how are you going to make out profitwise?" I am very happy to tell you that at the end of five months, we are running 10 to 15% better than we figured we were going to be by that time.

Now that's good, it is a good trend, but you heard quite a few pitfalls, potential troubles that can hit us with the situation in copper. It doesn't take very many million pounds of copper at 4¢ a pound difference, buying it at 47¢ and selling it at 43¢ to make quite a difference in the overall results.

The orders for the five months in the fiscal year are up about 28% or so above the same five months a year ago and we were beginning to have a pick-up in orders at this time about a year ago. The Kroeger order chart, with which you are familiar—the red line is that of industry generally, the blue line is ours. It is based on a moving average. One reason for our dip down here (reference to chart) is

because we haven't been able to enter all the orders we could have because we have only entered them on the basis of the orders that we have thought we had sufficient [fol. 5117] copper to produce. However, you see the general trend is up. We are apt to be more heavily affected than industry generally as we were here because of the inventory liquidation but now, as you see, we are well ahead of the pace on the inventory overall picture of industry.

Financially, we are very solvent as Harry told you. Harry made a new record in collections the other day. It was a million-and-a-half or so dollars in one day—a million-and-a-half dollars! You realize just about twenty years ago today, a little later than this, we were talking about how we were going to raise approximately two million dollars to start the Company. It is quite something to ponder on. Of course, they are different dollars, but they are the dollars that we have to work with. Let's not forget we still have a big debt of about four-million dollars, part of which was incurred for Torrance and part of which was incurred for consigned stocks. We heard something about consigned stocks earlier and you will hear more about this before I get through.

We might look at this almost twenty-year record—the sales in the first year were less than two million. This year we expect they will be well over 50 million, and the net worth at the beginning of the company was less than two million. By the end of this year, the net worth of the Company will exceed 15 million dollars. Our organization has, we believe, been strengthened during the year. You heard of some of the changes. There is no one who could be more delighted than I have been with the way in which the whole group has taken the bumps. Last year was a rough year. I think, frankly, we had about the poorest record of any wire company in the business and that is not normal for us. I told you the other day, that in 1938, when all the companies were losing money and we were only two or three years old, we were one of the few who made money, but there was a story back of last year. We were doing a lot of holding line. We got out of the small company-class. The influence of our policies and our actions could have made a much worse debacle out of last

year's results if we had chosen not to hold the line and not to try to get a better industry than we seemed to be having.

I haven't been around here as much this year. I have been doing a lot of traveling, not the kind of traveling that I would like to do to your districts, nor the kind of traveling out in the mill that I would like to do. I have had to do certain other special jobs. And I want to pay particular tribute to Jack who, as Executive Vice President, has been carrying on. I have delegated job after job to him. He has taken over well and taken off my shoulders a great many responsibilities and has done an outstanding job working with the other top people in the Company. I have absolutely no qualms about being away and doing some of the other jobs. I know that they will be carried on well and better than if I were here myself.

Capital expenditures—yes, we are still spending money. You see what we are doing to the old bare wire building, we are revamping it, we are also going to add to our aluminum production and what you heard about aluminum certainly indicated that there was need for some revision—some [fol. 5118] additional capacity there. Incidentally, we have spent approximately 11 million dollars or so on capital expenditures in the last 11 years and that is a pretty heavy pace for a company of our size in the ploughing back of the money that was made.

Employee relations have been good. We had troubles at Rome and we are currently having some potential trouble at Torrance, some more organization work, we don't know how it will come out.

During the year we announced a revision on the employee dividend plan and what we think is one of the most forward-looking pension plans that is in operation today, together with a profit-sharing trust. We haven't got all the details available on that. Those things have been worked out again on the old Rome Cable principle of endeavoring to get the best that we can within our ability to pay.

I was very pleased with the Engineering report. I like the way Bob said it. "Not much new in products but more and better with what we have." I think we went through a period of adding so much to our product line—we got a little bit ahead of ourselves and we had an awful lot of

headaches and an awful lot of troubles. I think what has happened in this particular period is that we have consolidated our position, we have worked harder on the quality end. The returns picture is much better than it has been, I think, since the Company started. We, on the other hand, from what you saw from Rudy, Mac, and Bob, have been working on other new things that are going to mean something in the future—but I again say let's not go off half-cocked until they are fully ready—until we have the equipment. Let's not promise things until we have got good assurance we can produce. Let's not go through another Tree Plex, another Rigid Conduit, let's be a little surer of our ground. And you know that I am a gambler, not to match up with some of you boys in your games around here, but in the business world, you know that I am willing to take chances.

Remember that laboratory exhibit which is very, very impressive and let us do a little digging into the fact that at the present time in Rome we have two-hundred product classes—two-hundred product classes: Each product class may have dozens and dozens of sizes and types of wire under them. Now I told you this last year, as far as I know, nothing has been done about it, but in that set-up, 35% of that number of product classes are giving us less than 6/10th of 1% of our total sales. These items individually total $12,000.00 per year. Now you can't make very much wire today on a thousand dollar per month total for a production class. When you go up to $24,000.00 a year, the figure goes up to 46% of the total number of product class or almost 100 product classes gives a grand total of less than 1½% of our business. Now I know that we take certain jobs because we want to get in with a good customer and to get experience in running certain products, but in this period of scarcity, in this period when the mill has a big problem of rescheduling to keep going for regular customers, can't we do just a little bit more on investigating of what is the value of spreading ourselves so very thin? I feel that there is a lot of "gold in them thar hills" and it would mean paying better dividends.

[fol. 5119] On the material side, it took 65¢ of the sales dollar last year to pay for materials and supplies. You heard Jack's story. It is going to be probably a larger

amount because of the higher price of copper this year. An excellent job of taking care of our material requirements has been done by Jack and Stan. The aluminum picture has presented problems. We think we have licked most of the problems of the production on the Properzi. You have heard of what we are going to do in expansion. The economics of aluminum over copper will mean further usage of aluminum. Then we hit the matter of supply. Then we hit the matter of how we are going to reconcile the economics. Gentlemen, I would not be very happy for Rome Cable to have the Company entirely on an aluminum production basis based on the present prices on a switchover from copper. It would be a very, very sad Company as far as returns were concerned. So we have got a lot of things to be done in that connection.

The plant re-arrangement has gone forward apace, the boys have done an excellent job in manufacturing, engineering, we are looking and already seeing the benefit of many of the savings.

Now there is one thing that I understood was said that I would like to take just a little bit of an issue with—and that was that anyone was certainly crazy to be in the conduit business. Well I had something to do with that. We were told back in '36 that we were crazy to get in the wire business again. Industry was operating at 30% or 35% capacity and I can remember a New York banker going through our plant in the late 30's and saying we should certainly get out of the rubber covered business. We can remember it took us 40 odd months to break even and yet shortly after that, the Rubber Covered Department carried the Weatherproof and Bare Wire Department through a bad price war. I can remember a little bit about the cost in rejects and high costs in getting into high voltage. I can remember rather vividly—rather vividly, the fact that last year, the building wire, which we had made for a long time in which we had two-and-a-half times the volume that we had at Torrance that we lost 200 thousand dollars on it. So I am not discouraged about the Torrance picture.

Volume, when we had it in certain months, showed the potentiality there. Glenn Kroger has done a fine job. Ted Lewis has done a fine job in getting us established with the

industry and establishing out reputation with competitors. I think the policies in the conduit business last year were much better than some we had had in the wire and cable business. I like Dick Gates' enthusiasm. They have got a grand bunch of boys who want to be on the team and are on the team and I think we'll give Torrance a blue ribbon in the not too far distant future.

What we have learned from the meeting? Well, I guess we had better go out of the warehouse business from what the McGraw-Hill boys told us so we had better save some money on some warehouse leases, inventories and consigned warehouse stocks. Part of that debt that we built up was at your behest and right at the Sales Meeting time two or three years ago, we authorized the equivalent of over 4 million pounds of copper to go into that. Because we were operating on LIFO that meant a switch in inventory which accounting-wise kept our value of copper in inventory at a relatively low figure. Let's not forget that when you do [fol. 5120] increase your inventory, or replace it, you are replacing it at a higher level and I was alarmed, as some of the organization know, about this climb to 600,000 pounds above the level authorized. What happened? In the period between June and August, as Jack told you, we lost 2,200,000 pounds of inventory, that went out at lower prices. It costs us quite a pretty penny. Replacement of that at 43¢ or 47¢ copper can well represent ¼ million dollars loss and if we are not able to replace that inventory on an overall basis, which we hope we can do before March 31st, Harry is going to have to dig up a little matter of over 250,000 dollars in additional taxes. The overall average of the cost of our inventory will move up 3 or 4¢ a pound so we mean what we say, it's your money you're dealing with when you give an extra amount on this consigned stock. I was amazed to find early in the year that we were getting about 1 and ½ times turnover on a lot of our building wire items. Because we had to have material going though the mill here, we had to have it in stock, we had to have it in transit to the warehouse, we had to have it in the warehouse and then we had to have three or four months in the hands of the jobber. Now that's not efficient. I won't go for this business of three months stocks with a consigned stock

where we have a warehouse also in that same city because in that event, you are going up to 4½ months stock in many cases and that is not good operation.

This question of inventories to me is an extremely important matter and it is extremely important that we get information back from you. If you find for example, that your customers are carrying too heavy inventories, get that back to the Sales Department so that we won't be operating overtime and then suddenly shut off.

Coming to our part in industry. Where do we stand? There are certain figures that are available. On copper, we have improved our percentage slightly this year despite the shortage, I mean our percentage of the overall total because of what Jack has been able to do. In building wire we are up slightly. We have about 3% of the total magnet wire business but we don't make a great portion of that product. It runs about 11 to 12% of what we make. We run about 5 to 8% of the NEMA power and control cable. Five percent of the portable cords, and on the overall with about 40 companies representing a major portion of the industry, on the items covered by NEMA, we run about 5%. We run about 8% of the aluminum covered wire business. On EMT 6 to 7% and in rigid 3%. Now, if we had a billion and a half industry, you have got some conception of where we stand from some of the figures that I have quoted.

Here you have the total of insulated wire and cable. (Reference to charts) These are NEMA charts and we have put the Rome Cable figures on them—the blue line is the Rome Cable—the black line is total insulated wire—the red line is total new construction—the green line is total electrical manufacturing industry and this goes up to 1955 and the figures to 1970 are going well above two billion dollars. You notice how the building wire follows the total of new construction here. Rome Cable figures fell off last year. You know why, but we are back on the trail again. Here is the trend of magnet wire business. Look how closely that follows the motors and generators sales, and the pos-
[fol. 5121] sibility here we are off a bit because the enameled types represented a larger proportion than the other type coverings that we make.

You have heard about the NEMA job that I have. I just want to touch lightly on that and some of the things

that we have been doing, some of the things that I think are helpful for the industry. You have heard about the IPCEA being responsible now for the standards. If we are successful in this program we will have some real standards in the industry and you know that that will relieve a lot of your headaches. Frank McKevitt has headed up a traffic committee. For the first time, the wire and cable and the brass fabricating industry are working together to make some very effective savings in freight rates. We have had all the labor relations people in the various member companies in NEMA together to swap information covering important matters in labor relations as far as the industry is concerned. We had Jay down there last week on a matter of analyzing cost systems with regard to what is considered overhead and how inventories should be carried. We are trying to make it easier to satisfy the Government on the matter of cost analysis.

We also had a meeting of statistical and market analysis group. Out of that I hope that we will have an industry that will be as well informed as any in the country. The companies are enthusiastic about some of the things that we have been able to do. Copper has been a headache, but there again, in its initial stages, we were able to work with the brass mill. For years whatever the brass mills did the wire mills would do exactly opposite. We have been working very closely whenever we have gone along on a program alone, we have kept them informed and same is true vice versa. From my trip to Washington last week, I believe that there will be and we have seen some actual results on copper. There is some possibility also that if we can get a law in effect on involuntary liquidation of LIFO that many million of dollars will be saved to the industry. LIFO at Rome Cable means over a 3-million dollar cushion of what we have at the present time.

Coming to the growth picture, let's look at, let's say, the almost 20 years of our Company. Twenty years ago, the gross national product which was the output of everything was 72½ billion dollars/ Well, the cost of government runs about that today. In 1945, ten years later, it climbed to 214 billion dollars. Today there is some actual predication that we may reach this year almost 400 billion

and by 1970, 567 billion. Electrical energy—(reference to charts)—electrical energy—remember at the start of Rome Cable, you have seen this chart before, we used it in our prospectus, we used in in the talk to Security Analysis, the production of kilowatt hours. We have capital expenditures of utilities on the green line. We have plotted the Rome Cable sales line as it actually has occurred in that period. We had a dip last year. Here is our estimated resumption of that line. This only goes to 1964 at some 800 billion—you carry it on to 1970 and you get a line that goes up to a new figure—a trillion-four-hundred and some odd billion kilowatt hours. Well, if this same story holds true, fill in your own figure.

[fol. 5122] The Federal Reserve Board index was at 47% in 1935, 107 in 1945, 136 today, and over 200 expected in 1970. Rome Cable Sales were nothing in 1935, 17 million in 1945, 55 million in 1955—what will they be in 1970 if we follow along that curve. Aluminum production 60,000 tons in 1935 almost 500,000 in 1945—a million-five in 1955 and 3½ million in 1970. Copper wire bars—259,000 tons the actual consumption of copper wire bars in 1935, was less than one-half what Rome Cable has consumed in the period since we have been in business, 570,000 tons in 1945, 800,000 tons in 1955, but their predictions on the usage of copper in 1970 do not climb anywhere near the way any of these other items.

You heard what the McGraw-Hill boys said about the potentialities of business. All of the things that are going to add up well for the wire industry. You have at your places, passed out before, a very fascinating story of forecast by the McGraw-Hill Electrical World staff from 1955 to 1970. You men of the Sales Department take it to heart and think of the potentials that you have ahead. You men of the factory take a look at it also as to what kind of plans we are going to have to make in order to meet that kind of demand.

But let's not be carried away entirely, let's approach this thing with care. I was not too young but what I heard the wail of the new plateau by many bankers, and many industrialists in the late 1920 period. I well recall that book that was published in 1933 by the very interesting title "Oh Yeah!" in which the quotes of these men

prominent throughout the country were given and it certainly was rather a sad picture, so there are a few things on the horizon that can cause trouble. These inventories can get out of hand. I believe that we have enough brakes on our economy today to cause us not as much concern. I believe the long term trend is well plotted but it behooves us as a company and each of you as a representative of the company to be on your guard. Let's remember '54. A lot of companies were having a pretty good year in '54. They didn't get the dip that we did. We went through some pretty rough times. By being on our guard, by doing some of the things that have been so ably discussed and talked about at these meetings this time and not forgetting them when we leave this room, we can learn a lot from 1954.

I go back to Jerry's remark about "Why should I worry about the thing, that's for the boys at the head office", but many of you are shareowners. I don't like this worry angle, I say "think" is a little better. Let's all of us do a little more thinking about our job and what we can do, let's use our heads a little more.

The matter of the fair advantage was quoted. Charlie Ellis and Jay Sarles remember a little bet that I had with them where I said, "I'd like to have a fair advantage" and the matter was indicated that we don't need a fair advantage. We do have a fair advantage. We have got this organization harmoniously working together. We have got the equipment. I hope you are all as proud as I have been during these last few days to hear the number of times that your Company has been mentioned as being first in this, first in that and it ran over a whole range of different things. The fair advantage is the reputation that you men have made for the Company. That, to me, is a real fair advantage in any selling job. We have had a success story that is envied. Let's keep it that way. As Harry Barnard said in his story, "Interesting, ain't it?"

[fol. 5123] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 105

Mr. W. A. Miller—Phila.
Mr. G. E. Rolston—Rome
December 7, 1955
Philadelphia Electric Co., F.O. #A-14095

Dear Bill:

I have your memo of December 5 relative to the above mentioned order number and particularly with regard to the feeling that this customer has that our promises on this class of material are not reliable. I quite agree that they have every reason to feel this way and the information that I am going to give you is not in the nature of an alibi because we as a company are responsible for the promises and items that we agree to take. I do feel, however, that I should tell you quite frankly about this situation and properly tell you what we are doing to correct it.

In the first place, this plant has not been set up to draw aluminum wire in size smaller than .061. We only had one drawing machine set up for aluminum and was put in for the express purpose of making conductor to go into line wire and Triplex and as you know, the smallest size of individual wire strand going into those products is the size of strand into #6 AWG. About a year or year and a half ago, we were approached by the Aluminum Company of America to make some of the smaller sizes of stranded wire for them with TW insulation and in some cases, with RoMarine-RoPrene. Because of our other commitments and the insulating of their conductor, we felt that we could not refuse to do it and we set up purely on a temporary basis one drawing machine to produce some of the smaller sizes of wire. Our experience under this set up, of course, has been very unhappy and we have not done a good job on orders for this size from your customer nor have we done a good job for the Aluminum Company. Unfortunately our whole organization has not been completely aware of this situation and we now find that you and we are embarrassed by poor per-

formance on this particular type of wire. I will not attempt to go into all the other problems on discussions that have taken place with regard to outside diameter and tolerance, etc. because I am not qualified to do so and it would take an hour or two to try to reconstruct what has transpired, consequently, I am talking only actual making of the stranded conductor itself and in the case of this particular order that you are talking about, over one [fol. 5124] month of the delay has been caused due to that one source.

You now properly come to the question of what are we doing about it. I think we intimated to you at the time you were here at the Sales Meeting that we realize that we are going to expand our activities in aluminum wire and we told you of the new plant that we were building and the fact that we are putting in equipment to make a full range of sizes. This means that we will have not only the one original rod machine which was in our old set up but an additional intermediate drawing machine and twelve fine wire drawing machines. This work is pretty well along and I would say that in the next six weeks or so we would have a complete new operation for the drawing of the finer sizes of aluminum wire. I am sure that as soon as we get more and more experience in drawing these finer sizes that our difficulties of the past will either be eliminated or greatly minimized. I feel quite sure that we can convince you as well as any customer after we have set this thing up properly that we can do a job and keep reasonably close to promises which we make.

As I said at the outset, this is not going to solve the immediate situation but at least indicates that we are conscious of the fact that in order to take on items that are required by the trade that we must have a mechanical set up and the proper equipment to do it. I will have to speak for myself in this case when I say that I was distinctly opposed to trying to take on orders for products that were not within the scope of our mechanical equipment at that time and I think the results that we have had during the past months demonstrate just what has happened where we do take a gamble on some kind of a temporary set up.

I do not expect you to pass this information on to the

Philadelphia Electric Company at this time but I do believe that when and if we have this complete installation going that we will be able to convince them that our capabilities are well in hand and possibly we can convince them that we should be given another opportunity.

Very truly yours, ——, ——.

GER:hc

[fol. 5125] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 106

A. D. R. Fraser
R. A. Schatzel
December 8, 1955
1955 Developments

1) Butyl Rubber

The desirable properties of this material has long been recognized. The difficulty of its processing has been a problem to overcome. Some of this has been due to non-uniformity in the rubber as received. This shows improvement which we hope continues. Compounding to fit existing equipment has also been a problem, and cannot be completely accomplished without mechanical changes and adjustments not required by other types or rubber.

We have made real progress in the understanding of these problems and have made progress in equipment and compond adjustments to enable us to manufacture orders for both high-voltage and R.H.W. insulation. With the adjustments in equipment now under way, solution to this problem should be accomplished.

2) Aluminum

Progress in the casting, rolling and drawing of aluminum has continued. We have drawn aluminum wire to #30 AWG and fabricated it into flexible welding cable, which is being evaluated by Lincoln.

Study of connectors for such cable is being made by both Rome Cable and the Lincoln plant.

Once again the use of aluminum Magnet wire is re-

ceiving attention, which will undoubtedly result in an increased selective use where engineering studies justify. We are in position to supply if evaluations or changes in economics can justify.

3) Mining Cable

The mining industry again is moving forward. We have developed an improved mining machine strand and cable within the present dimensional limits, and at little change in cost, which should go far to satisfy the demand of several years for a more sturdy and reliable cable for mining equipment.

4) RoFlex

Throughout the years there has been periodic complaints of lack of flame resistance, sticky wire, flaking at freezing temperature, dirty wire to handle, etc. on Nonmetallic sheathed cable. Working with our supplier we have developed a finish which meets all requirements of performance and appearance. We are producing about [fol. 5126] 40% of our production at present and will be in full production when equipment is available in February.

5) Magnet Wire

We are accepted as one of the leading manufacturers of quality large round, rectangular and flat Magnet Wire; Paper, cotton and glass covered. We have never made enameled Magnet Wire. Within the past two years many of the problems of film coating large flat and square Magnet Wire have been solved. The synthetic enamels are tough and heat-resistant to a degree sufficient to warrant their use without other covering.

Film coated Magnet Wire for certain uses is replacing flat and square Magnet Wire to the extent of about 25%, and continuing to grow. In addition the use of film coated single glass covered wire is growing for some uses as replacement of double glass. It is therefore necessary for us to consider either equipping or to obtain a source of suitable enameled bare.

Study of enamel types and of equipment requirements

has been started. The field of enamel development is as broad or broader than the field of synthetic rubber, and while there is no single enamel which satisfies all needs, we believe by prudent judgment a single type covering can be selected to cover the basic requirements we will need.

6) Silicone Rubber

There has been much progress in the development of these materials. Dow Corning have been recognized this year by the Chemical Engineering Industry for their outstanding achievement in building a laboratory curiosity (Bouncing Putty) into a going business in the space of 12 years. A growth from 50,000 per month to 6,000,000 per month in that time and still in its infancy.

The U.S. Navy has standardized on it and are endeavoring to have the British Navy do likewise. We are an approved supplier of such cable to Navy. We have manufactured one order on a plant trial basis. We have been complimented on its quality by the Navy. Further improvements in our methods have been made and work with the Navy has been invited by them to enable us to provide other types.

[fol. 5127] In addition to Navy, certain industrials are finding limited use for Silicone rubber insulated cable. This represents a new field of chemistry which will grow as our knowledge and Technology expands.

R. A. Schatzel.

RAS P

[fol. 5128] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 107

H. T. Dyett,
A. D. R. Fraser,
G. E. Rolston,
S. O. Williams.

J. H. Dyett
August 18, 1955

Alcoa Pig

This afternoon I talked with Jess Willard of Alcoa's Albany office and requested him to supply us with 400,000 lbs. of aluminum pig for each month of the fourth calendar quarter. Jess said that he had not yet been able to get approval of the 300,000 lbs. October order which we sent him.

At the present time Alcoa gives the Albany office only 600,000 lbs. a quarter to distribute in the pig or ingot form. We have been getting about 80 per cent of this. We have recently been able to get 300,000 lbs. a month owing to the relief the aluminum industry has been able to get from Government stockpile.

Jess made it very clear that in his opinion we should look towards another source. I explained the difficulties of trying to get a now supplier at a time when metal supplies were at an all time scarcity. He agreed with this but stated that Alcoa was not very anxious to sell aluminum pig. They wish to use their aluminum in more fabricated products. He stated that our requirements had jumped to such an extent that he could not see how Alcoa could take care of us. I explained that their requirements on us for wires and cables had jumped in the same way and that we were doing everything to meet their needs.

Mr. Wilmot has recently returned from a trip to the Connecticut Valley and was amazed at the projected plans of expansion which would demand large quantities of aluminum. In Jess' opinion there is just not enough production in the United States to take care of the requirements in the foreseeable future.

I asked Jess to relay our request to Pittsburgh at the

earliest possible time. He said they would definitely not sell aluminum pig on a firm price basis. I brought up the fact that we had tried to place firm orders with Bill Stout between June 27th and August 1st, and Jess replied that he could not have accepted any during this period.

Ralph Davies is at present on the west coast and will not be back until after Labor Day. Jess suggested that Ralph should come to Rome shortly thereafter to discuss our mutual plans. Jess also intimated that he would like to be here at that time but I made no commitment.

JHD:AS

[fol. 5129] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 108

Notes on Visit of Messrs. Ralph Davies and Phil. Coffin to Rome on Oct. 4, 1955

Messrs. Davies and Coffin, together with Messrs. Willard and Stout of the Albany sales office of ALCOA and three other Pittsburgh representatives were in Rome yesterday.

Messrs. H.T. Dyett, J.H. Dyett, G.E. Rolston and A.D.R. Fraser met with the first four mentioned in the morning, at which point the main discussion was their ability to take care of our requirements for aluminum pig. We were asking for 400,000 per month for the last three months of this calendar year. Ralph Davies explaining the extremely critical situation in which they found themselves owing to a fall-down of ALCAN in supplying aluminum to ALCOA on their contract. He indicated that our usage of 400,000 pounds per month is an increase of 100% over our earlier requirements and that they did not have the metal. He indicated that they would endeavor to give us 900,000 pounds for the last quarter, which would mean 400,000 pounds in October and 250,000 pounds each in November and December. We indicated that not having made any efforts to get additional suppliers we were in a bad position with aluminum in short supply to get on the books of other suppliers and furthermore that even if we were able to get some metal we had to make certain tests

as to practicability of running. After much discussion it was finally agreed that they would supply us with 400,000 pounds in October, 300,000 pounds in November and that Mr. J.H. Dyett would make efforts to get some additional metal by December from other sources. Mr. Davies stated that they definitely did not want to be 100% supplier to anyone and made no commitment as to the percentage he would like to have of our business. I believe we can count on 300,000 pounds per month through the first calender quarter of 1956.

[fol. 5130] It was indicated that aluminum is available on the Black Market and also that if we were able to pick up ordinary grade aluminum that possible arrangements for exchanging same for EC ingot could be set up.

We then went to lunch.

In the afternoon with Messrs. Davies and Coffin from ALCOA and Messrs. Rolston, J.H. Dyett and Fraser from Rome we discussed their requirements from us and how their program of production was planned. Mr. Coffin indicated that the first extruder for Polyethylene will not be available for delivery until late spring 1956. This was confirmed by Mr. L.T. Guest in conversation with Mr. Schatzel who stated that they would not be in production on Polyethylene for eight to nine months. Coffin stated that their second extruder would be available in August. Their twisting equipment would not be delivered for approximately one year. They are able to twist a limited amount of smaller sizes of Triplex in Massena now on a costly basis on a cabler. Therefore, we will continue to get Polyethylene business in sizable quantities for the next eight or nine months and it will be at least a year before they manufacture all of their Polyethylene. For the full year we will continue to get the larger sizes of Polyethylene that has to be twisted, On Neoprene they stated they have no idea of adding facilities for Neoprene and if they were asked to make a guess they would say at least two or three years and possibly never. This was also confirmed by Mr. Guest separately in conversation with Mr. Schatzel. They seemed to be questioning their ability to handle Neoprene. On Mr. Coffin's statement that they would have liked to have given us orders for 7,000,000 feet of conductor for October and November, because they needed

[fol. 5131] it for stock, I brought up the subject of their sizable stock increase of 50% since the end of July and that the walls of our shipping room were bulging with material. This seemed to surprise their entire group. I also indicated that we had produced for them in September approximately 8,500,000 feet and we had also made certain insertions in our production schedule at a penalty to our own customers' service when it was obvious that they could have substituted the running of that material rather than making it for stock. I tried to make this a very emphatic point with them and reverted to their conversation of the morning, that they be realistic in their demands if metal was as short as was indicated in the morning we did not feel it should be put towards increasing inventories. At that point because Mr. Coffin was at a loss to account for the sizable increase in inventory he called in their scheduling man Mr. Kehew. When I asked him the question as to what their actual needs for the period ahead without building stock, he indicated that 3,500,000 ft. would be adequate. I then stated that it would be helpful to both parties if they would review their requirements carefully and give us a revised estimate and that we would then check our production facilities and if we were able to give them any additional quantity we would so advise them. We did not consider it good practice on our part to have to run Saturdays and overtime to build stock for them which might mean reduced requirements in the near future as their over-estimates in inventory had done to us in the past. I indicated that on Neoprene insulating for the first nine months they had ordered an average of 2,760,000 feet per month and we had produced an average of 2,725,000 feet. On Polyethyelene they had ordered 2,170,000 ft. average per month and we had produced 2,170,000 ft. average per month and on Triplex they had ordered 1,200,000 ft. average per month and that we had produced 1,320,000 ft. This indicates that with the heavy production in September we have brought ourselves up-to-date on their requirements despite sizable increases in demand.

[fol. 5132] On the matter of their increased stock at Rome they stated that increases unfortunately were in less active sizes but they agreed to take prompt action on shipping sizable quantities to Massena.

I then asked them what their views were on entry into the building wire field. Mr. Coffin stated they had hired a special consultant in an electrical engineering firm in New York to make a full appraisal and study of the building wire question and give them a report on aluminum wire versus copper. He indicated that because of Kaiser's entry into this field and what he believed this report would show they might be coming to us to make aluminum building wire for them.

I then asked them about power cable. Phil. Coffin being an old utility engineer stated this was a subject dear to his heart and that their salesmen were getting increasing inquiries about the possibility of their supplying power cable. He stated that they have kept away from the subject but they did not know how long they could, but this would require considerable study. I pointed out to them that expecting us to make either building wire, and particularly power cable, was something that could not be undertaken over night and that a full appraisal of the impact on our facilities and extent to which we would become involved was an important consideration for both companies.

A number of policy matters were discussed. I spoke a word for their joining the Wire & Cable Section of NEMA and Phil Coffin asked if we knew of any technical production man who might be anxious to be superintendent of their Massena plant.

[fol. 5133] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 109

October 5, 1955.

To: Mr. Ralph V. Davies, Vice President
Aluminum Company of America
1501 Alcoa Building
Pittsburgh 19, Pa.

Dear Ralph:

First, I again want to say that we appreciated Phil and you coming to Rome yesterday.

As in the past, while not having any formal contract I think it well to summarize briefly certain decisions and programs that we talked about so that unfortunate misunderstandings can be avoided in the future. I would appreciate it if after reading this letter, and having had an opportunity to talk with Phil about it, if you would advise me that you agree with the letter or at what points we are at variance.

If Rome had started looking a month ago, they could have obtained metal from K and R, both of whom were soliciting business up to about 9/1.

First, we understand that you do not wish to be a 100% supplier of pig to us and now that we know this we will diligently endeavor to secure other sources. You agreed to supply us with 400,000 pounds of pig in October and 300,000 pounds in November. We did not settle on the exact December amount but my suggestion was that you try to give us 300,000 pounds and that we endeavor to get supplementary supplies to relieve your commitment of 300,000 pounds up to the extent of our ability to get 100,000 pounds between November and December, delivery to us. We understand that you will take care of us to the extent of 300,000 pounds per month for the first quarter of the calendar year 1956. We will also try to improve our supply position from other sources in that period.

No such understanding. We *hope* to help them to this extent.

In the discussion we stressed the importance to us of this transition period where we have not been on the books of other suppliers, because we had been getting 100% of our requirements from you. Our problem is compounded not only from the shortness of the overall supply of the metal and heavy backlogs in the hands of other suppliers but also because we will need lead time to experiment with quality of other suppliers' metal.

Should be good quality, based our past observations.

In the matter of your requirements from us, we understand that delivery of your first plastic extruder will not come until late Spring and the second machine in August and therefore you will be looking to us for full Polyethylene [fol. 5134] supply for the next eight or nine months and on large sizes of Triplex for a full year. You indicated that your requirements for Polyethylene would go steadily downward from late Spring and probably be ended by August or September of 1956.

We may have to lean on Rome indefinitely for fringe requirements.

You indicated that you had no present thoughts of doing any Neoprene insulating and the guess was made that it might be two to three years as the shortest time that you might even consider it and it would require additional time thereafter to get into production. We, therefore, are expecting and planning to supply your Neoprene insulating requirements at recent current levels of 3,000,000 to 3,500,000 feet per month. This is on a reservation basis. We will continue to twist all Neoprene insulated material.

We actually insulated well in excess of 5,000,000 feet of Neoprene in September. We stressed, however, the importance of getting any advance information on sizable increases because of limitations that could come up in compound mixing. Providing additional facilities for compound mixing might become a major capital expenditure with us, as well as a long lead time to get delivery of equipment, which emphasizes the importance of the second paragraph under 3. of the original memorandum of agreement between our two companies. In other words, if we have to acquire additional facilities that we be given the request so that we can advise you within 30 days as to

decision to make such an investment and what sort of extension of period of the old agreement would be required.

We understand that you are studying and have studied the subject of building wire and that when your studies are more definitive that you may ask us to manufacture building wire, or decide to go into the manufacture yourself, but in any event you would advise us of your decision.

I also raised the question of your view on Power Cable and here again we were told that you had a considerable amount of interest being expressed by customers but that you would discuss the matter at some later date with us as to your feelings. We stressed the complications involved in getting into production of a product as complex as Power Cable and the further strain on our facilities if we should be asked to provide Power Cable for you without adequate planning and sufficient lead time. This matter affects not only our and your manufacturing but the engineering and training of sales departments for proper customer contact.

[fol. 5135] We discussed sizable stock of your product here at Rome and asked for some relief as it has been increased 50% in the last two months. With approximately 5,000,000 feet now of finished stock in Rome our storage facilities are being overly taxed and we hope that some of this can be shipped to Massena or direct to customers. We also stated our desire to cooperate with your need for increased quantities and it was agreed that you would review your actual immediate needs and we would endeavor to tell you how much additional we could take on towards reaching the inventory build-up that you felt necessary. We have certain reserve shifts on equipment but would only be desirous of opening these up if the demand warranted it for at least a two or three months period.

We discussed this on the plane. This was the result of misunderstanding in paper work.

I believe this outlines the major significant items and while I do not like long letters I feel that the discussions were of such importance to both companies that it is well to be sure that we have no misunderstandings. I am sending you an additional copy of the letter in case you want to give one to Phil. Coffin.

As always it was nice seeing you and we appreciate the effort you made to come to Rome.

With kindest regards.

Sincerely, ADRF, President.

ADRF/m

enc.

[fol. 5136] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 110

(Original of This Letter is Filed in Vault with Original Copy of Agreement)

Aluminum Company of America

Pittsburgh 19, Pa.

October 12, 1955.

Ralph V. Davies,
Vice President.

Mr. A. D. R. Fraser, President,
Rome Cable Corporation,
Rome, New York.

Dear Ross:

This will refer to your letter of October 5 on which I probably should make a few comments.

First, in the third paragraph of your letter you relate your understanding that we will take care of you to the extent of 300,000 pounds of pig for the first quarter of the calendar year 1956. You may recall that when this subject was discussed Mr. Coffin pointed out that our books were not open for pig orders for the first quarter at this time. I think, therefore, it would be more proper to say that we hope to be able to help you to this extent.

In the fourth paragraph you comment on the quality of other supplier's metal for your needs. Based on past observations, we believe you will find the quality satisfactory.

The first paragraph on page 2, regarding polyethylene supply, might be amplified by the statement that we may count on Rome indefinitely for fringe requirements.

Going now to the first paragraph on page 3 of your letter—Maybe your people have told you by now that the exceedingly large stock of finished material on hand at Rome was due to a misunderstanding connected with paperwork. This large stock was called to the attention of other [fol. 5137] members of our party while they were out in the plant, and Mr. Coffin and I were told on the plane coming home that this misunderstanding was promptly corrected and shipments to alleviate the situation could be made.

Thanks for the courtesies extended to us on our visit and for the fine luncheon. We enjoyed our visit with you and your associates and had a pleasant return trip.

With best regards,

Sincerely yours, Ralph.

RVD:D

[fol. 5138] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 111

CC—G. A. Weiss

October 14, 1955.

Mr. Ralph E. Davies, Vice President,
Aluminum Co. of America,
Pittsburgh 19, Pa.

Dear Ralph:

I should have mentioned that the 300,000 pounds of pig per month for the first quarter of the calendar year 1956 was on the basis that you hoped to be able to help us to that extent.

We have been working overtime to get out the heavy specifications on stock shipments which we received after misunderstandings on paper work were cleared up.

In reading your comments on my letter of the 5th we are very pleased to know that our meeting of the 4th resulted in such complete accord of the matter covered in my letter.

With kindest regards.

Sincerely, ——, ——, President.

ADRF/m

[fol. 5139] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 112

cc: A. D. R. Fraser, S. O. Williams.

cc: Mr. R. Murray Willard, District Sales Manager, Aluminum Company of America, 90 State Street, Albany 7, N. Y.

October 21, 1955.

Mr. W. S. Stout,
Aluminum Company of America,
90 State Street,
Albany 7, New York.

Dear Bill:

Stan has showed me your letter of October 14th, and we thought it best if I answered it as I have been doing the rounds of the aluminum suppliers.

When Ralph Davies was in Rome on October 4th we reviewed our requirements and indicated that we would endeavor to get on someone else's books as soon as possible. Since then I have talked with three suppliers and have been unable to get any aluminum pig prior to January 1st. They are also not ready to talk about the first quarter.

In view of the above we hope that our December orders from you will total 300,000 pounds. This is in line with Ross Fraser's letter to Ralph Davies on October 5th which stated as follows:

> "We did not settle on the exact December amount but my suggestion was that you try to give us 300,000 pounds and that we endeavor to get supplementary supplies to relieve your commitment of 300,000 pounds up to the extent of our ability to get 100,000 pounds between November and December, delivery to us."

We have been unable to do this and, therefore, trust that you will be able to ship us the full 300,000 pounds.

In spite of the above, you may rest assured that we shall continue doing everything possible in order to get additional aluminum pig before the end of the year, but as

we suspected this is the worst possible time for us to begin to swim.

Best regards.

Sincerely, ——, ——, Executive Vice President.

JHD:AS

[fol. 5140] In United States District Court

Plaintiff's Exhibit 113

To: A. D. R. Fraser, R. A. Schatzel, S. O. Williams.
From: J. H. Dyett.

Date: October 21, 1955.
Subject: Aluminum.

I am attaching copy of a letter sent to Mr. Glass of Anaconda. On October 18th I was talking with Mr. VanAlstyne, President of Aluminum Limited Sales who stated that they were extremely short of aluminum because of a landslide at Kitimat and lack of rain at their Saguenay property. He admitted that we were a good location and that they would get in touch with us as soon as they had anything available. He believed they were shipping some Boronized pig into this country but did point out that there might be some exploration of the tariff problems necessary.

Mr. Robert Belknap, New York Sales Manager of Kaiser appeared to be the most anxious to sell us. He did not think that they would have anything except rods prior to the first quarter. In respect to this period he will have to get in touch with us. He seemed most anxious for me to meet Mr. Inch when I was on the coast and indicated that perhaps something could be done out there.

The net result of my visits was to emphasize the scarcity of aluminum at the present time. Although no promises were made I do not believe it will be too many months before we can make at least a start with Kaiser. ALCAN and Anaconda will be much tougher to crack.

Jack.

Enc.

JHD:AS

[redacted]

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1963

No. 204

UNITED STATES, APPELLANT,

vs.

ALUMINUM COMPANY OF AMERICA, ET AL.

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF NEW YORK

Volume IV

INDEX

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued,		
PLAINTIFF'S EXHIBITS—Continued		
114—Letter from J. H. Dyett to Clarence Glass of the Anaconda Company, dated October 21, 1955	5141	1993
115—Letter from J. H. Dyett to R. M. Willard of Alcoa, dated November 18, 1955	5142	1994
116—Rome memorandum from J. H. Dyett to A. D. R. Fraser, subject: "Kaiser Aluminum", dated November 22, 1955	5144	1995
117—Letter from J. H. Dyett to John L. Loeb of Carl M. Loeb, Rhoades & Co., dated December 2, 1955	5145	1996
118—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting December 13, 1955	5146	1999

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
119—Rome memorandum from J. H. Dyett to A. D. R. Fraser, Subject: "Aluminum", dated February 24, 1956	5159	2013
122—Rome memorandum from J. H. Dyett to A. D. R. Fraser, Subject: "Aluminum", dated May 15, 1956	5160	2013
124—Rome memorandum from J. H. Dyett to A. D. R. Fraser, G. E. Rolston and S. O. Williams, Subject: "Alcoa", dated June 15, 1956	5161	2015
126—Speech entitled, "Products" by G. E. Rolston at 1956 Rome Cable Corporation Sales Conference	5162	2016
127—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting on November 29, 1956	5166	2023
128—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting on March 7, 1957	5177	2034
129—Rome memorandum dated March 11, 1957 from J. H. Dyett to A. D. R. Fraser and H. T. Dyett, Subject: "Revere"	5189	2047
130—Rome memorandum dated March 29, 1957 from D. H. Thayer to All Salesmen, Subject: "T. J. Cope, Inc."	5190	2048
132—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting on March 4, 1958	5191	2051
133—Speech by R. A. Schatzel at the 1958 Rome Cable Corporation Sales Meeting Engineering Session	5205	2065
134—Rome memorandum from C. J. McMurry to J. R. Woods, Subject: "Knoxville Utilities Board, Knoxville, Tennessee", dated December 5, 1958	5218	2074
135—Rome memorandum from J. R. Woods to C. J. McMurry, Subject: "Knoxville Utilities Board", dated December 10, 1958	5219	2076
136—Letter from C. J. McMurry to Harry H. Hicks of the Tennessee Valley Authority, dated January 19, 1959 with note from McMurry to J. R. Woods	5220	2077
137—Rome memorandum from J. R. Woods to R. R. Davis, Subject: "Iowa Power and Light Co., Des Moines, Iowa", dated December 24, 1958	5221	2078

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
138—Alcoa Electrical Conductor Division Newsletter, dated May 11, 1955 with attached entitled "Covered Conductor Shipments"	5223	2080
139—Alcoa memorandum from P. T. Coffin to J. P. Haight, Subject: "Polyethylene Covered Conductors", dated February 23, 1955	5230	2087
140—Alcoa memorandum from P. T. Coffin to R. V. Davies, Subject: "Covered Conductors—Proposal for Alcoa to do its own Polyethylene Covering", dated July 11, 1955	5234	2090
141—Alcoa memorandum from P. T. Coffin to J. L. Patterson, Subject: "Covered Conductors", dated July 29, 1955	5237	2092
142—Alcoa memorandum from P. T. Coffin to R. V. Davies, Subject: "Rome Cable Corporation", dated January 4, 1957	5240	2095
145—Alcoa memorandum from Earl B. Cox to P. T. Coffin; Subject: "Electrical Conductor Sales Meetings", dated December 6, 1956	5241	2096
146—Alcoa News Release dated February 27, 1957	5243	2097
149—Minutes of Meeting of Alcoa Sub-Committee on Electrical Conductors, September 11-12, 1957	5245	2099
150—Alcoa memorandum dated October 11, 1957 from C. A. Appel to E. P. Burton, Subject: "Electrical Conductor-Covered"	5282	2127
151—Alcoa memorandum dated November 22, 1957 from E. B. Cox to P. T. Coffin, Subject: "Electrical Conductor Sales Meeting", December 9, 10, 11, 1957	5284	2129
153—Alcoa memorandum dated August 21, 1958, from T. L. Gilbert to P. T. Coffin, Subject: "Facilities for Neoprene and Rubber"	5286	2131
154—Minutes of Meeting of Alcoa Subcommittee on Electrical Conductors, September 10-11, 1958	5288	2132
155—Alcoa request for authorization Number M-2520, dated November 14, 1958, with covering memorandum dated July 27, 1959 from D. R. Little to O. R. Pellegrino	5328	2164
156—Alcoa memorandum dated January 13, 1959, by T. I. S. Boak, Jr., Subject: "Capital Expenditure Committee Meeting Notes", January 8, 1959	5334	2168

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
158—Alcoa memorandum dated July 8, 1957 from P. T. Coffin to R. V. Davies, Subject: "Rome Cable Corporation"	5336	2171
159—Alcoa memorandum dated July 11, 1957 from F. L. Magee to I. W. Wilson, Subject: "Rome Wire and Cable Company"	5340	2176
161—Alcoa memorandum dated August 14, 1957 from P. T. Coffin to W. K. Unverzagt, Subject: "Rome Cable Corporation"	5344	2179
162—Alcoa memorandum dated August 16, 1957 from P. T. Coffin to F. L. Magee, Subject: "Rome Cable Corporation"	5352	2185
163—Alcoa memorandum dated September 20, 1957 from T. H. Kerry to S. T. Gustina, Subject: "Rome Cable Corporation"	5354	2187
164—Alcoa memorandum dated September 26, 1957 from T. H. Kerry to S. T. Gustina, Subject: "Rome Cable Corporation"	5357	2189
165—Letter from H. T. Dyett to John L. Loeb of Loeb, Rhoades and Company, dated October 2, 1957	5359	2190
166—Alcoa memorandum dated October 14, 1957 from R. V. Davies ot F. L. Magee, with handwritten note by Magee, dated October 15	5360	2191
167—Alcoa memorandum dated October 15, 1957 from F. L. Magee to R. V. Davies, Subject: "Rome Cable Corporation"	5361	2192
168—Alcoa memorandum dated October 3, 1958 from F. L. Magee to R. V. Davies, Subject: "Ebasco Services, Inc."	5362	2193
169—Alcoa memorandum from F. L. Magree to D. Wilmot, I. W. Wilson, and H. C. Erskine; Subject: "Ebasco Services, Inc.,". dated October 16, 1958	5364	2195
170—Alcoa memorandum from T. L. Gilbert and R. H. Knapp to E. D. Mairs; Subject: "Preliminary Report, Covered and Insulated Wire and Cable", dated November 21, 1958	5365	2195
171—Alcoa memorandum from T. L. Gilbert to N. B. Lane, Subject: "Covered Conductor-Overall Program", dated December 2, 1958	5367	2197
172—Alcoa memorandum from T. L. Gilbert to E. D. Mairs, Subject: "Interim Report—Covered and Insulated Wire and Cable", dated December 22, 1958	5370	2199

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
173—Alcoa memorandum from T. L. Gilbert to L. T. Guess, Subject: "Insulated Wire and Cable Survey", December 26, 1958	5374	2203
175—Alcoa memorandum from T. L. Gilbert to E. D. Mairs, Subject: "Insulated Wire and Cable Survey", dated January 2, 1959	5380	2206
178—Alcoa memorandum from P. T. Coffin to F. J. Close, Subject: "Insulated Conductors", dated January 12, 1959	5382	2208
179—Alcoa report by T. Allen Johnston entitled, "The Market for Insulated Copper Conductor", dated January 17, 1959	5383	2210
180—Alcoa News release dated January 22, 1959	5395	2221
181—Alcoa News release dated June 15, 1959	5398	2223
183—Rome memorandum from C. J. McMurry to J. R. Woods, Subject: "Tennessee Valley Authority, Chattanooga, Tennessee", dated April 2, 1959	5401	2225
184—Rome memorandum from J. R. Woods to C. J. McMurry, Subject: "Tennessee Valley Authority", dated April 7, 1959	5402	2226
185—Alcoa telegram from L. M. Hall to H. H. Rodee, dated April 14, 1960	5403	2226
186—Alcoa telegram from H. H. Rodee to L. M. Hall, dated April 14, 1960	5404	2227
187—Rome memorandum from T. D. Bylin to A. D. R. Fraser, C. H. Ellis, G. W. Commerford, L. D. Fitler, and F. P. Baumler, Subject: "Aluminum Capacities", dated July 10, 1959	5405	2227
189—Alcoa memorandum from J. L. Healy, Alcoa Accounting Department, Cost Division, to P. T. Coffin, Subject: "Cable Prices", dated February 8, 1956	5406	2229
191—Alcoa memorandum from T. H. Kerry, Alcoa Accounting Department, Cost Division to D. Wilmot, Subject: "Electrical Conductor Cable and Redraw rod prices", dated February 20, 1956	5407	2231
192—Alcoa memorandum from W. B. Howard to R. B. McKee, Subject: "Central Cable Company", dated August 26, 1957	5412	2235
193—Alcoa memorandum from L. P. Favorite to R. C. Erickson, Subject: "Central Cable Corporation", dated September 24, 1957	5418	2241

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
194—Alcoa memorandum from J. L. Healy to P. T. Coffin, Subject: "Spread in Schedule Base Price Between E. C. Redraw Rod and Bare Cable", dated October 11, 1957 with attached Table I and Table II	5421	2243
195—Alcoa memorandum from Robert P. Miller to D. B. Miller, Subject: "Central Cable Corporation, Jersey Shore, Pa.", dated January 25, 1955	5424	2247
196—Alcoa memorandum from Robert P. Miller to D. B. Miller, Subject: "Central Cable Corporation, Jersey Shore, Pa.", dated January 27, 1955	5425	2248
197—Alcoa memorandum from L. C. Fisher to David B. Miller, Subject: "Central Cable Corporation", dated February 23, 1955	5426	2249
198—Letter from J. H. Dyett to R. Murray Willard of Alcoa dated August 5, 1955	5429	2251
199—Alcoa memorandum from J. L. Healy to D. B. Miller, Subject: "Electrical Conductor Cable and Redraw Rod Prices", dated February 6, 1957	5430	2252
200—Alcoa memorandum from R. C. Erickson to L. P. Favorite, Subject: "Central Cable Corporation", dated September 19, 1957	5431	2253
201—Alcoa memorandum from Alfred R. Gneiser to D. B. Miller, Subject: "Central Cable Corporation, Jersey Shore, Penna", dated October 15, 1959	5432	2254
202—Alcoa memorandum from David B. Miller to A. R. Gneiser, Subject: "Central Cable Corporation, Jersey Shore, Pennsylvania", dated October 20, 1959	5434	2256
203—Alcoa memorandum from G. V. Craighead of Alcoa to P. T. Coffin, Subject: "Westinghouse Electric Corporation, Buffalo, New York", dated February 7, 1957	5435	2257
210—Alcoa memorandum from P. T. Coffin to R. R. Cope, Subject: "Rea Magnet Wire Company", dated February 20, 1958	5438	2259
221—Alcoa memorandum from R. R. Cope to District Sales Office Managers, Subject: "Alcoa Aluminum Magnet Wire", dated October 1, 1958	5439	2260
223—Alcoa memorandum from P. T. Coffin to R. V. Davies, Subject: "Aluminum Magnet Wire", dated July 30, 1959	5443	2264

Record from the United States District Court for the Northern District of New York—Continued

	Original	Print
Plaintiff's Exhibits—Continued		
224—Alcoa memorandum from F. L. Magee to L. E. Hickman, Subject: "Rea Magnet Wire Company, Inc.", dated January 8, 1960	5447	2267
225—Alcoa memorandum from L. E. Hickman to Officers and salesmen, dated January 18, 1960 with attached letter from L. E. Hickman to Samuel A. Rea, Chairman of the Board of Rea Magnet Wire Company, dated January 15, 1960	5449	2268
227—Letter from F. L. Magee to Philip Sporn, President, American Electric Power Service Corporation, dated January 28, 1960	5453	2272
228—Alcoa Commercial Research Division Report, Subject: "Fine Wire", dated September 16, 1955	5455	2274
230—Alcoa Commercial Research Division Report entitled, "Long-Term Forecast of The Demand for Aluminum", dated November 20, 1957 (excerpts)	5463	2281
231—Alcoa memorandum from Richard W. Davis to William W. Knapp, Subject: Product Managers' Five-Year Forecast Cable & E. C. Wire-Cable Accessories", dated July 11, 1960	5473	2293
232—Alcoa document entitled, "Insulated Aluminum Power Cables", undated	5475	2294
233—Alcoa document entitled, "Rome Cable Division of Alcoa, Application for Consigned Stock Approval", undated	5487	2302
234—Letter from T. O. English of Alcoa to A. D. Ross Fraser, dated December 12, 1951	5489	2304
235—Alcoa "Sound Slide Film for Electrical Distributors", First Draft July 1, 1954, Revised July 14, 1954	5491	2307
236—Speech by G. E. Rolston at Rome Cable 1955 Sales Conference, Subject: "Copper or Aluminum"	5517	2333
242—Speech by C. H. Ellis at Rome Cable 1958 Sales Conference, Subject: "Production Highlights and Lowlights"	5519	2335
243—Rome memorandum from R. R. Davis to P. J. Lopushinsky, dated January 31, 1958 with attached letter to H. B. Heitzman, General Electric Supply Co., dated January 31, 1958	5524	2343

Record from the United States District Court for the Northern District of New York—Continued

	Original	Print
Plaintiff's Exhibits—Continued		
245—Rome memorandum from J. R. Woods to C. J. McMurry, Subject: "Townsend Hardware Co., Jackson, Tennessee", dated April 8, 1958	5526	2345
246—Rome memorandum from J. R. Woods to File, Subject: "Aluminum Price Situation", dated April 24, 1958	5527	2346
248—Letter from A. D. R. Fraser to R. S. Keefer, President, The Okonite Company, dated October 15, 1958	5530	2349
249—Alcoa memorandum from L. T. Guess to T. L. Gilbert, Fabricating Division, Massena Works, Subject: "Covered Conductor Forecast", dated November 24, 1958	5531	2350
250—Alcoa memorandum from F. L. Magee to P. T. Coffin, Subject: "Accurate Insulated Wire Corporation", dated January 30, 1959	5534	2352
251—Alcoa memorandum from Philip T. Coffin to T. O. English, Subject: "Accurate Insulated Wire Corporation", dated February 2, 1959	5535	2353
253—Alcoa memorandum from Philip T. Coffin to L. P. Favorite, Subject: "J. R. Richards Company, Carnegie, Pennsylvania", dated April 30, 1959	5538	2355
254—Alcoa memorandum from Leon E. Hickman to F. L. Magee, dated May 1, 1959	5540	2357
257—Alcoa memorandum from C. L. Kessler, Metallurgical Dept., Massena Fabricating Works to A. G. Church; Subject: "Copper-Coated Aluminum Wire", dated July 8, 1959	5541	2358
258—Rome memorandum from D. H. Thayer to All Salesman, Subject: "Aluminum Building Wire", dated December 8, 1959	5543	2359
259—Alcoa memorandum from H. J. Fahrney to F. W. Conrade, Subject: "Southwire Corporation", dated September 10, 1959	5545	2361
261—Alcoa memorandum from Leon E. Hickman to A. D. R. Fraser and Samuel A. Rea, Subject: "Surprenant Mfg. Co., Clinton, Massachusetts", dated February 9, 1960	5546	2362
263—Alcoa Request and Authorization, dated April 15, 1960	5547	2363
264—Alcoa memorandum from A. D. R. Fraser to R. McKee, dated March 1, 1960	5557	2373

Record from the United States District Court for the Northern District of New York—Continued

	Original	Print
Plaintiff's Exhibits—Continued		
265—Alcoa memorandum from A. D. R. Fraser to L. E. Hickman, dated April 13, 1960	5558	2374
266—Alcoa memorandum from Leon E. Hickman to Ray E. Palmer, Subject: "Surprenant Manufacturing Co.", dated April 20, 1960	5559	2375
267—Rome memorandum from G. L. McCutchan to R. A. Schatzel, Subject: "SPT Cords With Aluminum Conductors", dated August 22, 1960	5560	2376
268—Alcoa News Release, January 20, 1961	5567	2381
269—Alcoa memorandum from R. W. Knapp to D. R. Little, dated July 31, 1959	5569	2382
270—Rome request for Quotation dated November 7, 1960 from Boston Office with letter dated November 14, 1960 to Boston Edison Company, Req. #135052	5570	2383
271—Rome Request for Quotation dated November 7, 1960 from Boston Office with letter dated November 14, 1960 to Boston Edison Company, Req. #134950	5572	2385
272—Rome memorandum from G. A. Brodock to J. S. Scheppach, Subject: "Dow Chemical Corp., Baton Rouge, La.", dated April 19, 1960	5574	2387
273—Letter from C. D. Blair of Rome to Dow Chemical Company, dated April 21, 1960	5579	2393
274—Letter from G. A. Brodock of Rome to Public Service Elec. and Gas Company, dated October 30, 1958	5585	2397
282—Alcoa memorandum from Dixon Lewis to J. B. Holloman, Subject: "Rome Cable Corporation", dated March 23, 1959, attaching a letter from D. T. Thayer to Dixon Lewis, dated March 20, 1959	5587	2399
287—Rome memorandum from R. E. Gates to western sales offices, Subject: "Aluminum rigid conduit", dated May 8, 1959	5590	2401
288—Rome memorandum from R. E. Gates to G. E. Rolston, Jr., Subject: "Atlantic Refining Company-Rigid Conduit", dated May 8, 1959	5591	2403
289—Rome memorandum from R. R. Davis to Stewart Johnston, Subject: "Dutton Lainson Co", Hastings, Nebraska, dated May 20, 1959	5592	2403

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
290—Alcoa memorandum from P. T. Coffin to All conductor salesmen, district managers, assistant district managers, branch managers, resident managers and chief administrators, Subject: "Sales Organization for the Handling of Alcoa Aluminum and and Steel Conduit", dated June 8, 1959	5593	2404
291—Alcoa News Release dated June 16, 1959	5595	2406
292—Alcoa memorandum from J. E. Perryman to District Sales Office Managers, Subject: "Sales of Aluminum Conduit by Rome Cable Corporation", dated June 25, 1959	5597	2407
308—Report submitted by H. T. Dyett to the Board of Directors of Rome Cable Corporation at their meeting on December 10, 1958	5604	2416
315—Minutes of Rome Cable Corporation, Torrance Sales Conference, March 21 and 22, 1952	5611	2423
334—Rome memorandum from J. R. Woods to G. E. Rolston, Subject: "Aluminum Sales Policies", dated May 5, 1959	5623	2437
348—Minutes of Rome Cable Corporation, "Copper Meeting", dated April 20, 1959	5625	2441
349—Minutes of Rome Cable Corporation, "Copper Meeting", dated January 22, 1960	5627	2443
350—Alcoa memorandum by R. R. Cope, Subject: "Edward Ashley Associates—Aluminum Insulated Power and Feeder Cable", dated April 26, 1955	5629	2445
351—Speech by R. A. Schatzel at the 1955 Rome Cable Corporation Sales Conference, Subject: "General Engineering and Research Survey"	5631	2446
353—Alcoa Electrical Conductor Division Newsletter dated February 20, 1956	5642	2461
354—Rome letter "To Our bare, weatherproof and magnet customers", dated April 6, 1956	5647	2465
355—Speech by J. H. Dyett at the 1957 Rome Cable Corporation Sales Conference, Subject: "Materials, Money . . . What They Mean To You."	5648	2467
356—Unsigned undated handwritten memorandum from Rome files entitled "Potential Uses of Aluminum in Insulated Wires and Cables"	5655	2478

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
357—Unsigned handwritten memorandum from Rome files, dated January 12, 1959, Subject: "Potential Uses of Aluminum in Insulated Wires and Cables"	5661	2481
359—Rome memorandum from J. R. Woods to G. E. Rolston, Subject: "Aluminum", dated May 11, 1959	5669	2485
360—Memorandum from A. D. R. Fraser to L. E. Hickman, dated January 18, 1961	5675	2493
363—Rome memorandum from J. R. Woods to A. D. R. Fraser, Subject: "Pricing—Copper vs. Aluminum", dated September 3, 1957	5677	2495
364—Letter from Margaret Jennings of Rome to H. J. Zeck of Allis-Chalmers Manufacturing Co., dated May 27, 1958	5682	2501
365—Rome memorandum from P. J. Lopushinsky to District and Division Managers, Salesmen and Agents, Subject: "Distributorship Agreement", dated March 21, 1960	5683	2502
366—Rome memorandum from J. R. Woods to Alcoa and Rome District Managers, Salesmen, Agents and Administrators, Subject: "Aluminum Substitution", dated June 23, 1960 attaching a speech by J. R. Woods entitled "Economics of Aluminum Substitution, Facts and Fallacies"	5689	2510
367—Rome Electrical Conductor Distributor memorandum No. 3, Subject: "Sale of Overhead T & D Conductors through Distributors", dated September 6, 1960	5699	2518
369—Rome memorandum from J. B. Holloman to A. K. Buckenmaier, Subject: "Fitzpatrick Electric Supply Co.", dated January 9, 1961	5711	2528
370—Rome memorandum from J. B. Holloman to Division Managers, Subject: "Approved Distributor List", dated January 23, 1961	5717	2533
371—Article reprinted from "The Petroleum Engineer" issue of February, 1954, entitled "Pipe Line Application of Wire and Cable" by R. C. Graham	5720	2537
372—Rome memorandum from R. A. Schatzel to A. D. R. Fraser, Subject: "Aluminum vs. Copper", dated January 4, 1955	5724	2541
373—The Alcoa Report to the Building Industry—facts about aluminum in electrical systems (1958)	5726	2543

Record from the United States District Court for the Northern District of New York—Continued

	Original	Print
PLAINTIFF'S EXHIBITS—Continued		
374—Letter from R. C. Graham of Rome to L. C. Vipond of the Civil Aeronautics Association, dated July 2, 1958	5762	2579
375—Letter from O. O. Stedman, Rome to the Commanding Officer, U. S. Naval Construction Battalion Center, Port Hueneme, California, dated September 17, 1959	5763	2580
377—Letter from R. D. Golly of Rome to Harry Shopp, Chief Electrical Inspector, County of San Diego, dated October 19, 1959	5764	2581
378—Rome memorandum from R. A. Schatzel to G. E. Rolston, Subject: "Applicance Cords with Aluminum Conductors", dated August 24, 1960	5765	2582
379—Letter from R. R. Cope of Alcoa to the Firm of Edward E. Ashley, dated June 17, 1955	5773	2588
381—Alcoa memorandum dated May 12, 1959, from Philip T. Coffin to Electrical Conductor Salesmen, District Managers, Asst. District Managers, Branch Managers, Resident Managers, Administrators, Subject: "Confirmation" with attached telegram	5774	2589
382—"Polyethylene Insulated Cables for Primary Distribution and Similar Applications" by R. C. Graham, Chief Engineer, Rome Cable Division of Alcoa, dated April 1, 1960	5776	2591
385—Rome advertisement entitled, "Overhead Cables for Distribution"	5788	2603

[fol. 5141] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 114

cc: A. D. R. Fraser, R. A. Schatzel, S. O. Williams.

October 21, 1955.

Mr. Clarence Glass,
Anaconda Company,
25 Broadway,
New York 4, New York.

Dear Mr. Glass:

Your courtesy last Wednesday was most appreciated even if you could hold forth no hope of our getting any nearby aluminum. We understand at the present time you are not in a position to supply aluminum to our specification which is 99.55 E.C.H. Boronized aluminum pig. We do hope, however, that it will not be too long before you will be into this grade of aluminum.

Although you are not in a position to supply us at the present time we are wondering if there is any possibility of your supplying us with an aluminum of a lower grade for delivery to a point no further east than Chicago. If this is possible we should like to get information from you as to the availability of 50 to 100 tons of this material in the hopes that we could make a switch.

We are very anxious to become a customer of Anaconda in aluminum as well as in copper. We understand the many difficulties in getting started, but hope that it will not be too long before you will be as anxious to sell us as we are to purchase.

Sincerely, Rome Cable Corporation, ——, ——, Executive Vice President.

JHD:AS

[fol. 5142] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 115

cc: A. D. R. Fraser.

November 18, 1955.

Mr. R. Murray Willard,
District Sales Manager,
Aluminum Company of America,
90 State Street,
Albany 7, New York.

Dear Jess:

In answer to your November 10th letter, I have just returned from a California trip, consequently the delay in answering.

Ross will definitely be in Rome on December 1st and possibly the afternoon of November 30th. If there is any way you could rearrange your schedule it might be better to be here on the 1st, but he will make every effort to be in Rome on the 30th, in the event your schedule is inflexible. We shall look forward to seeing both you and Mr. McKee.

Bill was in to see me, and I gave him the sad story of our first attempts at swimming in the aluminum pond. As we expected, no other supplier finds us particularly attractive as a customer for the foreseeable future. It begins to look as though we shall have to depend upon you for our full requirements for at least the first quarter of 1956. You have probably heard of the increased demand for cables on your own company, so that you can well imagine that holding us to 300,000 lbs. a month is going to be a distinct hardship. In view of the situation we hope that you can be somewhat more generous. As one potential aluminum supplier told us, we could have been in the picture by now if we had been in a position to purchase metal during the first half of 1954. I guess our respective timing has been rather bad.

We shall look forward to seeing you week after next.

Sincerely, ——, ——, Executive Vice President.

JHD:AS

[fol. 5143] P.S.—Can we make reservations for you at the Green Lantern? We are hoping that you will have lunch or dinner with us—or better yet, both of them.

[fol. 5144] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 116

To: A. D. R. Fraser.
From: J. H. Dyett.
Date: November 22, 1955.
Subject: Kaiser Aluminum.

When I was in Oakland I met the following Kaiser personnel:

Messrs. D. C. Rhoades, Vice President & General Manager.
Tom Ready, Vice President in Charge of Operations.
Ford Lovelace, Mr. Inch's assistant in sales.

They all appeared to have considerable faith in the growth of the aluminum wire and cable business. Ravenswood should be in big production by 1957. I told them we should like to start very shortly at 50 tons a month and progressing at the earliest possible time to 100 tons per month. They would make no commitments but urged that we see their Chicago people. They seemed to know quite a bit about our company and Alcoa's plans of going into Polyethylene. They emphasized what a cheap purchase their Newark plant had been. Mr. Ready was amazed at Cerro de Pasco's buying of Circle. He stated that if Kaiser had known, it perhaps would have been interested in purchasing the company.

In Chicago on November 16th I met with Gillette Houck, Carl Ferguson of the electrical conductor office, Don Walker, and his assistant Verne Lorch, in the office of sales of pig and ingot, Maurice O'Halloran in charge of rod sales, as well as John Menz, the General Sales Manager. Mr. Walker stated that the first quarter was probably out but that they might possibly make a start with us in the second. He emphasized that the fourth quarter government relief must be replaced by April. He said that it was too bad we had not tried to buy from them earlier in 1955 since we would now be in their picture. Anything they could give us at the present time would have to be at the expense of their other customers. Mr. Walker also said that 1956 looked bad and that 1957 looked even tighter. After hear-

ing this story Mr. Menz tempered it somewhat by saying that it was hard to look ahead in the metal business and that he thought something might develop before anticipated. I told each one of them that we were most anxious to have Kaiser as a supplier but that in our opinion we would not have to wait to get suitable sources as long as 1957.

In line with my visits in Oakland and Chicago you might be interested in what American Metal Market November 18th issue stated: "The total aluminum supply including primary, secondary and imported metal for 1956 will amount to 2,350,000 tons. . . . . Net year requirements, exclusive of any stockpiling calls, will run from 2,050,000 to 2,150,000 tons." These are guesstimates made by a panel consisting of Mr. Nash from Alcon, Mr. David Reynolds of Reynolds Metals, Mr. Wilmot of Alcoa and Mr. Rhoades of Kaiser.

Jack.

JHD:AS

cc: R. A. Schatzel, G. E. Rolston, C. H. Ellis, S. O. Williams.

[fol. 5145] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 117

December 2, 1955.

Mr. John L. Loeb,
Carl M. Loeb, Rhoades & Co.,
42 Wall Street,
New York 5, New York.

Dear John:

Armand certainly sent Mr. Trefethen a most helpful letter. For your information, Kaiser has sold us 50,000 lbs. of aluminum rod. Although this is not the type of material we wish to purchase it will help us through a tough period in January. It is our hope that it will not be too long before Kaiser becomes a supplier of aluminum pig.

We continue to have our problems in getting enough

copper, but it looks as though operations for both December and January will be at satisfactory levels.

We do not expect to be in New York again for any length of time until mid-January at which time we are hoping you and Peter will reserve an evening for us.

Sincerely, ——, ——.

Enc.

JHD:AS

[fol. 5146] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 118

ROME CABLE
CORPORATION

ROME, N.Y.

REPORT SUBMITTED TO THE BOARD OF DIRECTORS OF ROME CABLE CORPORATION AT THEIR MEETING DECEMBER 13, 1955

I present herewith net sales and earnings by fiscal years up to March 31, 1955, and by quarters for the current year, the month of October and estimates for November:

Fiscal Year Ended	Net Sales			Earnings
March 31, 1937	$ 1,798,092			1,616
March 31, 1938	4,957,103			71,027
March 31, 1939	5,370,665			245,036
March 31, 1940	6,080,902			297,736
March 31, 1941	9,468,451			431,501
March 31, 1942	11,631,785			592,135
March 31, 1943	12,712,333			367,654
March 31, 1944	16,909,735			446,709
March 31, 1945	22,798,218			486,653
March 31, 1946	16,975,009			398,973
March 31, 1947	18,436,305			1,359,593
March 31, 1948	25,202,853			1,152,579
March 31, 1949	26,088,523			1,115,960
March 31, 1950	19,602,984			302,209)
		Plus: Transfer from contingency reserve		150,000) 452,209
March 31, 1951	35,142,901	Net	$ 1,922,136	
		Minus: Transfer to copper reserve	150,000	1,772,136
March 31, 1952	42,657,848			1,753,651
March 31, 1953	54,632,976			2,008,321
March 31, 1954	44,114,825			1,637,787
March 31, 1955	39,186,095			930,879
April-June Quarter	11,687,152			379,847
July-Sept. Quarter	13,931,255			471,316
Total Six Months	25,618,407			851,163

[fol. 5147]

ROME CABLE CORPORATION

Fiscal Year Ended	Net Sales	Earnings
Total Six Months 1955	$ 25,618,407	$ 851,163
October, 1955	5,185,657	187,248
Total Seven Months	$ 30,804,064	$1,038,411
November, 1955 (Est.)	4,569,000	160,000
December, 1955 (Est.)	5,337,000	194,000
Total Third Quarter (Est.)	15,091,657	541,248
Total Nine Months (Est.)	$ 40,718,064	$ 1,392,411

EARNINGS

November showed a drop in sales volume of approximately 10 per cent below October, largely due to lateness in copperarrival, which will be made up in December and bring the total dollar volume of sales for the quarter to a new high. Present trends indicate a net earnings picture somewhere between $1,900,000 and $2,000,000 for the year. Of the seven months earnings in the current year $923,000 came from Rome operations and $115,000 from Terrance. Total for both plants is more than double the results of the previous year.

SALES

The breakdown of sales before deduction for discount and freight from April to November 30, 1955, with November figures estimated, are given below:

	April -November 1955	April-November 1954	% Increase or (Decrease)
Rods	$ 4,268,000	$ 3,513,107	21.5
Bare	6,175,000	4,190,460	47.4
Weatherproof	2,295,000	1,655,069	38.7
Magnet	2,486,000	1,745,700	42.4
Rubber Covered	14,015,000	10,026,234	39.8
Terrance -E. M. T.	1,997,000	1,632,401	22.3
Rigid	1,804,000	1,154,354	56.3
Spiral 4	1,230,000	822,545	49.4
Aluminum	2,695,000	1,766,835	52.5
	$ 36,965,000	$ 26,506,703	39.5

On the basis of equivalent copper for the two periods the current year increase would be 25 per cent above 1954.

We estimate that the fiscal year in physical volume will be 40 per cent above 1954 and about 25 per cent on the same copper basis. Actual production increase in the current quarter is much greater than the 7 per cent of sales increase levels because of the heavy inventory liquidation that occurred in the July-September quarter.

[fol. 5148]

ROME CABLE CORPORATION

BACKLOG OF ORDERS

		Value
Jan. 2, 1955 - Rome -	Wire Products	$ 2,287,000
	Aluminum	338,000
	Spiral 4	1,845,000
-Torrance-	E. M. T.	38,000
	Rigid	19,000
	T. V. Mast	-0-
		$ 4,519,000
June 30, 1955 - Rome -	Wire Products	$ 3,472,000
	Aluminum	731,000
	Spiral 4	1,435,000
-Torrance -	E. M. T.	77,000
	Rigid	153,000
	T. V. Mast	13,000
		$ 5,881,000
Nov. 30, 1955 - Rome -	Wire Products	$ 5,605,000
	Aluminum	776,000
	Spiral 4	615,000
-Torrance-	E. M. T.	308,000
	Rigid	37,000
	T. V. Mast	184,000
		$ 7,525,000

The above figures on backlog of orders show a steady rise during the year, with the exception of Spiral 4 contract which expires next March. We have made a bid on requirements for next year but have not heard the results.

Incoming orders for the first eleven months of the calendar year show a 48 per cent dollar gain in total over a year ago for Rome plant and 39 per cent for Torrance. On poundage of copper orders are 18 per cent ahead of a year ago and orders received on aluminum 78 per cent.

COPPER

Since my last report copper sold by the principal domestic producers has remained at 43 cents per pound. On the other hand the custom smelters and metal dealers have been charging premiums ranging between two and seven cents per pound. During October world copper production established a new record, but the high demands of a booming European economy and buying for year-end inventory purposes in this Country have kept copper at historically high prices and in short supply. Rome Cable, I feel, has been well treated by its suppliers. However, the effects of last summer's disastrous copper strikes remain with us, and late deliveries caused

[fol. 5149]

ROME CABLE CORPORATION

COPPER -Cont'd

lower shipments in November than budgeted. Barring strikes throughout the world we expect to receive sufficient copper in December and January to fill most of our customers' requirements. By February or March we hope that supply will balance the demand and the premium price for smelter copper disappear.

ALUMINUM

Although our aluminum needs have been satisfactorily met by ALCOA the present allocations to us for the remainder of the fiscal year provide only for the present level of operations at a time when more of our customers are switching to aluminum in protest against copper's high price and new outlets could be developed. Since ALCOA in October advised us that we should no longer depend on them as our sole source of aluminum pig, we have actively been trying to get on the books of other aluminum suppliers. To date we have had only limited success with Kaiser, but we believe in a few months we can begin to rely on one or two other sources in addition to ALCOA.

STEEL

Steel likewise continues in limited supply, but we have been able to get sufficient supplies to increase our production of thin wall conduit for the next few months. If the steel companies maintain their delivery promises, we should be in a position to meet out customers requirements unless the anticipated steel sheet price increase forces an unusually large demand for conduit.

PAYROLL STATISTICS

Our factory payrolls covering number of employees, weekly payroll, average weekly wage and average hours worked for period a year ago, six months ago and the last week available, as well as number of monthly salaried employees for both Rome and Torrance are shown below:

Week Ending	No. Employees	Total Payroll	Avg. Weekly Wage	Avg. Hrs. Worked	No. Salaried Employees
ROME					
12/5/54	M 841	$ 77,311.85	$ 91.93	43.6	
	F 22	1,407.04	63.96	39.4	411
6/12/55	M 856	$ 76,183.41	$ 89.00	42.7	
	F 37	2,234.36	60.39	37.2	411
12/4/55	M 883	$ 89,775.04	$101.67	46.0	
	F 40	2,825.02	70.62	40.8	419
TORRANCE					
12/4/54	139	$ 12,612.48	$ 90.74	40.0	32
6/25/55	123	11,509.08	93.57	40.6	37
12/2/55	130	12,483.11	96.02	41/1	48*

* Due to transfer of 9 sub-foremen from hourly to monthly salaried payroll.

[fol. 5150]

ROME CABLE CORPORATION

PAYROLL STATISTICS -Cont'd

It is worthy to note that the increase in number of employees at both Rome and Torrance in the last year is considerably less than the increase in output.

LABOR

The CIO Steel Workers Union and the A F of L Machinists Union informed us that they had enough signed cards from employees to warrant an NLRB supervised election at Torrance. This was held on November 3, 1955 and a majority of our employees voted for no Union. Our majority was cut considerably from the previous year and our Torrance Manager has made an excellent analysis of reasons for this changing trend and attitude, and steps are under way by an educational program to rectify the conditions and misunderstandings.

Contract has been signed in Rome covering maintenance employees extending the contract to October 7, 1957, without any changes from our voluntary offer of July 27th. There is a reopening possible on October 7, 1956 regarding rates.

With the recently accomplished merger of A. F. of L. and C.I.O. we can expect increasing and better planned pressure upon both plants for complete unionization. Our personal and employee relations have been well handled in the past. This is a new challenge for the future.

CAPITAL EXPENDITURES

Our capital expenditure program has changed radically during the year due to better business outlook. We entered the new fiscal year with a carry-over of $324,000 unpaid for authorized expenditures from prior years. Our original informal authorization added a total of $545,000 to that figure. This was supplemented in September with another $165,000 for reconstruction of Building 1, and additional extruding equipment at a cost of $125,000 to take care of both increased ALCOA demands for neoprene, plus our own needs for additional plastic capacity. There was also added $185,000 for additional Property equipment. As a result our total authorizations plus carry-overs will total in the neighborhood of $1,350,000 for the year of which carry-overs will approximate $200,000, leaving a net addition of about $1,150,000 for the fiscal year. All but approximately $130,000 of this amount was for Rome expenditures. Our depreciation for the current year will run $655,000 for Rome and $195,000 for Torrance, or a total of $850,000.

Because of the increasing lead time necessary to get new equipment I asked our Operating Department at both plants to submit a preliminary request covering suggested requirements for the next fiscal year. These have not been screened or generally discussed by the Executive Committee at the time of writing this report but the grand total approximates $1,000,000. In the light of other discussions which we will have at this meeting I urge a very careful scrutiny and a partial approval of

[fol. 5151]

ROME CABLE CORPORATION

CAPITAL EXPENDITURES -Con t'd.

the most necessary items, and then having the whole program synchronized with our overall cash requirements for the new year.

For your information capital expenditures approved since the last meeting are listed separately.

ROME PLANT OPERATIONS

I am very pleased with the progress that has been made on plant rearrangement in Rome. About two-thirds of the program is completed and savings already made are running approximately 50% of our overall estimate. Shipping and Receiving Departments, as well as the Magnet Wire Dept., have been relocated. Several insulating sub-departments have been moved to Spiral Four building, the saturating and finishing departments and tool room have been rearranged. There still remain the rearrangement of the C-V. Dept., installation of the new Properzi in the reconstructed building, moving of Spiral Four and certain other sub-sections of the insulating department to complete our rehabiliation program. We commend the Production Dept. for their excellent production record which not only has had to contend with moving equipment but in some cases serious lack of copperv

TORRANCE

Torrance has made notable strides in cost reduction by cutting scrap, increasing percentage of operations on incentive. Their new warehouse will save considerably on outside warehouse rent and duplicate handling of material. By next quarter we should be successfully galvanizing the thread of our rigid pipe and we hope we can have a decision that would elimimte our costly enameling operation.

I am urging factory, engineering and sales for a decision on the protective coating problem for Torrance that might enable us to write off the $60,000 of unsuited equipment at very substantial annual savings for the future. Elimination of this enameling unit would provide sufficient space for one or two plastic extruders, which would enable us to begin manufacture of plastic wire at Torrance.

Industrial tubing business is showing a healthy growth. If either one of the two competitors who are asking us to make EMT for them for their West Coast needs should finally decide to do so this increased load would add very materially to the profits of the Torrance operations. At Glenn Koger's request we are investigating the cost of acquiring the additional 5 acres adjoining our plant which belongs to the City of Torrance.

[fol. 5152]

ROME CABLE CORPORATION

DIVIDENDS

In view of heavy demands on cash I consider it wise to recommend declaration of Dividend No. 67 at the regular rate of 35 cents per share payable on January 4, 1956 to share owners of record on December 23, 1955. If our present projected earnings for the current fiscal year materialize I believe we could well consider a 5 per cent stock dividend at our next Directors' meeting.

I also recommend payment of cash dividend to employees on the same date at 17-1/2 cents per participating unit, and that a contribution of an additional one-third of that amount be added to the Rome Cable Employee Profit-Sharing Trust Fund.

PENSION PLAN

We will have available for the meeting a proposed contract with Massachusetts Mutual Life Insurance Co. to handle all record keeping, acturial computation and disbursements on our Pension Plan on what is known as a split fund basis. If we were planning to amortize past service liability over a thirty year basis payment of $120,000 for the first year would be made to the insurance company and a fixed amount of $195,000 would be made to the bank trustee, J. P. Morgan & Co. For tax purposes we would be allowed a total contribution of $438,000 in the current fiscal year and we are accruing expenses at that rate. If we were able to maintain that rate of payment for eleven years a net saving of over $800,000 would accrue to the Company. Such advances could likewise cushion or reduce heavy payments in a year of poor operations. I strongly recommend our planning on a contribution of $438,000 before March 31, 1956.

There are a number of policy matters regarding the pension contracts with Massachusetts Mutual Life Insurance Co. and J. P. Morgan & Co. Incorporated that will be covered in a separate memorandum and on which I would like to have your decision and action at this meeting. As soon as the contracts have your approval we shall proceed to get Treasury approval on both Pension and Profit-Sharing Plan if humanly possible before the end of our fiscal year.

ROME CABLE EMPLOYEE PROFIT-SHARING TRUST

There are also some policy decisions to be settled before we can execute a contract with J. P. Morgan & Co. Incorporated on our Employee Profit-Sharing Trust and these will also be covered by a memorandum submitted to the meeting. With the payment to be made on January 4th we will have approximately $26,000 in the fund. I would like to have the trust instrument executed so that we can start putting it to work rather than having it lie in the bank without interest.

[fol. 3153]

ROME CABLE CORPORATION

ROME CABLE FOUNDATION

Since 1952 we have contributed $200,000 in cash and 1000 shares of Rome Cable Common Stock to Rome Cable Foundation. As of November 30th we had $26,000 in cash and $126,000 book value of investments (market value $155,000). Our commitments for the balance of the fiscal year will run approximately $16,000, which is about the same amount as we have already disbursed. Because of poorer operations last year we had to cut our contributions. I would like to recommend our paying $75,000 to the Foundation in the current fiscal year, but only paying $35,000 to them at the present time and awaiting final action on the above recommendation until our March meeting. If you see fit some portion of this contribution could be made from treasury stock. Our scholarship program will cost us about $14,000 in the current fiscal year.

EXECUTIVE BONUS

At the last meeting we approved the recommendation of the special bonus committee revising the Executive Bonus. It has been customary in prior years to make one or two distributions before the end of a calendar year and in good years these have ranged from $165,000 to $200,000. We have done this in an effort to make a more equitable distribution of taxes to the recipients. On the basis of the amount that will be accrued in the bonus fund by December 31st I recommend the payment of $150,000 at the Treasurer's discretion to those persons authorized at the last meeting of the Board and in the amounts indicated.

CHRISTMAS GIFT

In accordance with past practice I recommend that $5. Christmas gift be distributed to all employees other than officers who are directors.

GROUP 2 BONUS

For many years we have voted a distribution in December, a payment ranging from 2-1/2 to 7-1/2%, to a group of salaried employees not covered by Executive Bonus or Supervisory Bonus. On the basis of earnings I recommend that a distribution at the rate of 5% be made to those employees qualifying at an estimated cost of approximately $27,000, most of which has already been accrued. I further recommend that the salary committee be authorized to study and revise this plan.

STOCK PURCHASES

At various times during the year the Finance Committee has authorized the purchase of up to 10,000 shares of our stock. To date we have acquired 8,789 shares of this total at an average price of $23. 3/4 per share. There are several uses to which this stock could be put -(1) some could be transferred to Rome Cable Foundation or to the Pension or Profit-Sharing Trust at a saving in cash to the Company.

[fol. 3154]

ROME CABLE CORPORATION

STOCK PURCHASES -Cont'd

While the cost of acquisition mentioned above runs approximately 15 per cent below current market price, which is the maximum difference allowed by the Internal Revenue Department, and a year has elapsed since our last plan we do not believe that another offering should be made at this time because there is still $317,000 owing to the Company by 82 individuals on the other three offerings.

It is also possible that such a block of stock might be of use in some of our other programs that will be discussed at this meeting.

MOVIE FILM

We had a showing of our film "CABLE MAKERS" for several hundred of our Rome employees in November and it was well received. Plans are under way to make this available for TV showing.

We just had a showing today on the film which the conduit industry group produced under NEMA auspices. This is a very effective story both on adequate wiring and the use of conduit. We expect to purchase several copies for effective use by our sales department.

SALES MEETING

We had our annual sales meeting in September attended only by District Managers and a small group of Rome people. It was an excellent meeting. The Sales and Engineering Departments are conducting regional meetings throughout the year with marked success.

AMERICAN SYNTHETIC RUBBER

You will recall that our Board authorized the investment of up to $100,000 to be pooled with several other wire companies and other synthetic rubber users toward the purchase of the Louisville GRS plant from the Government. To date we have paid in $73,000 of our commitment for which we have 430 shares of American Synthetic Rubber Common Stock and $30,000 of 4-1/2% Debentures. We received our first debenture interest check in November in an amount of $ 675. I have also just received the six months' interim statement through October 31, 1955 which shows a very satisfactory earning during that period. Earnings are $691,000 after taxes or approximately $27. per share of the 25,113 shares outstanding. Their Board of Directors is considering a further expansion program. Production currently is at a rate of 20% in excess of rated capacity for the facility.

[fol. 5155]

ROME CABLE CORPORATION

RENEGOTIATION

We have had several meetings with the New York Regional Board handling our renegotiation case. For the fiscal year ended March 31, 1952 they have asked for a gross refund of $150,000, which after tax credit amounts to $24,000. Sufficient amount has been set up in our tax accrual to cover such a payment. We made one final effort, in a letter by Mr. Fraser, which strongly indicated our reluctance to accept their determination. We have received their reply stating they have further reviewed our case and are standing firm on their first determination. The course of action left to us is to either accept their recommendation or take our appeal to Washington. I would like to have some discussion of this at the meeting. My own recommendation at the moment is that we accept with a strong letter emphasizing that the determinaion which we are accepting for that year is being accepted without prejudice that might affect the two following years.

PRICES

Because of metal scarcity and heavy demands for the products of the wire industry prices have been more stable over the past few months than for a long time. Our products are being sold on a price based on 43 cent copper while the average purchase price of the raw metal by companies other than producer controlled is in excess of that owing to higher prices charged by smelters and other small producers. We have absorbed over a quarter of a million dollars loss in the first seven months of this fiscal year due to this condition.

ALCOA AGREEMENT

We had a meeting with representatives of the Aluminum Co. of America early in October. They indicated that they were going to put in their own extruding facilities for the production of plastic covered aluminum wires and that we would probably only be supplying small quantities of this type to them by next October. On neoprene, however, they told us they had no plans for that production. In fact almost immediately after that meeting they asked us to further increase our production for them. By manipulation of shifts we have been able to almost double that production. In November we had an official request to expand our facilities and accordingly after discussion have authorized the purchase of another CV insulating machine and are accordingly writing ALCOA to extend our agreement with them on this product to a total of 7,000,000 feet per month, which is more than three times the average that we supplied in the first eight months of the year. We have asked that the agreement be extended to January 1, 1958, with provisions for extending the agreement should both parties so desire. This should prove a very satisfactory and lucrative load for our plant.

[fol. 5156]

ROME CABLE CORPORATION

THE FUTURE

The majority of the judicies and predictions for the year 1956 talk of output and demand in excess of the current year. Every now and then we see and hear something which could well urge a note of caution. I hope we will have time to get your individual views as a means of determining policies for 1956. Such discussion could well encompass the all important step up in the cold war, our basic raw materials supply situation, our immediate expansion program, and certainly the financial needs which this would involve. We have ceased to be a small company but cannot yet be classed in the realm of being a big company. Such growth as we have had in a span of less than twenty years could not help but leave us with growing pains.

Whatever doubt, if any, there may be regarding the year 1956 certainly the prognostications and prophecies for industrial growth particularly in the electrical manufacturing and utility industries, which we serve, and the chemical industry which serves us are nothing short of fantastic whether it be ten, fifteen or twenty-five years that is being considered. Predictions made ten years ago, which seemed to be in the same category then looking at 1955 could well be as far wrong for 1965 to 1980. We have all thought that the pace has been terrific. We must carefully analyse our ability to further step-up our pace.

We have had many discussions in our various "Whither goest thou?" meetings and it seems to me that now we must become more aggressive and more definite in our approach toward the attainment of our goal. We have all agreed that even the maintenance of our present position in the industry must involve considerable expansion. We have discussed some possibilities of mergers. We have had certain nibbles where larger units in both allied and unrelated industries have shown interest in us. Diversification and bigness are every day subjects of discussion. We have had many discussions as to how best to plan our own destiny for the best mutual interest of share owners and employees alike. I think we have looked at the matter unselfishly.

Our most recent meetings seemed to have centered around rounding out our product line through the possibility of acquiring some smaller companies which could help accomplish this purpose as well as disperse our production facilities on a better basis to meet competition. The present pace in the program that we have been carrying out is more of a strain on our present organization than I like to see. Some things of necessity have had to lag and with the probability of adding to our overall program rather than curtailing it cannot help but add to our prospective difficulties. Any expansion move involving any other company should be well screened as to the matter of organization and what additional burden would be placed on the home organization here. At the next organizational audit meeting to be held in January I want each separate section of our company to review our organizational problems more aggressively and constructively.

[fol. 5157]

ROME CABLE CORPORATION

THE FUTURE - Cont'd

We must carefully search our present younger organization for men who are able to take on larger responsibility and present top executives will have to delegate more responsibility to these men in order to have them available for some of the problems that we face in the future. If my guess as to the program that will be suggested or adopted by this Board today is anywhere near correct. I feel we have done a fine job overall to date in share owner and employee relations and I am proud of our reputation with our suppliers, customers, financial institutions and in the communities where we have plants. We stand very well with our competitors too. While we have done an amazing job of keeping up-to-date considering the size of our organization I believe the stepped up pace of the future is going to require more serious planned efforts to even maintain our present position.

We must consider expansion of our product line, the new uses of aluminum conductors for building wires, service cable, power cables, welding cables, etc., as well as the possibility of broadening our present limited line of ACSR. Trends in rectangular magnet wire indicate rapid growth in demand for rectangular enameled magnet wire. This growth is going on at the expense of the type of product which we produce. It therefore seems vital that we should soon have facilities for production of rectangular enameled magnet wire and a broad line of enamel wire of other types we believe would also be helpful to us.

We have watched the terrific growth in telephone wire demand. Part of our present program of expansion provides some facilities for this.

We still lack the heavy sizes of rigid at Torrance and could well consider some discussion regarding expansion of our industrial tube operations, aluminum tubing and even plastic tubing. Mention was made earlier of potential manufacturing space available for plastic wires at Torrance. There are other locations that should be studied.

Mr. Fraser will bring you up-to-date at the meeting on the interest of some other companies in us and our interest in them, and we should have a discussion as to how this will fit our overall program.

Adoption of any part of this program is going to mean a need for more money and the expenditure of a great deal of energy by the Rome organization. Wherever competent outside services can be hired to do some of this work I am in favor of doing so. I believe it is vital that we as soon as possible determine what our needs are for a good sized student course for the coming year. The competition for the graduates is exceedingly keen and we will probably have to revise upward our ideas of remuneration, with all of its affects on our present organization. There are a number of departments in our organization which need near-term strengthening and if we cannot do it from our upgrading of our own organization we should be initiating steps to find them elsewhere.

[fol. 5158]
ROME CABLE CORPORATION

THE FUTURE - Cont'd.

This whole program is going to be adding to our expenses but I feel that the Board could well consider a sum expended in this fashion as insurance for the future.

I know this whole program is a large order for one day but I hope when the day ends we can consider that some progress has been made.

NEW DIRECTOR

I know I speak for all the members of the Board in extending a very sincere welcome to our new director, "Al" Foote. Each of us know how helpful he has been to us in the past and we are pleased with the opportunity of working more closely with him.

Respectfully submitted,

H. T. DYETT,
Chairman of the Board

[fol. 5159] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 119

A. D. R. Fraser.
J. H. Dyett.
February 24, 1956.

Aluminum.

This week the Syracuse office of Kaiser told us they had 90,000 lbs. for us in the second quarter, 30,000 lbs. each month. This is the first time we have been able to buy any aluminum pig from any source except Alcoa. Kaiser indicated that this was a start on a month to month basis since they did not wish to be in-and-outers.

Last week Andy Hunter and Kurt Gager of Aluminum, salesmen in the eastern section, spent nearly a whole day with us. They were not particularly optimistic as to getting into their month to month schedule but did say that once in a while they had wind-falls. I indicated we would be very happy to have one of these with the understanding that it would not be the basis for a month to month contract.

From the above you can see that we are beginning to make a start.

JHD:AS

[fol. 5160] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 122

cc: G. E. Rolston

A. D. R. Fraser.
J. H. Dyett.
May 15, 1956.

Aluminum.

Within the past week we have had conversations with both Kaiser and Alcoa on the subject of our selling redraw rod. Both these companies received the information that we had been selling to Aerofin Corporation. Messrs. Stout and Ralph Davies of Alcoa and Messrs. Belknap, Berry, Southerland and Tietjen have been advised that this was

only a sample order in the amount of approximately 1,000 lbs. The Kaiser men and Bill Stout were told by both Glenn Rolston and me that we were not currently selling redraw rod, that we were in no position to offer these rods owing to the tight aluminum situation, but we emphasized that we felt this was a normal type business for us in times when metal was not as scarce as it is today.

The Kaiser men left a long-term contract with us to run for a period of 10 years starting January 1957. This contract calls for 600,000 lbs. per year, which we emphasized was a drop in the bucket. They indicated that this would not mean they would not offer us more but that it is merely a part of the amount which the government wishes Kaiser to sell to independent fabricators during this period. We should have Executive Committee consideration of this contract next week.

In talking with Ralph Davies he stated that he would not be surprised to see the aluminum pig situation loosen up within two weeks or so. At present secondary aluminum is quite free and certain customers are turning to this market who had formerly stated they needed primary aluminum. As yet he did not know of any pig availability but intimated that this situation could change very fast. I emphasized that with the cut from 400,000 lbs. to 350,000 lbs. he caused us considerable hardship and that the most that we had been able to get from other sources was 30,000 lbs. a month. He promised that if and when more pig became available that they would consider additional amounts for us. He thought that Aluminum shipments might be increased into this country within the near future. Incidentally, he did not seem to take the Aerofin situation as seriously as Alcoa sales offices.

Gib Wolfe was advised this morning that we could not make any offer to sell Aerofin rods until the overall pig situation had improved.

JHD:AS

[fol. 5161] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 124

A. D. R. Fraser, G. E. Rolston, S. O. Williams.
J. H. Dyett
June 15, 1956

Alcoa.

On June 13th Bill Stout visited us, and I told him in Stan's presence that in July we were receiving aluminum from a third source and that we now were in the position where we could offer rods. He implied that they would have no objection to this policy, which confirms my conversation of early last month with Ralph Davies.

In respect to next quarter's aluminum from Alcoa, Bill stated that they would not reduce below the 300,000 lbs. a month and that they might possibly have additional tonnage for us. This statement was made after I told him that in line with our conversation last October we were now in a position to give them some relief in July to the extent of 60,000 lbs. if Alcoa actually wished to reduce July shipments to us. I made it very clear that we would be unhappy if they requested it, but we would agree to it since this was our verbal arrangement with Ralph Davies. I asked that he pass this information on to Pittsburgh.

Bill says that Alcoa is now thinking about long term contracts. It is his belief that these would run for a period of five years. I told him of our dislike of contracts which ran for more than one or two years unless there was a fair escape clause. He had been told two months ago that Alcoa would give us additional tonnage if we were going to enter into definite arrangements with other suppliers even if such arrangements did not start until early 1957. He did not know whether or not Alcoa would now favor us making long term contracts with others as the metal is now more plentiful. It seems rather unusual that a supplier would wish us to make contracts and then give us additional tonnages until these contracts became effective at a time when aluminum was scarce. However, I am only reporting what Bill told me.

JHD:AS

[fol. 5162] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 126

Rome Cable Corporation

1956 Sales Conference

Products—G. E. Rolston.

In our program this year we have tried to bring you men more and more into the discussions as you will see later. There is not as much in our part of the program on the products as such. We are not always sure that complete understanding is retained by you people when you go back. Most of the information on the product as such will be forthcoming as Bob said yesterday in the form of bulletins and we are going to try to send out supplementary information of a typical sales character that may supplement information that you get from the Engineering Department. There are, however, a few problems that we are faced with that involve products, the first one of which is aluminum.

You have heard Jack's story about availability. You saw some things in the plant and laboratory and while it is perfectly true that we generally are in a position to produce aluminum conductors with, we will say literally, any of the types of coverings that we now make for copper, they present no problem. Unfortunately, the commercial situation is not at all clear. At the moment, ACSR as a typical example where we have limited our activities in the past, we will expand. With the availability of more aluminum, we are making studies of this freight rate situation, but I believe while I cannot answer it at this time, that we can meet it. In all areas we will definitely expand the areas of ACSR which we have restricted heretofore. One part of our program has been to improve the operations of the Properzi equipment. We have better costs of producing rod than we had some time ago and here again, it is somewhat like a steel mill. If we are going to get those costs down, we are going to have to put more tonnage through those Properzi machines so that factor of quantity is an important one now.

There is no change in general in the picture insofar as covered line wire, whether it be Polyethylene or Neoprene or in Triplex. The commercial picture has been pretty well established for a long time, but when we get over into the area of building wire, RH-RW type or TW to name just the two in that field, we have a situation whereby one of the integrated aluminum manufacturers is exceedingly anxious to introduce aluminum in place of copper. It is our belief that in so doing they are overlooking certain fundamentals and elements of manufacturing costs and profit consideration, and we feel quite frankly that their published price schedules are entirely unrealistic in relation to costs, so much so that in some cases we can't even consider the possibility of having any price levels that would be competitive with that integrated producer. This situation is not peculiar to us. It is chiefly the problem of any other insulated wire manufacturer who is equally anxious as we are to put on a covering over literally any conductor. How soon this situation might be recognized I don't know, but let us go back for a moment to just about four or five years ago. As you know, the introduction of covered aluminum wire and Triplex only dates back in any quantity to the middle of 1951. The same integrated producer was definitely interested in promoting the use of covered aluminum conductors for overhead distribution work and he had published price lists that were approximately 20 to 25% under price lists that we and other insulated wire manufacturers had.

[fol. 5163] We wrote out the criticisms at that time. You fellows traced it and said you couldn't understand why our price was $120 when they could buy it from an integrated producer for $100. We believed then as we believe now that part of the problem in their mind was to overcome the resistance and the inertia on the part of utilities and others to change from a copper conductor to aluminum conductor. As time went on the thing became corrected and you now have an industry price level that is relatively uniform in those products. It is my belief and the belief of some others that the same action is being taken now in that it is recognized that the ordinary contractor has certain reluctance in dealing with aluminum conductor so they established a price level which creates enough incentive on the

saving basis to interest them to get into this product line. Now I believe the same thing would happen as heretofore that when such progress has been made and overcome in this inertia and resistance then the price might seek levels at which we think they should be in relation to costs at the present time. The answer to all that is that we are in a practically impossible position to say to you that we are introducing a line of type SE cable, TW building wire, RH-RW, RR cable, RRD, with aluminum conductors. I will say that in the study of this thing, when, as and if we do unless there is some change, they will not be anywhere near the price level that is now public information from this integrated producer. I am telling you in advance that if we do take such action please don't object to the high prices that we will have because that is the situation that is going on at the present time.

I can best give you an illustration of what we believe to be this type of thinking. It is what happened when we were told first hand from this integrated producer that there was three school buildings built out in Iowa in which they had an opportunity to work with the engineers and then subsequently the contractor in the detail layout of these jobs. The intent was very definite that they get aluminum building wire in these three schools. The figures were something like this: that in the original layout that the copper wire, priced as it was at that time, would cost approximately $75,000. If you used aluminum wire, we will say priced on what I call a conductor substitution that is where you simply take out the copper conductor and put in aluminum and have the same price for the covering would have resulted in about $62,000, but this particular integrated producer having an interest in getting it across agreed to furnish the wire for $47,000. Now my reaction to that whole thing was this, wasn't the difference between $62,000 and $75,000 sufficient interest to cause them to select aluminum in place of copper? Why did it have to be another $15,000 below what I would call realistic figures? Well, you can draw your own conclusions just how much you have to offer to someone to get them to overcome years of experience and practice, I don't know but that gives you the relative level.

There are one or two manufacturers who apparently have

decided that they will or have entered into what we will call it, insulated aluminum field. I am talking in building wire or 600 V rubber Neoprene. Their published price schedules as of this time are in the neighborhood of 15 to 20% above the published price schedules of this integrated [fol. 5164] producer. In other words, they have apparently decided that in their case, they too could not recognize this competition so they have brought out published price schedules at this higher level. U.S. Rubber is one, Anaconda Wire & Cable is another and General Cable Corporation is another. Just recently, in fact June the 20th, a new published price schedule of U.S. Rubber was issued on 600 V rubber Neoprene and TW aluminum conductor. That is the situation, so the only way I can see to approach it is to study these individual cases and come up with a decision as to whether or not we think we should go into this field at that level. Don't forget, we cannot afford to sell any of it if we make 500 ft. quantities here and there. It means a decision to manufacture and stock aluminum conductors of this type because you surely can't be in the building wire business 600 V RRD making every order special. We have made quite a considerable quantity of aluminum conductor with rubber Neoprene coverings, those of you who have not run into it as a matter of fact, we produced this cable for use in the Aluminum Company of America plants. We stock in Rome. In fact that stock is available to you. We carry a stock of RRD cable in assorted sizes. It is rather interesting to note that the prices at which we are selling this RRD cable, aluminum conductor, I assure you are not at the price level of this integrated producer,—we cannot meet it. We have been asked if we won't sell aluminum rod. We have already submitted some samples to two different accounts,—so it may well be that very shortly we will be selling 3/8" aluminum rod. We will also be interested in furnishing aluminum drawn wire similar to the fabricator customers we have now where we furnish copper. We will work on and expand that activity, but on new types of insulated construction materials in that whole field, we are going to have to go very very slowly.

In connection with the engineering department's program yesterday, they showed you that this problem of making what we call compact type of strand is not a difficult

one. They successfully made it and have a bulletin that will show the range of sizes that can be furnished, but here again, we have got the old commercial problem. If we are going to get anywhere, we just can't have two or three different wires for the same purpose. In other words, it is an awful job now, we've got many different constructions of Triplex and everybody wants a different type of neutral and when you combine Polyethylene with Neoprene and two shot compared to one shot and 500 ft. coils instead of 1,000 ft. reels, we are confronted with many problems.

Now it is my belief that we should not go hog wild on this type, what we will call compact strand. My own experience from the few places I have been in the field is nix. Jim Scheppach and I made calls, 20 minutes apart, in Indiana. One place said they have tried it and like it and they thought maybe that is what they would use. The other one said they had some and they never wanted to hear about it again. I don't know the specific reasons. Just within the last week, there is a report from Dick Gray's territory that Penn Electric bought 30,000 ft. of a Triplex cable with the neutral. They had all kinds of trouble with the particular type of fittings they use. Now that doesn't necessarily mean that this product is not good. There are these [fol. 5165] advantages that were given to you yesterday, but the point I am talking about is put yourself in our place. We certainly can't be talking about one day furnish this type of strand, and another day the other and get any service on it. We will probably have to set up absolute minimums and we may have to say we won't furnish it in less than 50,000 ft. quantities because here again we cannot afford to set up for small quantities. I have had some conversations with the company that has promoted this, Southern Electrical Corporation who started this compact strand and which they call Compresto. I believe the acceptance has been mixed. I am told that it has been well accepted in Texas and Oklahoma and through there. I am also told that in other areas they just don't want any part of it, so I think you have got to steer a pretty careful course in connection with that.

The next thing which Rudy touched on and said that I would mention is our changed equipment with regard to cabling of conductors and the fields which we might enter

both more profitably and in greater quantity than we have in the past. This new cabling machine will certainly give us greatly improved operations and greatly increased capacity on control cables. We are going to have considerably better operations of cabling of conductors. We will be able to go up to 37 conductors of one pass,—in other words as one pass through the machine you can cable up to 37 conductors. Actually by going through several times it brings our normal limit up to I think we can make 91 conductors of the straight away type going through this cable by the several passes which we couldn't do at all. Of course, we can make cables literally with hundreds of conductors depending on the groupings of pairs, triplets, quads, etc. With regard to the specific telephone type which we will call the exchange cable which is tied with the RTA and REA, we have checked the published price schedules of five or six of the people who are principally involved in that business and quite frankly we cannot see that we are going to be able to be competitive with G.C.C., Anaconda, Whitney Blake or Ansonia. Now, as Rudy mentioned, that still does not close the door to those types of cables of which there are many many variations. For instance as a typical example, there is the cable that is mentioned from Duquesne Light. There is a third type of cable, I believe it is going into a new Atomic Energy Plant. Now fundamentally it is this type of cable, but it isn't sold on the basis of the exchange cable price lists, so I just want you to know that when it comes to strictly these REA or RTA exchange cables we will not be competitive.

As Bob Graham told you yesterday, we have now a few new types of polyethylene. Let's make sure we know what we mean when we talk about high density or high molecular weight polyethylene. These terms can be confusing, so acquaint yourself with these new types so we will all know what you really want.

[fol. 5166] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 127

ROME CABLE
CORPORATION

ROME, N.Y.

REPORT SUBMITTED TO THE BOARD OF DIRECTORS OF ROME CABLE CORPORATION AT THEIR MEETING NOVEMBER 29, 1956

I present record of sales and earnings after taxes by fiscal years from 1937 to date, and by quarters for the current year, the month of October and estimates for November:

Fiscal Year Ended	Net Sales		Earnings
March 31, 1937	$ 1,798,042		1,616
March 31, 1938	4,957,103		71,027
March 31, 1939	5,370,665		245,036
March 31, 1940	6,080,902		297,736
March 31, 1941	9,465,451		431,501
March 31, 1942	11,631,785		592,135
March 31, 1943	12,712,333		367,654
March 31, 1944	16,909,735		466,709
March 31, 1945	22,798,218		486,653
March 31, 1946	16,975,009		398,973
March 31, 1947	18,436,305		1,359,593
March 31, 1948	25,202,853		1,152,579
March 31, 1949	26,088,523		1,115,960
March 31, 1950	19,602,984		302,209)
		Plus: Transfer from contingency reserve	150,000)
			452,209
March 31, 1951	35,142,901	Net	
		Minus: $1,922,136	
		Transfer to copper reserve 150,000	1,772,136
March 31, 1952	42,657,848		1,753,651
March 31, 1953	54,632,976		2,008,321
March 31, 1954	44,114,825		1,637,787
March 31, 1955	39,186,095		930,879
March 31, 1956	56,996,682		2,023,070
April-June Quarter	14,752,299		540,156
July - Sept. Quarter	13,172,110		641,090
Total Six Months	27,924,409		1,181,246
October 1956	4,505,518		196,214
Total Seven Months	32,429,927		1,377,460
November(Estimated)	4,255,000		185,000
December (Estimated)	4,400,000		180,000
Total Third Quarter(Est.)	13,160,518		561,214
Total Nine Months(Est.)	$ 41,084,927		$ 1,742,460

[Fol. 5167]

ROME CABLE CORPORATION

Sales for the current quarter should run approximately the same as for the last quarter but earnings may be off as much as 15 per cent, or about $80,000. Sales will run more than 10 per cent behind the same period a year ago.

SALES AND ORDERS

The breakdown of sales before deduction for discount and freight from April to November, with November 1956 figures estimated, are as follows:

	April - November* 1956	April-November 1955	% Increase or (Decrease)
Rods	$ 3,917,000	$ 4,270,046	(8.3)
Bare	5,965,000	6,182,107	(3.5)
Weatherproof	1,772,000	2,294,556	(27.7)
Magnet	2,572,000	2,486,256	3.4
Rubber Covered	15,834,000	14,011,423	13.0
Torrance-E.M.T.	2,356,000	1,999,051	17.9
Rigid	2,489,000	1,801,906	38.1
Spiral 4	-	1,229,700	-
Aluminum	3,635,000	2,695,544	34.9
	$ 38,540,000	$ 36,970,589	4.2

* November 1956 estimated.

On the basis of present indications our dollar value of sales for the current fiscal year will run about 3 per cent behind a year ago.

During the first seven months of our fiscal year quantity of incoming orders for copper products declined 10 per cent below the period of a year ago, while Aluminum and Torrance increased approximately 30 per cent. On the basis of dollar value the total was about in balance for the two periods.

BACKLOG OF ORDERS

January 6, 1956	Rome - Copper Products	$ 5,162,000
	Aluminum	907,000
	Spiral 4	463,000
	Torrance - E.M.T.	271,000
	Rigid	479,000
		$ 7,282,000
June 30, 1956	Rome - Copper Products	$ 4,153,000
	Aluminum	894,000
	Spiral 4	-
	Torrance - E.M.T.	189,000
	Rigid	76,000
		$ 5,312,000

[fol. 5168]

ROME CABLE CORPORATION

BACKLOG OF ORDERS - Cont'd

Nov. 1, 1956	Rome - Copper Products	$ 3,122,000
	Aluminum	1,017,000
	Spiral 4	-
	Torrance - E.M.T.	47,000
	Rigid	206,000
		$ 4,392,000

You will note from the three above periods the steady decline in backlog in Rome Copper Products and increase in aluminum backlog. There is little question but the weakness in the price of copper and greater availability that has developed during the year, which has influenced our customers to liquidate inventories, has materially affected our backlog.

COPPER

Since the September 5th meeting the producers have reduced the price of copper from 40 cents to 36 cents per pound. Although improving demand continues less than copper production, we believe there will be a determined effort to maintain the 36 cent level unless foreign consumption is adversely affected by oil rationing. At the start of 1956 the custom smelters were charging seven cents a pound premium over the producer figure of 43 cents. In November for the first time in many months there has been one quotation for domestic copper. With an ample supply of metal available we feel it expedient to keep our copper purchasing at a minimum.

ALUMINUM

As with copper we are being offered more aluminum than we require. We now have three sources supplying us each quarter with a fourth, Reynolds Metals, showing the first definite interest in shipping on a monthly schedule. Even though the aluminum companies foresee a tightening supply next summer, we believe our stocks should be ample for presently projected needs.

STEEL

Keeping a balanced inventory of sheet steel has confronted us with a serious problem. Cold rolled steel, required for E.M.T. has been plentiful, but the scarcity of hot rolled sheets for Rigid has resulted in an unbalanced inventory at the present. With the longshoremen back at work we expect, however, to have sufficient hot rolled steel next quarter.

[fol. 5169]

ROME CABLE CORPORATION

PAYROLL STATISTICS

	Week Ending	No. Employees	Total Payroll	Avg. Wkly. Wage	Avg. Hrs. Pr/Wk.	No. Salaried Employees
ROME	12/11/55	M 882 F 38 920	$ 93,823.58	$ 101.98	46.1	418
	6/17/56	M 903 F 23 927	87,996.85	94.93	43.8	440
	11/18/56	M 880 F 29 909	91,962.83	101.17	45.2	450
TORRANCE	12/10/55	134	$ 13,603.50	$ 101.08	41.8	48
	7/21/56	141	12,953.25	96.50	39.7	47
	11/10/56	140	13,930.66	100.70	41.1	47

You will note from a year ago the number of hourly workers has declined but the number of salaried employees has increased by 8 per cent. Some of this can be accounted for in new students and expanded departments, in line with my recommendations of last year. However, I feel that some study should be made towards bettering the relationship of hourly to salaried workers.

LABOR

Labor relations at Rome are excellent. On November 8th the Torrance plant voted to have the United Steel Workers as their bargaining agent by a vote of 80 to 50. This was a distinct surprise and perhaps we were too complacent and over confident about the results. Negotiations for the first contract will probably not be completed for two months or more. I am told that notwithstanding the election Torrance reports good labor effectiveness.

INVENTORIES

Our inventories are at the highest level we ever had and are 55 per cent higher than a year ago. We have had Ernst & Ernst studying our consigned and warehouse inventory control and are embarking on a program which should reduce our inventories by at least a million dollars before the end of our fiscal year, which monies can be used to good advantage in the paying off of our short term loans of $1,000,000.

[fol. 5170]

ROME CABLE CORPORATION

DIVIDENDS

I recommend payment of dividend No. 71 at the rate of 35 cents per share to share owners of record December 14, payable January 4, 1957. I also recommend payment of cash dividend to employees on the same date at 17-1/2 cents per participating unit, and that a contribution of an additional one-third of that amount be added to the Rome Cable Employee Profit-Sharing Trust Fund.

At our September meeting we discussed the possibility of declaring a 5 per cent stock dividend on the basis of current and expected earnings. I recommend the declaration of a 5 per cent stock dividend to share owners of record December 14 and that distribution be made on January 4, 1957.

EXECUTIVE BONUS

It has been customary at this meeting of the Board to make a first or second payment for the current year on the Executive Bonus. Inasmuch as there has been no payment made to date I recommend approval of disbursement of $175,000 to those members, and in the percentages authorized, at the June Board meeting.

CHRISTMAS GIFT

I recommend that $5.00 be given at Christmas, as usual, to all employees excluding Directors.

PENSION PLAN

We have sixty-two former employees receiving pension or disability benefits under our Retirement Income Plan. In our first year we paid $121,000 to the Insurance Company and $326,000 to J. P. Morgan & Co. Incorporated, Supplementary Trustee. On July 26th we advanced $100,000 to Massachusetts Mutual for current payments. Our insurance advisor suggests that a minimim of $147,000 be paid to the Insurance Company to take care of estimated withdrawals in the ten year period. With the current low yield of securities and the fact that our Supplementary Trusteed Fund as of November 21st shows an appreciation of 2 per cent we might want to have some discussion towards placing a more sizable amount with the Insurance Company in the current year, inasmuch as their interest rate equals that of the Trusteed Fund. This would, of course, enable us at some time in the future to reduce our payments to the Insurance Fund and contra-wise increase our payments to the Supplementary Trusteed Fund, if conditions were more favorable so to do. I would like to have some discussion on this subject at the meeting.

[fol. 5171]

ROME CABLE CORPORATION

PROFIT-SHARING FUND

The Profit Sharing Plan recently received Treasury Department approval. The Market value on November 21, 1956 was $78,160 compared to book value of $71,708. The yield at book value on the investment is 3.95 per cent.

ROME CABLE FOUNDATION

At this meeting it has been customary to take a preliminary look at the amount to be contributed to Rome Cable Foundation. We actually donated $[illegible]582 last year. I recommend that consideration be given for between $75,000 and $100,000 for the current year. As a means of saving cash I would recommend that 1000 shares of Treasury stock be authorized for transfer at this meeting and an additional cash contribution of $16,000 be made as the initial one for the current year. We can then look at the situation at our March meeting on what to do about the balance.

RESEARCH & DEVELOPMENT

At the last two meetings of the Board we had considerable discussion regarding the need for addition to the office and the building of a new laboratory. Capital authorizations were made with request for further investigation but both projects were held up.

We have had many discussions and urge reconsideration of the laboratory program. Mr. Schatzel for some time has been recommending the strengthening of the organization of our laboratory to better serve our needs. At the moment research is the smallest portion of our research, engineering and development budget. Principle duty has been plant and customer engineering service. We have reached a point in size and progress where additional expenditures for organization, equipment and facilities are necessary if we are going to keep abreast of the potential growth of our industry in the years ahead. Meeting the challenge of the atomic and electronic age, plus the many new materials coming from the chemical industry, as well as stepping up our true research on many that we now have further emphasizes the need for this step. Ross Fraser's trip to many wire companies in Europe where their facilities and expenditures for research in many instances dwarf ours indicate that dollars invested at this time in the expansion of our research program at Rome Cable will be one of the best items of insurance for our future.

As a personal note. Our present Director of Research and Engineering indicates he will reach retirement age in about four years and it is not his intention to serve in his present capacity beyond a year longer than that. It therefore seems imperative to me that we give him the facilities and the budget to realize the full benefit of his recommendations within the five year period. I estimate that the building and land will cost approximately $350,000. At this meeting, however, we are merely looking at the approval of the idea of going ahead. The actual details of the programwill be prepared in greater detail by Mr. Schatzel and also by our Plant Engineering staff.

I believe that a new laboratory will require probably an additional $100,000 worth of new equipment and that we might be looking at an increased expenditure for research of about $200,000 per year at the end of five years. This would still keep

[fol. 5172]

ROME CABLE CORPORATION

RESEARCH & DEVELOPMENT - Cont'd.

our percentage for research considerably below the electrical industry.

CAPITAL EXPENDITURES

Our total cash outlay for capital expenditures in the current fiscal year will approximate our total depreciation, or a total of about $850,000. We will have a carryover into the new fiscal year of appropriations totalling about $250,000.

The Executive Committee has had several meetings reviewing potential authorizations for the fiscal year 1957. At this time in addition to the carry-over and the potential $350,000 for laboratory I believe that we should informally authorize another $500,000, the use for which can be supported by Mr. Ellis for discussion at the meeting. The original tentative list prepared by the Manufacturing Department, which includes a complete enameling plant exceeded four million dollars.

In the last quarter we have carefully studied the needs for enameling and believe that for the present an additional expenditure of $65,000 will provide us adequate capacity on flats and squares and round sizes up to approximately size 20. We also decided not to provide additional equipment for production of ACSR at the Rome location.

PUBLIC RELATIONS

For some time we have been anxious to improve or organize our public relations along better lines. Our Advertising Agency - Charles L. Rumrill & Co. Incorporated have recently added a Public Relations Department and in conjunction with our Advertising Department they have outlined a program for better product, corporate, local, regional and national publicity at a fee of $9,000 per year, plus expenses estimated to run from $2,000 to $5,000. We have listened to the outline of the program and heartily recommend its adoption.

TEN YEAR DINNER

Our eleventh ten year dinner was held in the cafeteria Tuesday night, November 27th, with seventy-two new ten year members being added this year. We now have nearly half of our employees having ten years or more service, for which we are very proud.

STUDENT REGRUITING

In June we added Milo Eames to our staff to assist Mr. Schatzel in handling our Student Course, Scholarship program, recruiting of students and overall direction of educational activities in the Company. He is currently visiting the colleges with a well planned program to interest them in Rome Cable. Last year we were unable to get any engineers at all. Our program for the current year calls for three electrical engineers, two mechanical engineers and one chemical engineer. We will likewise not be passing up any opportunities for good prospects who are not engineers.

[fol. 5173]

ROME CABLE CORPORATION

NEW YORK STOCK EXCHANGE

Our number of stockholders is increasing and we should in the near future reexamine the possibility of listing on the New York Stock Exchange.

REVIEW OF CURRENT YEAR'S PROGRAM AND THE FUTURE

At the meeting a year ago I outlined a series of problems and urged the adoption of an aggressive and more definite approach toward the attainment of our goals. In the current calendar year we have accomplished a great deal along certain lines but there remains still many unsettled problems. Organization-wise we have strengthened the Finance Department and look for that department to take over certain responsibilities presently covered by the Comptroller's Department in the matter of salary administration, pension, insurance, etc. Our Sales reorganization is working smoothly and we have strengthened our Advertising Department, and we have increased the responsibility of many of our younger people in the organization, buf there is still much to do in this connection.

On the list of new product additions mentioned a year ago the only definite addition is plans for rectangular and heavy round enamel magnet wire, which will be available some time in mid 1957. We have seen the encouraging results attained when Torrance has an adequate load and the importance of supplementing or augmenting its product line should prove profitable, unless the recent decision to unionize should make the climate or cost unreasonable. We all still appreciate the wisdom of greater diversification of product.

For years we have seen the addition of many new materials for insulation in the development of new products, which in itself has expanded our line, but has also made many uneconomical and unprofitable runs to keep so many items in the line. A realistic appraisal on the basis of market and profitability could well pay big dividends at what we believe slight sacrifice in volume and provide better service to customers.

With the almost fantastic predictions of growth for the electrical industry in the next ten to twenty years we must take more definite steps towards examining and appraising the possibilities of other locations. Our several efforts to acquire or merge with certain other companies, on the basis of expanding our product line and improving our distribution points, have so far met with no success. We continue to have approaches made by larger companies and have listened to their story but our executives still feel that the control of our own destiny will be a happier course. I likewise feel that by taking full advantage of the combined knowledge and reputation of our organization that the financial returns from such a course will prove its merit.

Ross Fraser spent some time in Europe visiting various wire companies in England, Germany, Switzerland, France and Italy. He came back much impressed with the progress of many of these companies in the field of new products, improved equipment design, manufacturing techniques and advanced research. He advises that we have an open door with some of the very progressive companies for a liaison and interchange of technical research information. He feels it is imperative that in planning any equipment program on keeping us up-to-date that some of the European developments should be

[fol. 3174]
ROME CABLE CORPORATION

REVIEW OF CURRENT YEAR'S PROGRAM AND THE FUTURE - Cont'd.

checked by our people on the scene. He also urges near-term visits by research and engineering.

Respectfully submitted,

H. T. Dyett, Chairman of the Board

[fol. 5175]

E.R's approved since our last meeting:

R&WC	E. R. No.	Description	Amount	
	1802	Purchase a reroller unit	$ 3,800	
	1803	Purchase measuring machine and base	250	
	1804	Purchase and install 4 wire heavy round and rectangle wire enameling units	85,000	
	1805	Appropriation for second half F.Y. covering Furniture and Fixtures	11,080	
	1806	Purchase and erect materials and labor to extend Building #24	11,500	
	1807	Purchase and install portable vacuum cleaner	1,200	
	1808	Purchase and install a Reliance 75 VS Control	8,200	
	1809	Purchase and install near test tanks in Bldg. #20 a suspension type scale for weighing large reels	1,500	
	1810	Purchase and install electric hoist for lifting compound to C.V. mezzanine	1,200	
	1811	Purchase and install new time clocks and master clock	7,000	
	1812	Purchase a subzero constant temperature cabinet with one set of mandrels	900	
	1813	Capitalize the cost of labor and materials supplied to enlarge the southerly C.V. mezzanine and add an additional flight of steel stairs therefrom	10,000	
	1814	Purchase and install a 500# capacity dial scale in plastic mixing department	800	
	1815	Purchase and install Drummond Microhematocrit and Drummond Hematocrit Reader	250	
	1816	Purchase and install Westinghouse Water Cooler	200	$142,880

[fol. 5176]

E.R. No. TONNAGE	Description	Amount	
C-269	Purchase 1 McKinley Type D Portable Mechanical Shoplifter	$ 255	
C-270	Purchase 1 - 7000 lb. capacity Clark "Utilitruc" fork lift	7,515	
C-271	Install 2" Black pipe by-pass line from Propane Surge Tank to Boiler House	352	
C-272	Install Service Recorders for Tube Mills and Chasers	1,188	
C-273	Purchase one DoAll Contour Bandsawing, filing and polishing machine	2,536	$11,846
Additional E.R's approved:			
1718-A	Additional appropriation on takeups on C.V's	$ 2,500	
1744-A	Additional for installing 6" C.V. unit with drive, and two 72" payoffs and takeups	14,000	
1799-A	Additional for four cylindrical steel tanks	2,600	
1639-A	Over-expenditure on large dome type vulcaniser	5,900	
1741-B	Over-expenditure on two aluminum casting and rolling units	715	
1745-A	Additional on installation of 6" plastic covering unit	1,300	
1769-A	Additional on 100 HP V S drive for the 6" pan tubing machine	500	
1784-A	Over-expenditure on 13 window type air conditioning units in office mezzanine in Bldg. #20	715	
1795-A	Additional on 4 air conditioning units in the Engineering Dept., Bldg. #15	395	$28,625

[fol. 5177] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 128

ROME CABLE
CORPORATION
ROME, N.Y.

REPORT SUBMITTED TO THE BOARD OF DIRECTORS OF ROME CABLE CORPORATION AT THEIR MEETING MARCH 7, 1957

I present record of sales and earnings after taxes by fiscal years from 1937 to date, and by quarters for the current year, the month of January and estimates for February and March:

Fiscal Year Ended	Net Sales			Earnings
March 31, 1937	$ 1,798,092			$ 1,616
March 31, 1938	4,957,103			71,027
March 31, 1939	5,370,665			245,036
March 31, 1940	6,080,902			297,736
March 31, 1941	9,465,451			431,501
March 31, 1942	11,631,785			592,135
March 31, 1943	12,712,333			367,654
March 31, 1944	16,909,735			466,709
March 31, 1945	22,798,218			486,653
March 31, 1946	16,975,009			398,973
March 31, 1947	18,436,305			1,359,593
March 31, 1948	25,202,853			1,152,579
March 31, 1949	26,088,523			1,115,960
March 31, 1950	19,602,984			302,209)
		Plus: Transfer from contingency reserve		150,000)
				452,209
March 31, 1951	35,142,901	Net		
		Minus: Transfer to copper reserve	$ 1,922,136 150,000	1,772,136
March 31, 1952	42,657,848			1,753,651
March 31, 1953	54,632,976			2,008,321
March 31, 1954	44,114,825			1,637,787
March 31, 1955	39,186,095			930,879
March 31, 1956	56,996,682			2,023,070
April - June Quarter	14,752,299			540,156
July-Sept. Quarter	13,172,110			641,090
Oct.-Dec. Quarter	12,724,365			535,399
Total Nine Months	40,648,774			1,716,645
January 1957	4,298,930			163,376
February (Est.)	3,186,000			54,000
March (Est.)	3,849,000			152,000
Tot. Fiscal Yr. (Est)	$ 51,982,704			$ 2,086,021

[fol. 5178]

ROME CABLE CORPORATION

Sales for the current quarter will run 10% lower than the period October to December and 29% lower than the same quarter a year ago. The reduction in overall quantity would be about five points less in each case, the difference being caused by sizable copper price reductions from the two earlier periods. Profits for the fiscal quarter are estimated at $369,000, of which approximately $100,000 will come from Torrance. Estimated profits for the fiscal quarter have been most difficult to estimate because of continuing drop in copper price, which has created a gross loss of $187,000 if copper stays at 32 cents plus inventory gross loss of about $110,000 from the prior year. This represents an over-statement of about $50,000 net in prior year's profits. While the total estimated profits of $2,086,000 will exceed the prior year the per share earnings will be down from $3.82 to $3.74, owing to larger number of shares outstanding in current period, owing to stock dividend. Extraordinary and we hope non-recurring charges approximated $500,000 charged against current fiscal year.

SALES AND ORDERS

The breakdown of sales before deduction for discount and freight from April to February, with February estimated, are as follows:

	April 1956 Feb. 1957	April 1955 Feb. 1956	% Increase or (Decrease)
Rods	$ 5,486,000	$ 7,019,000	(21.8)
Bare	7,545,000	9,395,000	(19.7)
Weatherproof	2,332,000	2,982,000	(21.8)
Magnet	3,454,000	3,652,000	(5.4)
Rubber Covered	20,797,000	19,832,000	4.9
Torrance - E.M.T.	2,950,000	2,658,000	11.0
Rigid	3,352,000	2,283,000	46.8
Spiral 4	--	1,691,000	-
Aluminum	5,061,000	4,147,000	22.0
	$ 50,977,000	$ 53,659,000	(5.0)

Sales estimate for the current fiscal year will be off about 8% from the prior year, although we actually had about equal quantity with the prior year in Rome, and Torrance quantity was 21% ahead of a year ago.

Incoming orders for the eleven months of the fiscal year on a quantity basis are off 5% from the same period a year ago, and the first two calendar months are off 20% from the same two months a year ago.

[fol. 5179]

ROME CABLE CORPORATION

BACKLOG OF ORDERS		Value
February 8, 1957	Rome - Copper Products	$ 2,897,000
	Aluminum	513,000
	Torrance- E. M. T.	48,000
	Rigid	177,000
		$ 3,635,000
August 31, 1956	Rome - Copper Products	$ 3,654,000
	Aluminum	1,083,000
	Torrance- E. M. T. & TV Mast.	365,000
	Rigid	474,000
		$ 5,576,000
February 10, 1956	Rome - Copper Products	$ 5,304,400
	Aluminum	815,000
	Torrance -E. M. T. & TV Mast	428,000
	Rigid	766,000
		$ 7,313,400

Our backlog shows a drastic decline from the two prior periods shown above. Aluminum decline comes from ALCOA now making most of their own plastic. Other Rome product declines are due to lower prices and hand-to-mouth buying in a lower copper market.

COPPER

Producers price for copper has been reduced another 4 cents per pound since the last meeting and smelters and world price is between 1 and 2 cents per pound lower than that. The January statistics were up appreciably from December but sentiment seems to indicate that most people are looking for a 30 cents per pound price. At 32 cents per pound this means a reduction of 23 cents per pound from the world price prevailing at the end of our last fiscal year, which in actual cents per pound is the largest in modern times.

ALUMINUM

Aluminum is in plentiful supply and all the major producers are now anxious to sell us. While our budget for the new fiscal year shows an appreciable increase over fiscal year 1956 our monthly intake will be reduced from the recent levels when we were trying to get a more satisfactory inventory on hand.

STEEL

We have been working on reduction of our cold rolled steel inventory and believe our commitments and inventory will soon be in better balance with our production.

[fol. 5180]

ROME CABLE CORPORATION

PAYROLL STATISTICS

Our factory payroll covering number of employees, weekly payroll, average weekly wage and average hours worked for a period a year ago, six months ago and the last week available, as well as the number of monthly salaried workers for both Rome and Torrance are shown below:

	Week Ended	No. Employees	Total Payroll	Avg. Wkly. Wage	Avg. Hrs. Worked	No. Salaried
ROME	2/19/56	M 894 F 33 927	$ 97,844.69	$105.55	47.0	422
	8/19/56	M 872 F 31 903	$ 91,225.32	$101.02	45.3	448
	2/24/57	M 801 F 24 825	$ 70,580.79	$ 85.55	38.9	457
Torrance	2/18/56	131	$ 12,409.41	$ 94.73	40.2	44
	8/18/56	129	$ 13,844.66	$107.32	43.1	47
	2/16/57	135	$ 13,830.40	$102.45	40.4	48

There was a drop in Rome hourly employees of approximately 100 from a year ago. Half is caused by temporary layoffs due to reduced volume and inventory liquidation in February but the other half of the layoffs has been projected as efficiencies and savings from the start of indirect incentive plan in January 1957. Practically all of the increase in salaried workers represents change from indirect hourly to salaried method of payment and does not represent increased cost.

LABOR

Due to area and national competitive labor agreements we granted an approximately 5 cents per hour increase to all Rome plant employees on December 17, 1956, with an additional 7 cents in December 1957 and December 1958. This was accepted by IAM representing maintenance workers in the Rome plant. At the same time we announced an incentive plan for indirect workers effective January 1957.

[fol. 5181]

ROME CABLE CORPORATION

LABOR - Cont'd

On February 18th we signed a contract with U.S. Steelworkers representing Torrance production employees granting approximately the same increase to them, but only for the year 1957, with contract expiring in December of 1957. We agreed to investigate the possibility of indirect incentives at Torrance also. On this basis Rome should have clear sailing for approximately three years and we hope that the Torrance plant can negotiate their contracts in conformity with Rome.

It is distinctly evident that we are getting higher production with less manpower.

In January we offered free polio shots to all employees stationed at Rome on a voluntary basis. About 150 over age 40 indicated, in response to our questionnaire, that they did not wish to have them. The reception otherwise was excellent. We are making the same offer to our Torrance employees this month.

INVENTORIES

Projected inventory reduction of over one million dollars in the current quarter will be realized by March 31st. While our present policy of expanded consigned stocks and heavier finished stocks to provide better service to customers will mean our carrying somewhat higher inventories than will show at the end of the year we believe it good policy to eliminate the band of 40 cents copper before March 31st.

WORKING CAPITAL

Our working capital should show an increase of over one million dollars over the previous year. We will pay off our $1,000,000 of short-term loan before the end of the year and will have reduced our long-term debt by $460,000 in the current year.

PRICES

Prices for all poundage products have been reduced with each producers' reduction in price of copper. Reduced volume in insulated products accelerated competitive granting of additional discounts. Some of the worst offenders with extensive discounts have recently published new policies, which, if followed and considering copper cost reduction, should bring margins more nearly in line with December and early January levels.

Our prices for Rigid Conduit are being increased this week to reflect recent increased steel and labor costs.

RENEGOTIATION

We have agreed with the New York Renegotiation Board covering fiscal year ended March 31, 1953, net cash affect of which is approximately $52,000, for which we had ample provision in our tax reserve. This determination was somewhat higher than we had hoped. Mr. Sarles was successful in having them agree to consider to handle the years 1954 and 1955 jointly, so that we should be able to include termination expenses in 1955 and 1956 to offset what they may consider excessive profits in 1954. We believe our reserve should

[fol. 5182]

ROME CABLE CORPORATION

RENEGOTIATION - Cont'd.

cover their determinations. It must be remembered that we still have to clear Washington on the above findings.

TAX REFUND

The Internal Revenue Code for 1954 presented an opportunity for a different handling of property taxes. Working with our accountants, Ernst & Ernst, our Comptroller's Department has filed claims for refund covering fiscal years back to March 31, 1952 which in the aggregate should give us a refund of $109,198 plus approximately $30,000 in interest. Local representative has approved the refund and it remains now to get further executive action from the Bureau

DIVIDENDS

I recommend payment of Dividend No. 72 at the rate of 35 cents per share to share owners of record March 18th, payable March 28, 1957. I also recommend payment of cash dividend to employees on the same date at 17-1/2 cents per participating unit, and that a contribution of an additional one-third of that amount be added to the Rome Cable Employee Profit-Sharing Trust Fund.

A 5 per cent stock dividend to share owners of record December 14, 1956 was distributed on January 4, 1957.

EXECUTIVE BONUS

We made payment of $175,000 on current year executive bonus in November. On the basis of projected earnings I recommend approval of an additional disbursement of $125,000 to those members and in the percentages authorized at the last June Board Meeting.

PROFIT-SHARING TRUST

As of the first of March the Profit-Sharing Trust has a book value of $83,800, market value $91,400 or an appreciation of 9%. It has a yield on book value of 4.76%. Approximately $14,000 more will be added to the fund on March 28th.

PENSION

On March 1st we had 409 employees covered by Pension Plan started in 1944 with Bankers Life Company of Iowa. As of now 11 employees are currently receiving pensions under this Plan.

Under the Pension Plan started August 1, 1955 we now have 62 people drawing pensions. We have paid Massachusetts Mutual $147,000 which completes our commitment for the current year. We are getting 3.75% interest on this money. In the Trust handled by J.P. Morgan & Co. Incorporated we have securities with a book and market value of $334,000, with a current yield of 4.08%. I believe we should accrue $300,000 for payment to the bank trust fund some time prior to June 15th, which is in keeping with our plan inaugurated last year to get maximum tax amortization and clear up back service payments in eleven years.

[fol. 5183]

ROME CABLE CORPORATION

ROME CABLE FOUNDATION, INC.

At the last Directors' Meeting we voted Rome Cable stock and cash in amount of $40,000 to the Foundation. An additional $35,000 will have been accrued by March 31st on our books. I recommend that at least this $35,000 be given with possible consideration for an added contribution.

As of March 1st the Foundation had assets having a market value of $285,000 with an estimated annual income of $12,000. Expected disbursements before the end of their fiscal year will total $6500. and preliminary budget for the new year will total $40,000.

SALES BUDGET FOR FISCAL YEAR 1957

In accordance with past practice we have prepared an estimated sales budget for the fiscal year starting April 1, 1957. This shows total dollar expectancy of $53,000,000, which is up about 2% from the current year. Overall quantity increase, however, is expected to show an increase of 7%. We are expecting profits, however, to show an increase of 14%.

CAPITAL EXPENDITURES

Total capital expenditures for the current fiscal year will approximate $800,000. Sale of one of the Properzi units and other sales reduced cash outlay by approximately $100,000, compared with depreciation and amortization for the year of $768,000. We charged operations with sale of $67,000 of obsolete equipment. Disposals of other fully depreciated or obsolete equipment will bring gross additions therefore to approximately $500,000.

At the last meeting we informally approved $500,000 for Rome and Torrance, exclusive of the new laboratory. Their new requests for the next year total $482,000 for Rome and $90,000 for Torrance with a carry-over of $400,000 from prior year approvals. This would bring total carry-over and requests to $972,000, of which it is estimated approximately $250,000 would be carried as a cash cost to fiscal 1958. With an expected cost of $425,000 for the laboratory this would mean potential cash needs of approximately $1,150,000 which deserves considerable discussion in the light of the above sales budget and estimated profits for the new fiscal year. It also points up the importance of consideration of possible other means for financing research and development laboratory, as will be discussed later.

On the basis of the above figures I recommend that we give Rome approval for $250,000 and Torrance for $50,000, with a further review in the light of conditions at our May and/or June Directors' Meetings.

The original 1955 plant rearrangement program is reasonably complete, with the exception of receiving department and basement operations of synthetic extrusion. New plastic mixing was put in operation during the current quarter with excellent results and is operating at a $50,000 per year saving. Major items still to be delivered in

[fol. 5184]

ROME CABLE CORPORATION

CAPITAL EXPENDITURES - Cont'd.

1955-56 program are bull block and enameling machine. We expect the bull block to be in operation by June 1957 and the enameling equipment by May 1957.

ADVERTISING BUDGET

In the current year it is expected that we will have spent approximately $240,000 for advertising against a budget of $262,000. Our Sales Department with our Agents and Advertising Dept. proposed a budget for the new year of $340,000 which total figure has been incorporated in our total expense budget for the new year. Cost of space has increased $32,000 alone. A sizable amount of the increased budget comes in the field of public relations, on which expenditures cannot be made until the latter part of the year. I therefore recommend that we approve a budget of $275,000 for the new year and consider how much additional we may want to give them at the June Board meeting. I am well pleased with the full program as submitted and hope we can give full approval at the June meeting.

RESEARCH & DEVELOPMENT

At the last meeting we tentatively approved the sum of $350,000 for the construction of a new laboratory. Since that time we have engaged the firm of Charles Butler & Associates to act as architects and consultants with our organization. There is on view here today an artist's conception of the proposed building, which has pleased all of us who have seen it.

Preliminary estimates indicate the cost will run approximately $425,000 for approximately 26,000 sq. ft. of floor space, 7000 ft. of which is in the basement the larger part of which will be for pilot plant purposes. I recommend tentative approval of the revised estimate of $425,000, pending actual bids. If we can act promptly completion should be sometime in November.

For some time past our Secretary has been checking with our counsel and auditors on possibility of financing the new laboratory, either through the Foundation and Pension Trust or Foundation and some other financing agency, such as an insurance company, on security of a long-term lease of the property to Rome Cable Corporation. A special report will be presented to the meeting outlining all of the details and I hope we can have a full discussion at the meeting and determine on a program of procedure.

In connection with the new laboratory we must pursue vigorously the reclassification of present personnel and secure three top men in the fields that Dr. Schatzel needs to start his new program.

[fol. 5185]

ROME CABLE CORPORATION

ORGANIZATIONAL CHANGES

Since Stuart Barrett's death the Comptroller's Department assumed responsibility for much of his work. In the interest of good organization and because of the rapidly expanding work involved in some of the fields it was determined that such items as taxes, pensions, employee dividends, profit-sharing trust, stock purchase plan, salary administration, insurance and Foundation matters should properly come under the Treasurer's jurisdiction. Therefore, effective March 1st Donald R. Fraser, Assistant Comptroller, with several other employees previously handling the above programs were transferred to the Treasurer's department. This will relieve our Comptroller's Department of considerable detail and also place the above functions where they more properly belong in the Treasurer's department.

NEW YORK STOCK EXCHANGE

In the belief that we now have the proper qualifications I recommend we pursue the matter of listing on the New York Stock Exchange some time after the issuance of our next annual report.

T. J. COPE, INC.

In December there was called to our attention that a company by the name of T. J. Cope, Inc. manufacturers of cable accessories, troughs and racks, was for sale. Since that time we have had several of our officials meet with their people and expect to have some figures to review at the meeting on Thursday. The principal owner has died and the company is now being run by trustees who are anxious to sell. Our sales, engineering and manufacturing people speak well of this company's reputation and their organization.

We had a meeting with one of the Trustees, who is also their auditor, the son of the former owner, and the General Manager on Wednesday, March 6th, reviewing their financial figures and discussing policies and methods of operation, which will be reported on for discussion and action at the meeting.

B. F. GOODRICH CO.

Earlier in the year we received a report from B. F. Goodrich Co. covering a new type of conduit made with Geon. We understand that we are the only conduit manufacturer to which they have brought this detailed report. We all felt it had enough interest to cause us to have certain tests run at Torrance and Rome, and certain investigations made with the Underwriters and checks on the cost data furnished. This might prove an interesting product addition to Torrance, where we feel increased load would produce excellent returns.

[fol. 5186]

ROME CABLE CORPORATION

GENERAL

The final quarter of the current fiscal year will be disappointing from an earnings and sales volume standpoint. However, elsewhere in the report is the projected level of operations for the new fiscal year which we feel is reasonable of attainment despite the current situation.

We continue to receive inquiries as to our willingness to sell or diversify, or expand, in other directions and all of such inquiries of merit are carefully checked and appraised by our staff. Certain announcements, and some rumored acquisition of presently operated units in the wire industry by large aluminum and copper producing units are naturally going to affect our industry and must be carefully appraised. We still believe that our ideal method of expansion would be acquisition or merger with other strong independents to broaden our line.

Respectfully submitted,

H. T. Dyett

H. T. Dyett, Chairman of the Board

[fol. 5187]

E.R's approved since last meeting of the Board (Nov. 29, 1956):

	E.R. No.	Description	Amount	
ROME	1796	Materials and labor to construct building between Bldgs. 1 and 12	$35,000	
	1817	Purchase and install one metal enclosed 2300 volt gang operated three pole load break switch for installation on power mezzanine in Bldg. #20	2,500	
	1818	Purchase and install a three stand flat rolling machine with necessary edging rolls and two takeups	50,000	
	1819	Supply materials and labor to construct an enclosed stairwell in Bldg. 16	10,000	
	1820	Purchase a Model 1938 Addressograph Machine	3,200	
	1821	Purchase one Executive Electric Battery Runabout	1,000	
	1822	Purchase Clark Telescopic Fork Lift Truck	7,150	
	1823	Purchase 4-wheel drive Jeep	2,550	
	1824	Purchase one Model Multigraph Duplicator	2,050	
	1825	Purchase equipment from Army Signal Corps Supply Agency now in our plant and formerly used in Spiral Four Production	2,090	
	1826	Purchase and install an electrically heated oven for cleaning extrusion tools	1,000	
	1827	Purchase and install 42" telephone cable twister	45,000	
	1828	Purchase and install two 20" Cord Twisters	30,000	
	1829	Purchase and install traversing reel takeup	7,500	
	1830	Purchase and install semi-automatic welder	7,500	
	1831	Purchase portable 500# capacity floor scale	900	
	1832	Purchase a small Universal Grinder	8,500	
	1833	Purchase one Weber electric vacuum oven	400	
	1834	Purchase an ice storage cabinet	240	
	1835	Purchase 1 Model 3038-T Mettler B-5 Analytical Balance	5,980	
				$222,500

[fol. 5188]

E.R. No.	Description	Amount	
TORRANCE			
C-274	Purchase 2 Modern Cut-off machines	$ 1,890	
C-275	Purchase Automatic Marking Machines, Extra Reservoirs and Recording Die Rolls	13,400	
C-276	Purchase material and fabricate thread brushing machine for Hot Dip.	7,213	$22,503

Additional E.R's approved:

E.R. No.	Description	Amount	
ROME			
1741-C	Over-expenditure, charged to Misc. Account of Plant Engineering and Maintenance	$ 5,120	
1799-B	Additional appropriation steel tanks	6,000	
1790-A	Additional on construction of addition to Bldg. #20	5,920	$17,040
TORRANCE			
C-271A	Additional costs to installation of 2" black pipe By-Pass Line from Propane Tank to Boiler House	$ 330	$ 330

[fol. 5189] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 129

Confidential

A. D. R. Fraser & H. T. Dyett
J. H. Dyett
March 11, 1957
Revere

Dear Ross and Dad:

This afternoon Rudy, Charlie and I had discussions with Louis Glesmann, Harold Wilson and Ed Barnard on the subject of buying aluminum pig from them.

Olin-Revere expects to be in production in late 1957, but Revere is anxious to make lasting connections with several outlets prior to that time. Evidently they have aluminum on contract from other sources which they can spare until such time as their own Ohio property is ready to deliver which would be some time in the first half of 1958 with full production in late 1958. G.C.C. evidently is trying a new Kaiser aluminum specification pig shortly, and we should get the results of this run. We are also expecting to get 100,000 of this new material.

They made it quite plain that they had been quite worried about policies of the integrated companies. I said that this had been also foremost in our minds and that integration was a very serious problem to the independents. They stated Revere did not expect to go into the wire business. There was no indication that they had heard the rumors which we have, but it is probably natural that they wouldn't divulge anything.

One very important thing that came out of the meeting was that Olin-Revere was being set up as a non-profit organization and that Revere would receive its metal at cost. I wonder if this would be true of our southern friends. This provides very serious food for thought.

In speaking of the future I said that we would give them every consideration owing to our very close relationship with Revere. However, we could not lose sight of the fact that Kaiser had helped us during very tough times and

that any switch on their contracts from delivery to Revere to delivery to Rome Cable would be known by Kaiser and we wondered how they would react to this. We made it quite clear that although we were optimistic on the future of aluminum that the policies of the integrated companies would determine to an appreciable extent the rate of our growth in this field. Mr. Wilson stated that they wished to enter into five year contracts. I gave him the history of how we had avoided these in the past and anticipated doing it in the future. Not knowing the policies of the aluminum companies over the next few years we are in no position to tie ourselves up in this manner. Louis Glesmann stated that he was sure they could arrange something that would be satisfactory to both parties.

It was left that we would have further discussions in May or June, but I gave no indication that we could place any business at that time. It was a very friendly meeting and should be considered in the nature of purely exploratory. We gave Mr. Wilson our specifications.

Indications were that Revere wished to sell up to 15,000 tons of their 60,000 ton allotment from Olin-Revere thinking that other aluminum suppliers could take care of them for anything above 45,000 tons a year when excess demands required.

Jack.

JHD:AS

[fol. 5190] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 130

To: All Salesmen
From: D. H. Thayer—Rome
Date: March 29, 1957
Subject: T. J. Cope, Inc.

I am sure you will be interested to learn that, as of Monday, April 1, we have bought the plant equipment and other assets of T. J. Cope, Incorporated, Collegeville, Pennsylvania. Operations will remain in Collegeville and will be conducted under the name, T. J. Cope Division, Rome Cable Corporation.

We make this announcement with enthusiasm for in this further diversification of our product line we also broaden our service to the electrical industry, particularly with respect to the utility and industrial markets.

As many of you know, Cope has been a pioneer and leader in the development and manufacture of steel cable troughs, trays and racks along with other related products. Use of these items is becoming more widespread with the increased utilization of high voltage cables and promotion of interlocked armor construction. We feel that the sales possibilities for Cope products are very promising and the Cope name enjoys an excellent reputation in the trade.

While we take over the Cope organization on April 1, there will continue to be many problems connected with the integration of its functions with our own, particularly as they may influence sales policies. As soon as these can be resolved you will be fully advised.

Presently, Cope products are sold nationally through appointed agents. For your information a list of such agents is attached. No change in this set-up is contemplated for the moment but it is a matter that will be given thorough study. I believe you can appreciate, also, that there will be many problems of distribution, warehousing and sales policy to be clarified for smooth functioning. In the meantime, we wish we might have your thoughts and specifically request that all District Managers let us have their suggestions or recommendations.

We wish to cooperate fully with the present Cope sales organization. We should lose no opportunity to promote the sale of Cope products. A letter of announcement, as per the attached copy, is being mailed to our customers and it is suggested that you acquaint yourself with their requirements for cable troughs and trays.

If you are not already acquainted, please make a point of knowing the Cope representative in your area toward the end of working with him whenever possible.

Very truly yours, D. H. T.

DHT:rer

Attachment

[fol. 5191] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 132

ROME CABLE
CORPORATION

ROME, N.Y.

REPORT SUBMITTED TO THE BOARD OF DIRECTORS
OF ROME CABLE CORPORATION AT THEIR MEETING
MARCH 4, 1958

I present record of sales and earnings after taxes by fiscal years from 1937 to date, and by quarters for the current year, the month of January and estimates for February and March:

Fiscal Year Ended	Net Sales			Earnings
March 31, 1937	$ 1,798,092			$ 1,616
March 31, 1938	4,957,103			71,027
March 31, 1939	5,370,665			245,036
March 31, 1940	6,080,902			297,736
March 31, 1941	9,465,451			431,501
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March 31, 1950	19,602,984			302,209)
		Plus: Transfer from contingency reserve		150,000)
				452,209
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March 31, 1956	56,996,682			2,023,070
March 31, 1957	52,790,055			2,255,819
April-June Quarter	13,420,000			351,000
July-September Quarter	11,009,000			352,000
October-December Quarter	9,810,000			228,000
TOTAL NINE MONTHS	32,239,000			931,000
January 1958	3,209,000			56,000
February (Est.)	2,483,000			(58,000)
March (Est.)	2,748,000			(46,000)
QUARTER TOTAL	8,440,000			(48,000)
TOTAL FISCAL YEAR (EST.)	$ 40,679,000			$ 883,000

[fol. 5192]

ROME CABLE CORPORATION

From the ten months comparison with the same period a year ago Rome plant profits dropped over $1,100,000, approximately one-half of which is due to decreased volume, most of the rest is due to reduced prices between the two periods, mainly on construction wire items.

The current quarter has continued the downtrend in sales, particularly at Rome and mid-February additional 12-1/2% price reductions is the main reason for the loss of $48,000 (8¢ per share) recorded for the quarter. Projected profit break-down for the current year for the three plants is -Torrance $449,000, Rome $361,000, Cope $73,000, a total of $883,000, or $1.58 per share.

With the rapid changes in volume and the drasti c affect of the sizable price reductions it is almost impossible to accurately predict earnings.

SALES AND ORDERS

The breakdown of sales before deduction for discount and freight from April to February, with February estimated, are as follows:

	April 1957 Feb. 1958*	April 1956 Feb. 1957	% Increase or (Decrease)
Rods	$ 4,760,000	$ 5,392,000	(11.7)
Bare	4,428,000	7,463,000	(40.7)
Weatherproof	1,318,000	2,293,000	(42.5)
Magnet	1,920,000	3,461,000	(44.5)
Rubber Covered	15,116,000	20,553,000	(26.5)
Aluminum	3,406,000	4,889,000	(30.3)
TOTAL ROME	30,948,000	44,051,000	(29.8)
EMT	2,411,000	2,466,000	(2.2)
Industube	519,000	486,000	6.8
Rigid	4,232,000	3,450,000	22.7
TOTAL TORRANCE	7,162,000	6,402,000	11.9
COPE	1,905,000	-	-
GRAND TOTAL	$40,015,000	$ 50,453,000	(20.7)

* Preliminary

For the fiscal year our total sales are estimated at approximately $43,000,000 compared with $55,000,000 a year ago, or a decline of 22%. Thirty-one per cent in Rome and an increase of 6% in Torrance.

On a quantity basis, using copper and aluminum, at Rome, we show an expected 18% drop between the two years. At Torrance a 2% drop in steel usage.

[fol. 5193]
ROME CABLE CORPORATION

SALES AND ORDERS -Cont'd.

While the final total for incoming orders on copper products is not completed for February the total looks as if it will exceed January by about 5% and be the best total since November. We are predicting another 5% increase in March over February.

Incoming orders for Aluminum products is off slightly in February.

Torrance showed expected drop from inflated January levels but should show at least 10% better in March than February.

Cope expects to be better by about 10% than February.

BACKLOG OF ORDERS		Value
February 1, 1958	Rome-Copper Products	$ 1,757,000
	Aluminum	139,000
	Torrance -EMT & Industube	84,000
	Rigid	42,000
		$ 2,022,000
August 31, 1957	Rome-Copper Products	$ 2,453,000
	Aluminum	415,000
	Torrance -EMT & Industube	87,000
	Rigid	20,000
		$ 2,975,000
February 8, 1957	Rome-Copper Products	$ 2,897,000
	Aluminum	513,000
	Torrance -EMT & Industube	48,000
	Rigid	177,000
		$ 3,635,500

The above figures in dicate practical elimination of any backlog. With continued weakness in the copper market and industry generally, customer purchasing is largely on a near-term basis which requires sizable stocks to service and adds to the complications of manufacturing with a reduced force where prompt service is the means of getting an order. This obviously adds to the cost of production.

RAW MATERIAL

All the materials we use continue in plentiful supply although most of the world's copper producers have announced cutbacks in production, the United States Copper Association figures indicate that to date this has been talk rather than action. Until supply, which has exceeded demand for two years, approaches demand, we feel that copper prices will remain at depressed levels.

Copper product sales by fabricators in January dropped to 57,000 tons, a reduction of 35,000 tons from December and by far the lowest month in many years.

[fol. 5194]

ROME CABLE CORPORATION

PAYROLL STATISTICS

	Week Ending	No. Emp.	Total Payroll	Avg. Wkly. Wage	Avg. Hrs. P/Wk.	No. Salaried Employees
ROME	2/10/57	M 864 F 30 894	$ 80,952	$ 90.55	40.3	457
	8/18/57	M 812 F 24 836	$ 75,111	$ 89.85	39.8 *	476
	2/23/58	M 665 F 30 695	$ 63,412	$ 91.24	39.8 **	456
TORRANCE	2/16/57	135	$ 13,830	$ 102.45	40.4	48
	8/1857	135	13,983	99.81	39.8	54
	2/16/58	115	12,413	107.05	40.0	55
COPE	4/20/57	57	$ 4,176	$ 73.26	40.3	34
	8/24/57	62	4,741	76.47	41.9	34
	2/22/58	54	3,750	69.44	37.0	34

* Includes 13 switched from hourly to salaried, 7 students and 13 summer help.
** Includes 13 switched from hourly to salaried and 7 students.

From the above you will note that the number of hourly workers has been reduced approximately 200 at the Rome plant, while the number of salaried workers remains approximately the same. Twenty of the additions to the Rome salaried payroll are due to transfers from hourly workers and the seven new students we have in our Student Course this year.

This subject has been given a great deal of study in Rome and plans are already laid for the reduction of approximately 29 people in the current year due to retirement, resignations and contemplated reduction in force. Further studies on ways and means of reducing this will be discussed at the meeting.

[fol. 5195]

ROME CABLE CORPORATION

LABOR

We signed a contract with the Steelworkers representing our production people at Torrance running to October 18, 1959, which granted 7 cents per hour increase on December 16, 1957 and 7 cents on October 13, 1958. We also granted an eighth paid holiday and extended the same Health Care Plan that we had at Rome. This contract contains nothing other than what we had granted in Rome contract, and is the same as was voluntarily granted in December of 1956 before we had a Union in Rome.

We have had more than our growing pains in working out details with the Union at Rome. They have had a sizable number of petty greviances which have regrettably taken a great deal of our top manufacturing people's time. I believe, however, most of it has been necessary to get across our position and we were ready to go to arbitration to establish our viewpoint on seniority in lay offs. Present indications are that the Union leaders are backing down in their claims owing to evidences of discontent among the members. The sizable number of layoffs in the last three months necessitating "bumping" of jobs has added considerably to our production problems.

INVENTORIES

In January our inventories were reduced by approximately $950,000 from December. We expect to effect an additional reduction of $200,000 to $300,000 before the end of the fiscal year.

T.J. COPE DIVISION

Our Cope Division has had a downturn in sales in the last few months. This, plus inventory adjustments necessary after the final settlement will cut into profits to the extent of about $25,000 in the current quarter and end the year at an estimated $73,000. Total sales for the year will run just under two million dollars. The organization is doing an excellent job and is confident that we will hit two and a half million sales in the new fiscal year They have just brought out a new catalogue, which is an excellent sales help.

They are working on two new products, a bus box and a Geon wireway. We hope these will be available early in the new year.

Allan Ziegler is very anxious to have us get a larger tract of land for future expansion, as his present location is very limited. I think this should be deferred for the time being.

TORRANCE

Torrance will have a record year in both sales and earnings. They are right on schedule in their work on the equipment and installation to produce 2-1/2 to 4" rigid conduit. They expect to have this available by October 1st. Fortunately, prices have been quite stable in the conduit business, and are improving in the Industube, after a very competitive period last Fall.

[fol. 5196]

ROME CABLE CORPORATION

PRICES

As previously mentioned price cuts mainly in construction wires and low voltage power cables cost us almost half a million dollars, compared to the 1956 similar period. Another seventy-five to one hundred thousand dollars can be added to this in February and March. The wire industry is a sorry contradiction to labor's contention that manufacturers move prices up with each wage increase. Despite an 80% rise in wage rates from the end of World War II we are today selling many items considerably below prices in effect at that time. We have a great deal of evidence showing improved manufacturing efficiency in reduced costs but even these cannot keep pace with such unrealistic pricing methods.

COST REDUCTIONS

When our capital equipment program of $427,000 at Rome is completed it should show savings of approximately $12,000 per month. One-third of these have already been accomplished and it will rise to one-half before the end of the fiscal year. Industrial engineering savings through new incentive rates will total approximately $40,000 per year. We have not been able to fully realize the estimated savings from our indirect labor incentive, owing to lowered volume and changes in personnel due to layoffs, so that it is a bit more difficult to estimate actual savings during the current period. They should exceed $100,000 per year in more normal production periods.

With the closing of our Cafeteria by May or June and substituting automatic dispensers we will save an estimated $50,000 to $80,000 per year.

We have just reorganized our Cost Reduction Committee and our latest estimate, which I have in detailed form, projects actual items which will generate cost reductions in Rome running $200,000 to $250,000 annually.

INDUSTRY STATISTICS

From the various industry statistics which we have available to us we can tell you that use of copper by wire mills was off 10% compared to 1956. Our own consumption of copper bolstered by heavier toll production was also off 10%. Because of our efforts to "hold the line" on some price sheet items we lost some ground in our proportion of construction wire and low voltage power cable products, and thin wall conduit. We maintained our position, or bettered it, in magnet wire, cords, molded cords, and cables, plastic control cables, and had a sizable increase in our proportion of rigid conduit. Despite the most unrealistic type of competition by some of the large aluminum producers our proportionate loss in the manufacture of our own aluminum insulated wire did not suffer as badly as we feared. With ALCOA making all their own plastic wire in the past year our total volume of production on this item, of course, was much curtailed.

[fol. 5197]

ROME CABLE CORPORATION

SALES BUDGET & EARNINGS PROJECTION FOR FISCAL 1958

The original sales budget for fiscal '58, prepared in January, showed a 10% increase over estimated '57 on Rome products, 8% on Torrance and 25% on Copo. I cut this estimate 10% right down the line, which brought overall volume estimate to approximately the 1957 level with lower activity in the early part of the year and heavier in the latter half of our fiscal year. Taking this figure and using January sales prices and various cost reductions mentioned elsewhere in this report, produced a profit estimate of approximately $1,100,000 or about $2.00 per share. At construction wire prices 7-1/2% below January for the year the result would be approximately $850,000, or $1.50 per share. Taking the latest reduction of 12-1/2% the estimate would run approximately $625,000, or $1.10 per share. We must not lose sight of the fact that on the basis of past history in this industry further price reductions, and our policy to really meet competition could definitely affect these estimates. On the other hand history has demonstrated that such periods of most unrealistic prices have been relatively short lived.

CAPITAL EXPENDITURES

We have been able to save approximately $300,000 on the original estimate of required capital expenditures for the current fiscal year. As matters stand now we expect to spend $1,517,500 cash outlay in fiscal 1957. We will carry-over $498,500 and approval is requested for $311,500 for the new fiscal year. This would bring, without consideration of any carry-overs into the next fiscal year, total expected cash outlay in fiscal 1958 of $810,000. Projected depreciation for that year is $966,000. A table showing the planned distribution of expenditures, carry-overs and 1958 requests is as follows:

	1957 Expenditures	Carry-overs	Requested 1958
Rome	$ 1,274,000	$ 228,000	$ 140,000
Torrance	223,000	257,000	150,000
Copo	20,500	13,500	21,500
	$ 1,517,500	$ 498,500	$ 311,500

RESEARCH

Our laboratory building is about 90% completed and it is hoped that we will move early in April. Total cost including consulting services will be $675,000. The equipment originally estimated at $100,000 is expected to be covered with a total of $75,000, of which all but $13,000 will be in current year approvals.

We are encountering difficulties in locating a man for Assistant Research Director. Most of the desirable candidates are already well settled and are loath to change. Dr. Schatzel believes that progress will be better when we can actually show them the building. We feel we have a candidate for the mechanical engineer needed, possibly within our own organization.

[fol. 5198]

ROME CABLE CORPORATION

RESEARCH - Cont'd.

We are studying appropriate program for formal opening the new Research Center with program commensurate to the current economic situation, without, however, losing sight of the great potential value that a dignified proper opening would, we believe, pay dividends in the future.

NEW PRODUCTS AND DEVELOPMENTS

Our enamelled rectangular magnet wire is now in the hands of some customers for tests. It was a necessary addition to our line if we were to maintain our position with our customers in the heavy magnet wire field. We are pleased with the results from our new flat rolling equipment. Production coming off that equipment for the Simplex order for use on the trans-Atlantic cable is adjudged the best we have ever produced.

While we have not had any major new products added to our insulated wire and cable line during the past year we have made noteworthy strides in instrumentation cables for computers and missile launchings. We have been asked by Haseltine, a sub-contractor for IBM, to add to the sizable volume we have already been producing for them. The original request covered some Teflon cables and our engineering and research department has developed a new specification and made a sample, using foam polyethylene. We believe that this new construction can be profitable.

In the current fiscal year we have sold over $600,000 of instrumentation cable through January. I have been well pleased with the high percentage of orders we are getting on quotations made. I wish to commend Engineering, Research, Production, Accounting and Sales for the fine cooperative effort on these products. With heavier defense expenditures in this field our sales volume should continue to grow, and our new cabling capacity planned two years ago will come in to excellent use when it is installed in the latter part of the next quarter.

We are also working with certain other customers on special projects which could add considerably to our volume. Our new research facilities will certainly be very helpful on these programs, and our timing in having them available is none too soon.

DIVIDENDS

Conditions have changed rapidly since our last meeting and our earnings estimate has been reduced. Even with all of the uncertainties it seems probable that we will finally end up with an amount slightly in excess of the $1.40 per year rate. Our dividend policy has always been on a conservative basis and in the two prior periods where we only earned our dividend or slightly more, in fiscal 1949 and 1954, we paid at the then regular rate. Estimates of current and future earnings, as well as cash flow, will be presented for the Directors' consideration in determining the declaration at this time. Whatever declaration is made should also be followed through as far as the employee

[fol. 6199]

ROME CABLE CORPORATION

DIVIDENDS - Cont'd.

dividend and profit sharing trust are concerned. I believe there is merit in considering and even announcing to the employees a potential modification by the time of the next dividend action. We will have discussion on that and the legal reasons for such, if taken, will be presented.

ADVERTISING BUDGET

We cutback our advertising budget for the current year by $55,000 in Rome but Cope exceeded their budget by $20,000, owing to the catalogue price exceeding estimates. The Advertising Department has prepared an excellent budget and requested $366,000, $293,000 of which is for Rome and Torrance. These budgets are somewhat lower than submitted by our agencies. At this time I believe we should limit our total to $300,000.

I feel our newly reorganized Advertising Department has done an excellent job in the past year.

PENSIONS

Forty-nine additional people have been added to the salaried pension plan insured with Bankers Life and there are now 444 people covered under this plan, with 12 drawing pensions and 69 drawing pensions under our latest plan from Massachusetts Mutual.

Our estimates of earnings included only payment of $350,000 on Massachusetts Mutual-J.P. Morgan, Incorporated Plan rather than $481,000 which would give us eleven years payment on back services and would save us $861,000 for interest charges versus the thirty year refunding covered by payment of only $350,000. It is recommended that payment of $200,000 be made to J.P. Morgan & Co. Incorporated for the supplemental pension trust before March 31 and that power be given to the Executive Committee for review of any additional payment depending on year-end results and the possible tax advantages, without charging the full amount to current year's earnings. We get 3-3/4% on money deposited with Massachusetts Mutual. Our pension trust had a book value of $649,000 at December 31, 1957 and a market value of $621,000, with an estimated annual return of approximately $28,000, or 4.30%.

PROFIT SHARING TRUST

Our Profit Sharing Trust had a book value of $133,000 at December 31, 1957, market value of $130,000 and annual return of approximately $7,000 and yield at book value of 5.32%.

[fol. 5200]

ROME CABLE CORPORATION

ROME CABLE FOUNDATION, INC.

At the last meeting we approved $25,000 contribution to the Foundation. Earnings figures presented include another $25,000 grant before March 31st. I recommend that we approve another $25,000 to the Foundation for the current fiscal year, as their cash balance will be nearly depleted by March 31st.

As of February 28, 1958 our investment portfolio had a cost value of $298,000 and market of $275,000 with an annual income of approximately $17,000, or about 5.7%.

EXECUTIVE BONUS

With predicted earnings the executive bonus will be either nothing or probably not more than $30,000 to $50,000 compared to $406,000 a year ago. This represents a compensation loss of approximately 40% to all the members on a full participation basis and one-half that to those on an half participation basis. This further brings out that the modification that we made two years ago was not adequate and I believe somewhat unfair from a tax angle to the participants, as well as endangering morale. I believe that study should be started which could take into consideration some plan of deferred payments or spread payments on high years over an extended period, as some companies do, in order to make our rates of compensation compare more favorably at all times with others in the industry.

RENEGOTIATION

We have at last been advised by the New York office of the Renegotiation Board that they are willing to make settlement for the years ended March 31, 1954 and March 31, 1955 for a gross amount of $250,000, net after all tax corrections of approximately $48,000. This, if approved by Washington would give us a higher rate of earnings return in these two years than in the previous years which we have closed. Their offer was made early in February and we should hear from Washington prior to the publishing of our annual report.

TAX REFUNDS

We have been negotiating with the Syracuse Internal Revenue Office for a refund of $109,000 on certain past years. They have conceded $33,000 and our auditors feel that the full $109,000 will be allowed. The Syracuse office has written to Washington for a ruling.

[fol. 5201]

ROME CABLE CORPORATION

EXPANSION AND ACQUISITIONS

Discussions with Alwalt were delayed by them until they could take an inventory and prepare new financial data covering the first nine months of operations under the new incorporation, with separate manufacturing and selling units. These figures have just been received with no time to analyze them as I write this report. A letter from their attorney to Walter Danielson, our attorney in Los Angeles, talked of a figure of $1,500,000 as a purchase price, which on the basis of previous financial data is out of all reason. I will discuss this matter at the meeting.

We also received from Manufacturers Trust an inquiry as to whether we might be interested in acquiring William Brand Company of Connecticut. We do not have all of the data that we requested on this company, but a preliminary review of what we do have does not stir up too much interest in our Executive Committee. This will also be discussed at the meeting.

Hardly a week goes by but what we receive some kind of letter on this subject. At our "Whither Goest Thou?" meeting I asked Jack Dyett to review our studies and bring them up-to-date on several companies in the industry that we have discussed from time to time. At the same meeting Charlie Ellis was asked to prepare estimates for a unit to produce certain plastic wires at another location, with Glenn Rolston providing a list of favorite locations from market viewpoint. A study has also been asked and started on possible production of certain instrumentation wires on the West Coast.

"WHITHER GOEST THOU?"

Our annual "Whither Goest Thou?" meeting was held about two weeks ago, and in addition to a number of the subjects previously covered in this report, we had full and frank discussions, and assignment of responsibility where needed, on competition, sales policy, consigned stocks, communications, new products, new processes, new equipment, budgets, etc. I feel it was a most constructive and decision making meeting.

ORGANIZATIONAL AUDIT

Two weeks ago we also had our annual organizational audit meeting. I feel that overall our organization today is stronger than it has been in many years, but our meeting emphasized a number of problems. Within the next five years and still more when we stretch our sights for ten years we are faced with retirement of many men who have been most influential in their contributions to the growth of our Company. Some are talking of earlier retirement.

We have a wonderful group of young men coming along in the Company. For two or three years I have urged that these young men be given greater responsibility and authority to better prepare them for their future responsibilities. Our student program has proven an effective means of adding new blood to the organization.

[fol. 3202]

ROME CABLE CORPORATION

In such times as these I hope we will not color our decisions to discourage the enthusiasm of our organization and make some of them seek elsewhere for the kind of opportunity that they expect, and, with the future of our industry we should be able to provide. I hope it is not going to be necessary to eliminate our student program for the new year. I hope also we will actively pursue getting the necessary additions to our organization in the several spots that conditions and new developments indicate are necessary.

GENERAL

This has been a long report but we felt it advisable to outline in more detail than usual some of our problems and give you an indication of what we are trying to do about them. We also hope it will form a background for decisions and policy making. These are perilous times for many companies but we still continue to have great faith in the future of the electrical industry, and the great needs of utility, equipment manufacturers, chemical, mining, oil and other industries which we serve.

Respectfully submitted,

H. T. Dyett

H. T. Dyett, Chairman of the Board

[fol. 5203]

E.R. No.	Description	Amount	
1886	Purchase and install a Pratt & Whitney gauge on flat rolling machine	$3,000	
1887	Purchase and install four gauges	3,500	
1889	Purchase 1 roller type take-up with reel ejector	2,685	
1890	Purchase and install wire preheater for plastic extruder	3,000	
1891	Purchase and install new wall hung and floor cabinets, sinks	11,700	
1895	Purchase and install one IBM Time Recorder and Relay	500	
1896	Purchase and install Thurnam-McGeoch hopper, heating and loading machine	3,500	
1897	Purchase and install two hoods and stacks over saturators in Reflex finishing machines	1,100	
1898	Purchase J&C welder for C.V. Machine	600	
1899	Purchase a Davis portable combustion analyzer	975	
1900	Purchase and install an Addison Electric Co. diameter control system for use on #4 plastic extruder	1,800	
1901	Provide stainless steel ventilation hoods over the pickle tank and hot water rinse tank in Rod Mill	12,000	
1902	Purchase and install Pratt & Whitney gauge on three strand rolling machine	3,000	
1903	Purchase 1 elec. operated plastic welding torch	150	
1904	Purchase 3 adjustable coil blocks to coil Triplex	3,150	
1905	Purchase 2 special 6" extrusion screws in CV & Tuber	3,000	
1906	Purchase and install 1 Edwards Twisting Machine	8,000	
1907	Purchase office furniture, etc. for Research Bldg.	7,000	
1908	Purchase and install metallurgical equipment in Laboratory	10,750	
1909	Purchase and install a Kingsley Wire Marking Machine	1,500	
1910	Purchase and install 2 zinc stearate applicators	3,500	
1911	Purchase and install 7 measuring machines	1,600	
1912	Purchase and install a payoff with elec. brake	1,700	
1913	Purchase and install 3 sets of stairs to CV extruders	1,500	
1914	Purchase and install a hoist, bridge and rails on #5 CV	1,250	
1915	Purchase material, machine, etc. for rolling mill	3,800	
1916	Purchase furniture for lobby and Library in new building	2,500	
1917	Purchase and install 4000 lb. capacity coil block	6,800	
1918	Purchase lined cylinder sections for Synthimal machines	4,450	
1919	Purchase and install binding head	325	
1920	Purchase and install 2 taping heads	2,250	
1921	Provide labor and material to insulate hot air duct in Rod Mill	1,800	
1922	Provide set of stairs in Bldg. #5	800	
1923	Erect concrete block enclosure in Bldg. 4	1,225	$ 114,150

[fol. 5204]

E.E. No.	Description	Amount	
TORRANCE			
C-297	Construct finish line for Rigid Conduit on Hot Dip Unit	1,910	
C-298	Install automatic thread protector applicator in Rigid Finish line	5,085	
C-300	Purchase a new Clark "Philitrue"	6,436	
C-301	Purchase and install new motor driven air compressor	16,678	
C-302	Make complete set of Tube Mill Rolls for production of 2-1/2" - 3" and 3-1/2", ½" rigid	38,720	
C-303	Fabricate and install 68 ft. of Electroplater	2,513	
C-304	Purchase and install one threader	21,230	
C-305	Purchase and install galvanizing unit for production of 2½ - 3 - 3½ and ½" rigid	177,925	
C-306	Fabricate and install Crane system	6,854	
C-307	Purchase and install overhead rolling door	1,402	
C-308	Purchase equipment and install one plate shear on tube mill	1,208	
C-309	Fabricate and install Feeding Mechanism	650	
C-310	Purchase and install 14x16 steel rolling door	780	$281,605
COFE			
F-10	Purchase Johnson Model J B and Saw	$ 719	
F-11	Purchase one Spencer Industrial Vacuum Cleaner	686	
F-9	Install a complete set pipe sprinkler system in office buildings N and N	9,500	
F-12	Purchase 5-139 jak tung trucks	489.41	
F-13	Workbenches for use in shop	918.11	$ 12,312.52
	Additional E.E's approved:		
Penn			
1894-A	Purchase additional gauges and a diamond chip sieve shaking machine and accessories	$ 2,500	
1898-A	Purchase and install 2 concentric taping heads	5,000	$ 7,500
Torrance			
C-278-B	Additional expense involved in completing new Lab	$ 300	
C-289-A	Additional expense of furniture & fixtures	475	
C-296-A	Additional expense involved in completing construction work in Maintenance Bldg.	110	$ 885
			$ 426,652.52

[fol. 5205] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 133

September 2, 1958.

Rome Cable Sales Meeting

Engineering Session

R. A. Schatzel

I want to extend greetings to everyone and to issue to you a cordial invitation to drop over and visit these new Research facilities of yours. I notice that our time is pretty short this morning, and so I will not take much time to go into any elaborate generalities but get down to the business at hand, and that is, to provide you information, and to help you do the job that Ross has outlined and that we all have before us.

The competitive picture you know better than I, and it isn't alone a picture that we control in this country—it's one that we have a pressure from many other places, and yet I feel that we have met that kind of competition in the past and that we can, and will meet it now, but you will have to make the best use of our abilities and our facilities.

Before going into those, I'd like to introduce Dr. Fuller —would you please stand. Dr. Fuller is our Consultant. You've heard about him many years he's been with us, but today he was able to make it.

As you know, we do not have a Student Training Course this year, so I don't have a group of students to introduce to you. That doesn't mean that we have abandoned the idea, we may still have some, but at the moment we don't.

During the year we have not added appreciably to our Staff. The only new addition, I believe, is Steve Jovanovitch—would you stand please. Steve has had 12 years experience in the cable industry in England and we think, will be an addition to our Product Development Dept. in the Laboratory.

[fol. 5206] Most of you have been over to visit our new Research and Engineering building, and I don't need to describe very much the building itself. Those that have not, I'm sure will be there, and we'll see that you're taken

through and told something about what is in it. One of the things that you'll notice as you come in is the display in the Lobby. We're going to have a permanent display there, and we hope both the building and what's in it, is going to be something that will be of use to you in selling our products, in selling your customers on Rome Cable. In that display that you will see over there—at the present, there's some improvements to be made, but in general it will show the products we make, the materials we use in making them, and the typical applications of them in photographs which will be above. In addition to that, we expect that we will have some outstanding products—say of the month, or the products that we have led in as the leader in the Industry, Rome Firsts. Those are not there now, but they will be as we get that display completed.

Another thing, in going through a building, it's hard to visualize just what it's for, and I'm going to try to outline that to you very briefly now.

As we said last year, our Laboratory facilities, (and we hope that this will help you with your customers), are divided up into a number of laboratories which are coordinated through our Director of Research. We hope that in each one of those, that they feel their responsibility for their own growth and their own development, and that they feel that they have a responsibility for ferreting out problems and bringing them to us, as well as for us to bring them to them.

[fol. 5207] We have a Metallurgical Department which is equipped now with a small foundry in the basement, with a unit that can hot roll, cold roll, draw, heat-treat, do the metallographic and other testing. It can do metallographic work complete from melt to the finished product on a laboratory scale. The only thing that is not complete in that, and which we do not need at the present time, is spectrographic work, and that we can get locally, and we can also get overnight in New York—so there's nothing at the moment that we lack there.

We do have some important problems because this whole thing with Ross, as outlined this morning, is one where an industry is growing in precision and control. Those are the things that are meant by Automation. Those are the things that develop a greater output per manpower hour;

those are the things that mean reduced cost and increased quality, and those are the things that we're trying to prepare for and have to do—there's no way out of it. We're going to meet competition. We're building in that direction; we have a Product Development Department which is under Mr. Duffy, and directly reporting to Mr. McCutchan, and that we're reinforcing. That is a large department, including the Electrical Laboratory itself, because you cannot do product development without evaluation, and that is the function of those two departments. I might say subdepartments of the other, and in that you will notice that we are not complete, but we have under way plans for developing equipment that will allow us on a small scale, to do taping, to do processes that we cannot do in the plant; to duplicate others that we do in the plant, and at the same time, test products developed. Such things as the great number of synthetic fibrous tapes that are coming out, we [fol. 5208] couldn't possibly use in the plant at the present time.

Another thing which we are faced with, and that is a thing that we hope to meet, is that with all these new materials that are coming out, one of the limitations placed on them by all of us and by industry generally, excepting the few that are now stepping out as leaders, is that when we bring out a new synthetic material we make it a condition that it work on our present equipment, and immediately we start modifying that new material until we have lost its real advantage in properties and have made it fit a piece of equipment which it wasn't designed to do. Materials and equipment go together; sometimes have to be designed one to fit the other. We're doing the whole problem now, by making the material fit the machines we have, and the processes we have, rather than to design new equipment, new processes to make best use of materials that are developed. That will be also part of that department, along with the Mechanical Dept. which is already in being, and which you've seen upstairs. We have also a Analytical and Control department there for approvals of new materials and development of methods which will work with this expanded Technical Superintendent's department; an Organic Chemical Laboratory, which will work not alone with suppliers, but to modify or develop Polymers and

resins, particularly needed for our own use, and with that a group which we called Instrumentation last year. I think perhaps the better name is Applied Physics, in the upstairs Laboratory, which is investigating many of these newer developments in order to see where they best fit into making a better product, improving the process or improving our methods of making them.

Those are things that are expanded; some of them are [fol. 5209] new, but when you go over I want you to see that building as a unit—not as these separate departments—because it's only through their coordination and their work together as a team, that they become useful; but to make them all conform to just one particular pattern is not going to be what you're going to see; they're going to have a blueprint of the man at the head of it.

Our Plastics and Rubber department is quite complete and, I think, will be the most versatile I know of in this industry—capable of duplicating any process that we have in the plant and of exceeding that, because we will have in that department equipment for extrusion of rubber and plastic products that at the moment we won't be able to handle in the plant. But through the work that we do there, the guidance for the handling of them in the plant and the guidance to our plant engineering for the development of similar equipment will be given.

I've mentioned the Technical Superintendent's department during the week, and I think Charlie will want to expand on that, but that department has been expanded and we have transferred a very capable man as the head of it, in Lee White whom you've met before, and I won't ask to stand now; but that department will control the day-to-day technical operations of the plant.

Another department that I want to mention which hasn't been expanded, but which has been developed further, and perhaps later in the morning discussions can come on that, and that is, the Quality Control Dept. The Quality Control Department, working closely with our plant production, is [fol. 5210] your representative, the same as the general or overall inspection is, in holding up the quality of products during process, and at the request of our Production Department and with their help they have evolved a plan of what we call "Workmanship Audit" in the department.

By regular inspection they are checking to see if machines are properly set up, that the materials are properly kept, that the workman is making his necessary checks, and so forth. Then a regular form which I can't go into with the limited time now; if you fellows are around any time and are interested in that, I'd be awfully glad to show it to you, because we believe that it is another tool in meeting this competition, and it's a tool which Rome Cable has been getting some recognition for in this particular field.

I don't need to talk about our Inspection. P. Isom has been doing an excellent job, and I think that the department is working so closely with the Quality Control Department in setting up inspection procedures, that we can be proud of it.

Now I'm not going to have too much time to touch on many of the other things that I have here, but they'll come out later. Some of the items that have come up in the year —some of the items that you fellows have been particularly interested in—are what we are doing on Triple AC Alloy to meet Kaiser competition. We've investigated that. We have had wire in here, we've endeavored to buy rods so we could draw it ourselves, but that was impossible; but we have been able to offer and are offering, the 5005 Alloy, which is an alloy that Reynolds brought out two years ago. It is also available, I believe, to Alcoa, and as far as Triple AC goes, that seems to be a pretty good answer at the present time. However, there is another new development coming in and that is, this one of Copperweld, the Alumoweld. [fol. 5211] Alumoweld is about what we talked to you several years ago, and each year during the past several years that Alcoa was developing. But Copperweld went to Battelle Memorial Institute and have developed and are offering a 30% conductivity Aluminum Clad Steel Conductor, which can be processed and drawn, and we can purchase that through Copperweld. At the present time their production is limited, but they are building a plant, and I think that sometime early next year it will be available in quantity; but samples are available right now and we'll get some information out to you in the field after we evaluate it. You do have available, 5005 Alloy, and in our estimation it is a very excellent material as a competitor to the Kaiser Triple AC.

We also had a number of questions during the year about the 62% conductivity of Kaiser and its advertising and competition. The question has come, why we don't do it. We have not been able at the moment to meet 62% conductivity on hard-drawn wire. We meet 62% conductivity on rolled rods; we can meet and do meet about 61.8% on hard-drawn wire. The question has also been asked by you —does Aluminum Co. meet it? To the best of our knowledge they do. We are working with the suppliers of aluminum to improve on the Pig that is supplied to us, and we are making progress. As we said, our rod itself does meet 62% conductivity, but not the drawn wire—we are trying to do that. However, we'd like some guidance from you as to its importance. Our own estimation of it is—it's purely a gimmick—it has no importance. The difference between 62 and 61.8% conductivity is less than the variation in dimensions that are allowed, and its effect on the opera-
[fol. 5212] tion of a line is negligible; but I do know that it is a factor in advertising, and if you have trouble with it you should let us know and we'll see that we can do to help you.

Hi-Density and Cross-Linked Polyethylene

Now the next thing that I have on my list is Hi-Density Polyethylene. In that connection there's a great deal of work being done, but you'll hear more about that I think, during our discussion. We feel that it has at the moment; a limited used. It's diffcult to remove from wire, and there is some question about some of its properties—environmental cracking, and other properties, when it's put on in certain films, but I might say this, that all that we have supplied, and the only source that we use, has none of those weaknesses, that we can find. The only weakness that it does have is its hard nature and difficult removal from wire, and it doesn't seem to have advantages other than the higher softening point and abrasion resistance.

Another development in that is what is called a cross-linked. You're hearing from that from G.E. as Vulkene. Well, we are working on that, and may have something later to tell you about it. It may become available on a license agreement, or it may become available through some of the work we're doing with another company who

are working on this product. Many of you want to know what cross-linked is, anyway. Cross-linking, if you look at this thing as a material that has molecules lined up in chains in parallel direction. Cross-linking would be a method of bonding those two chains at various points, like those two tables down through here. If you could put a spike across them, that would be a cross-linking of those parallel chains. It's the same thing as vulcanization; it's [fol. 5213] not carried out with sulphur or the same process, but it means the same thing as vulcanization—so if after it has been cross-linked, it has lost a good deal of its thermoplastic property, and has a much higher melting point and much greater toughness. Now that is one of the things which I think during the year you'll hear more of, and just wanted to assure you that we're working on it.

Spacer Cable

I have one other item that I think I'll cover in spite of the fact that we're trying to hold to a time schedule, and that is, the development of the Spacer type cable and what the situation is on Spacer type cable. When that came out we took the problem of developing a competitive material, and mainly our Electrical Lab. product development group, particularly Duffy and Marwick, came up with some ideas of designs which were tried out, and we finally hit on a design which we think has advantages, and at the same time avoids the patent of Hendrix. Now the fact that Hendrix has three patents—there's only one that we are concerned with. Hendrix Spacer has two parts, identical but in reverse, so that as you put them together they become clamped around the cable. Now that is patented and that patent is specific. Every claim in it requires that the clamp be made of two identical parts, which in reverse, form a closed clamp around the cable. Now that is patented and that patent is specific. Every claim in it requires that the clamp be made of two identical parts, which in reverse form a closed clamp around the wire. In his patent also, is a claim or claims on a system, which he calls a cable, and that includes the wire, the messenger and the clamp itself as a cable system. For a long while that stumped us, even though we had a clamp. The question was, what is the [fol. 5214] interpretation of the system, and what has

Hendrix been allowed? Does the fact that he has a patent on a cable system, including a cable clamp, mean that he has a patent on a cable system that includes every cable clamp, insulated clamp, because the use of metal cable clamps or conducting cable clamps is old, but his is specifically an insulated cable clamp; so does he have a patent which says that his patent covers a system or a cable, including insulated conductors and messenger of all designs? Our patent attorney has given us an opinion that all the Hendrix claims are limited to a cable system in which you use a clamp that has two like reversed sections only. Any other clamp that does not infringe his clamp is not covered as a system. So that we feel free now to say that we do not infringe his clamp or his system. You might ask then, why did Flowers get out of it? Well, Flowers had a clamp which also included two reverse sections and directly infringed Hendrix's Clamp. Therefore it also infringed on his system, but the question of whether we have a patent or not is still to be settled. We can't say that we have a patent—we do say that we are free, that we do not infringe Hendrix's Clamp or his claims of a system, and therefore, this will be given to you to sell. Now Glenn and I have talked about this and Glenn will outline more completely the policy on which this will be done. But essentially, as far as the construction is concerned, the system we will offer will consist of Spacers and the insulated conductors with the grommets—the messenger will be optional. Our recommendation for a type of conductor will be either aluminum or copper conductor insulated with Tree wire thicknesses of high-molecular weight Polyethylene; that's [fol. 5215] our recommendation. That is not what probably the great majority will use, because from a look over the orders, they are ordering everything from full thickness of PVC, full thickness of Hi-Density Polyethylene, full thickness of high-molecular weight Polyethylene, Butyl or Oil-base with Neoprene, and those are all ordered as the insulated conductors, and so they're all standard conductors. There's nothing special about them; they can be furnished, and yet you'll want some recommendation of a standard from us and that will be it; (Tree wire thickness of High-molecular weight Polyethylene)—yet we could furnish any of these others, and Glenn, I think, had better out-

line that to you. Now through the Cope Division we will also be able to recommend accessories for pulling-in.

Rome Cable Manual

Our Rome Cable Manual which is out now just a year and the second edition is a year old. 50% of them are out in the field—we still have 50%, and it would be helpful if you would send in as you did in the past; any comments or criticisms or suggestions. Generally those come in the first part of the offer—it doesn't come so much later.

Regarding the Spacer Cable, you will be sent a bulletin of instruction, and an instruction for installation. We'll also send you a complete Spacer of this type with the grommets, and I think that will give you all that you need for this particular purpose.

A Few Items of Industry Activity

The ASA held a conference last month to discuss the need and practicability of a National Building Code. This was sparked by H. Luce, Editor of Life. While there was strong sentiment for it, there was a great deal of opposition from powerful segments of Industry, including Labor. [fol. 5216] The chances of its formulation are not bright.

Mr. Selden, who is Chairman of the NEMA Technical Committee on Conduit is now also alternate to our Jack Edwards as a member of The Codes and Standards Committee, as well as on Code Making Panel #6. Mr. R. C. Graham continues for a third year as a Vice-President of IPCEA and who have done a great deal of important work to be later discussed. The following changes adopted or to be adopted by the Code will affect you during the year:

A. New Wire Type TBS. Thermoplastic insulated, braid covered switchboard wire rated 90°C. Approved in sizes 14 through 4/0. This product is designed to replace Type A. We have submitted and have obtained U/L listing.

B. Ozone-resistant insulation must be used on all wires rated over 2 KV. This will prohibit ordinary Type R, RW, etc. from use over 2 KV. Sizes 14 and 12 limited to 2 KV maximum—#10 limited to 4 KV and #8 to 5 KV maximum, i.e. #8 smallest size for 5 KV.

C. New wire Type SA. Silicone insulated, glass or as-

bestos covered wire rated at 90°C. for use in dry locations. For special applications can be rated at 125°C. Would be recognized in sizes 14 thru 2000 MCM.

D. Shielding of high-voltage cables will be by means of metallic shield only, no semi-conducting shields in the future.

E. NFPA Raceway Fill Investigation—Interim Amendment #110. No official action taken as yet by Code Panel. Confusion has delayed this program. May still be clarified so that recommendations of the Committee can be adopted in the 1959 Code.

[fol. 5217] F. THW—Code Panels have accepted proposal submitted by Rome, Simplex, and Plastic Wire. Will be rated 75°C. dry or wet in sizes 14 thru 500 MCM, 3/64" minimum insulation thickness. U/L expected to adopt Code recommendations.

We are aware of the fact that several of our competitors have issued specifications for High-voltage Butyl rubber compounds with requirements in excess of those of IPCEA and ASTM. We have authorized you to meet such specifications in some cases. Our compound does meet them. It is probable we also will issue such a specification in an endeavor to develop a uniform standard of this kind.

[fol. 5218] In United States District Court

Plaintiff's Exhibit 134

To: Mr. J. R. Woods
From: C. J. McMurry
Date: December 5, 1958
Subject: Knoxville Utilities Board, Knoxville, Tennessee

Dear Jack:

Gene had been pressing to see if we could not get on the approved list for KUB for aluminum bare both all aluminum and ACSR. The approval for this might have its bearing in the future becouse there is always the possibility that KUB will switch to aluminum triplex, etc. in lieu of the copper bare and weatherproof to which they are

now sticking. Gene was told that if we are on the approved list of TVA for aluminum, there would be no hesitancy on the part of KUB in putting us on the approved list. However, then Gene ran into the stumbling block as he found we were not on the approved list at TVA.

It seems that the procedure with TVA would be to request approval of our aluminum products and that TVA would then arrange for probably two or three of their engineers to visit our plant, inspect our facilities and production and then give approval. Had we formerly been on the list and then removed, the plant inspection would not be necessary. Apparently however, we have never been on the approved list or made any effort to be in the past.

I hesitate to request such approval without consideration by you. Are we sure that there would not be an unfavorable report because if there were to be, it could have a deleterious effect with others of the large municipals in Tennessee.

The other question is whether it would be worthwhile because based on the competitive situations that usually develop with any sizable inquiry (and practically all TVA requisitions for this type conductor would be large) we just let ourselves open for a lot of useless quotations. If we fail to quote, we would be removed from the bidding list although I do not feel that this would affect our status as being an approved supplier.

I would appreciate your comments.

Sincerely, C. J. McMurry.

CJMcM:wg

P. S.: Gene advises that we are approved at Chattanooga Electric Power Board, Nashville Electric Service and Memphis Light, Gas & Water Dept.

[fol. 5219] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 135

C. J. McMurry—Atlanta
J. R. Woods—Rome
December 10, 1958
Knoxville Utilities Board

Dear Mac:

The reports we have have been receiving from you and others would indicate that the pricing basis on Bare and ACSR is pretty firm. Based on very recent reactions to one cut in price, I would have to assume that they will remain firm or a new sheet will come into being. This being the case, it would seem very desirable to be on the approved list with this customer.

If approval at Knoxville requires TVA approval, I would think that it would be well worth the time and effort involved. You must bear in mind, of course, that our ACSR capability is limited to those sizes which require a one steel strand core wire. In other words, our approval from TVA would be a partial or limited approval. I can foresee no reason why an unfavorable report would be rendered by TVA engineers, particularly in view of the fact that we process our own aluminum from the pig and also our years of experience in the manufacture of overhead conductor. I think we should actively pursue the TVA approval.

Very truly yours,

——, ——.

JRW:reh

[fol. 5220] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 136

cc: J. R. Woods, E. C. West

January 19, 1959.

Mr. Harry H. Hicks, Supervisor
Electrical Section
Tennessee Valley Authority
Chattanooga, Tennessee

Dear Mr. Hicks:

Thank you for your letter of January 15th in regard to inclusion of our name on your mailing list covering ACSR cable.

Our aluminum cables are manufactured at our Rome, New York plant and the name of the contact would be Mr. J. R. Woods, Sales Manager for Utilities.

Sincerely yours, ——, ——, Southern District Manager.

C. J. McMurry/wg

Dear Jack:

Please see your letter of December 10th under subject of Knoxville Utilities Board. I immediately wrote TVA and have just received comments they will probably have people making an inspection trip in the summer or fall of this year.

Sincerely, ——, ——.

CJMcM:wg

[fol. 5221] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 137

cc: Stew Johnston—Chicago

R. R. Davis—Kansas City
J. R. Woods—Rome
December 24, 1958
Iowa Power and Light Co., Des Moines, Iowa

Dear Bobby:

I think I can answer your questions in your memo of December 22nd as follows:

1. Yes, I believe it would be attractive for us to pursue this customer to the tune of 20,000 ft. of Carp and a little weatherproof per month. I don't think we can ever afford to overlook this type of business which when all added up is really the backbone of our production.

2. This question requires a little crystal balling that neither of us are capable of at the moment. I don't think that we really expect anyone to give you an unqualified statement to the effect that we will be competitive regardless of the going price. I might mention in this regard that there was a time prior to going to the 15 and 7½% discount when we had to face up to the issue of either going to it or going out of the business. As bad as that price level was we elected to meet the going competition. I think our investment in our future is so tied up with aluminum that we will continue to make this decision even if it hurts our pocketbook in the worst way. Naturally, of course, this is a decision that is made on a higher level and I can only recommend that we ride the roller coaster and I assume that my recommendation would be honored. The only thing that would keep us from going along with a particular customer like this would be a situation where many of our big customers were willing to pay the sheet price or a modest discount from it and a small account like this demanded something better. We always have to look at these situations pretty closely because we think we are darn fools to spoil our situation with the big people for the sake of maintaining

good relationship with a distributor and a very small amount of business with a utility. Previous history has shown that a situation like this doesn't exist very long because somebody does what we think we are darn fools to do and everybody gets the lowest price. There is, however, in this example, a period of time when we are not competitive. I might say that the current aluminum price situation looks better than it has for a very long time. I mentioned the story in Chicago but I will repeat it again here that for the last several months aluminum prices were very firm. We were only able to detect two cases of cut prices, both of them being on a public bid. The ink was not even dry on these quotations when Kaiser reduced the price to the level quoted on the public bids. If this is an indication of their state of mind and we believe that it is, [fol. 5222] then it would be logical to assume that as soon as anyone quotes at a price other than the correct list, we will immediately have a new list corresponding to the cut price. I, of course, cannot give you a certificate to this effect but I think it is logical to assume that that is exactly what will happen. In other words, I think that the aluminum industry has got its back up on this cut price situation and they are going to either straighten it out or die in the attempt. If you can accept this as fact, as I do, then I think it is safe to say that we will be able to keep this customer competitive. I have given you all the facts that I have at hand and I think that they are sufficient for you to make up your own mind as to whether or not you want to commit yourself to keeping this customer competitive. Personally, I think it is worth the chance and I would suggest that you do so.

Very truly yours, ——, ——.

JRW:reh

[fol. 5223] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 138

Mr. A. J. Stewart, Massena

May 11, 1955.

Coffin—E.C. Gen.

L. H. Hemeter, Pittsburgh Office

District Managers—Asst. Managers
Branch Managers—Cable Salesmen

Supervisors—Product Managers

R. V. Davies	H. L. Hall
F. L. Magee	N. M. Kehew
D. Wilmot	B. S. Henderson
R. B. McKee	J. W. Hood
J. P. Haight	L. N. Grier
A. P. Hall	R. L. Phifer

Massena

J. H. DeKlyn	A. J. Stewart
Lee M. Arbegast	H. S. Marando
H. D. Lockhart	C. Weegar
D. L. Mayne	Wm. Hall
P. H. S. Chapman	H. E. House
T. L. Gilbert	R. R. Myers

Vancouver

E. D. Mairs	J. P. Lamoureux
J. T. Barclay	D. Barney
	H. E. Young

New Kensington

R. R. Cope	R. C. Kasser

ELECTRICAL CONDUCTOR DIVISION NEWSLETTER

The rate of production of bare cable during April showed but little change from the previous month. There was a 4% increase in aluminum weight, but the mills have ample capacity to enable them to step up their activity. Idle equipment means fewer jobs and reduced profit—neither of which is desirable.

Covered conductor activity, although not all that we hoped for, was, at least, fairly good. April bookings, although equal only to 70% of those for March, were 118% above the corresponding month of last year. Shipments were 27% greater than for March and 75% above April of 1954. New orders dropped to 72% of the March totals

but were 21% above the corresponding month of last year.

Comments have been made occasionally concerning our covered conductor business. It is true that we started from scratch in 1952 and there was only one way we [fol. 5224] could go—forward. I feel sure, however, that you will all be interested in the *rate* of advance as shown on the attached chart.

Most of you peddlers started selling conductor when, except for very limited quantities of weatherproof, everything was bare. Orders for bare cable often total a million pounds or more, and there is a real satisfaction in wrapping up a job of that size. However, to concentrate on bare cable and pass up covered would be a great mistake. From a profit standpoint, covered conductor means more to us than bare. Last year shipments of covered conductor in our district sales offices varied from 15.8% of the total down to a measly 0.016%. If we all work harder for this business, we can certainly show that the estimated rate of increase was established by a pessimist. Utilities usually buy covered conductor in moderate quantities just like we buy our bread and beans at the grocery store. If we can get them to do this weekly shopping with us, there is no reason why our sales of covered will not, within a few years, approach that of bare.

The aluminum weight of bare cable orders received during April showed a 10% increase over March and a 29% increase over April of last year.

The orders for 100,000 pounds or more aluminum weight are as follows:

Customer	Aluminum Weight—Pounds
Consumers Power Company	122,212
Dakota Electric Supply Company	134,789
General Electric Supply Company	247,884
Graybar Electric Company	1,188,083
Ohio Power Company	288,986
Pacific Gas and Electric Company	247,667
Priester Supply Company	108,243
Southern California Edison Company	282,725
U.S. Department of the Interior	1,830,715

[fol. 5225] In our March Newsletter we told you that more accessory orders were needed. Massena sat ablinkin' like a toad in a hail storm watching for them to

come in—but no soap. The result was that the Accessory Finishing Department was cut down to one shift as of April 11.

Bus as today's price should be as sought after as a buss from your best girl. There is activity in several sections of the country and Ray Campbell and Art Craig keep rooting up generator lead business just like young shoats in a pinder patch.

Chuck Appel started the wheels rolling with City of Seattle on the Duwamish Substation, and Buz Carleton took over when Chuck moved to New York. Because of teamwork between the Sales Department and Slim Mathews, Bob Wachter, and Wally Porter, in the Operating Department, we obtained an order for 22,000 pounds of bus and 25,000 pounds of structural material for the substation structure. Incidentally, they will also use our cable in the station.

All over the country large new buildings are being designed and constructed. These buildings will require bus duct, and we want Alcoa aluminum to be used. If you are not obtaining information from our architectural salesmen relative to these jobs, you are missing a good bet. They not only know what projects are in the wind, but they also can give you the name of the architect who will specify the kind of bus to be used. As an example, the University of Pittsburgh Schools of the Health Professions building was designed by a Chicago architect who specified copper bus duct. The electrical contractor wanted to use aluminum. Jim Holloman and Hal Kelly called on the architect and were successful in having the specifications revised to permit the use of aluminum bus. Phil Collins then got busy with the electrical contractor who called his source of supply for the duct and specified that the aluminum bus be Alcoa. Just another case of bringing the bacon home through cooperation.

[fol. 5226] It is surprising how far and to what extremes people will sometimes go in order to accomplish some desired result. At times they show as little judgement as the man in a no-limit poker game who backs a pair of treys against a royal flush.

Two customers recently built lines of 4/0 ACSR. Be-

cause they wanted to use a Burndy Y34A hand compressor for installing the joints and dead end assemblies —they had purchased Burndy joints—they had our Cat. 1875.2 dead end bodies and Cat. 975.2 jumper terminals turned down on a lathe to give them the same OD as the Burndy joints. Skip bites were used on the jumper terminal and part of the dead end body; *no compressions were made on that part of the dead end body between the lug and clevis.* We assume skip bites were also used for compressing the barrel of the steel clevis end. We will have a definite answer to this before long.

If anyone is planning a similar installation and asks you about it, tell them it is plain lousy. Mechanically this construction is probably good for about 35% of the ultimate strength of the conductor. We will make electrical and mechanical tests later.

A few years ago there was some demand for a loop-dead end that would accommodate cables larger than 2/0 ACSR, but we did not have an opportunity to develop one at that time. A Cat. 414 loop dead end suitable for 3/0 and 4/0 ACSR as well as 4/0 and 266,800 cm All-Aluminum is now available and can be shown in white data provided there is an appreciable market for it. Please let Mr. Dallye know your thoughts concerning this Cat. 414 for he does not want to authorize a stock at Massena or Vancouver unless there will be enough demand to justify production.

[fol. 5227] A few months ago we issued a brochure on our 12-ton compressor Model 12A. The pictures in this brochure showed the press without insulation on the body and handles, and the tables did not show the complete range of cable sizes that it will accommodate. The questions that you should answer for Mr. Dallye are:

1. Do you feel that the brochure is satisfactory in its present form or should it be reprinted using new pictures and revised tables?
2. Has it done any real good?
3. When the compressors are in the hands of our distributors, will having a supply of these pamphlets available to them be of much sales value?

We do not want to reprint the brochure unless it helps in our sales efforts, because we have a fairly good stock of the pamphlets on hand.

Through the years we have referred to our supervisors as cable supervisors. As a result some feel that their work is confined to bare cable. This is not the case. The supervisors are interested in and work with conductor of all types—bus and covered cable as well as bare.

The word "supervisor" does not fully describe the work they do, and we hope before long to use another term that will be more appropriate and more descriptive of the work they do. We have a number of ideas we are mulling over, and invite your suggestions.

The returns are not completely in for April, but March was the whoppingest best month yet for our agents and distributors. The comforting thought behind this is that every pound of this business is at schedule prices, and our distributor and agency organization is operating "in the black".

However, April will go down as the month of "wash sales"—sales "washed" through consignment stocks in- [fol. 5228] stead of being entered as agency sales. We cannot blame a distributor for wanting to make more money—that is his business—but we strongly censure the Alcoa salesman who permits the distributor to line his pockets with unearned, good Alcoa dollar bills. Our commissions and discounts have set a standard in the industry for fairness, and it ill behooves us to condone reception by "washing" agency sales through a consigned stock just to allow the distributor a larger discount or more margin with which to cut his price! We must all be constantly on the alert to short circuit any of these deals. Our contracts are specific in this respect, and we shall continue to scrutinize and refuse to accept in Pittsburgh those consignment orders which should be entered as direct shipments to distributor's customers.

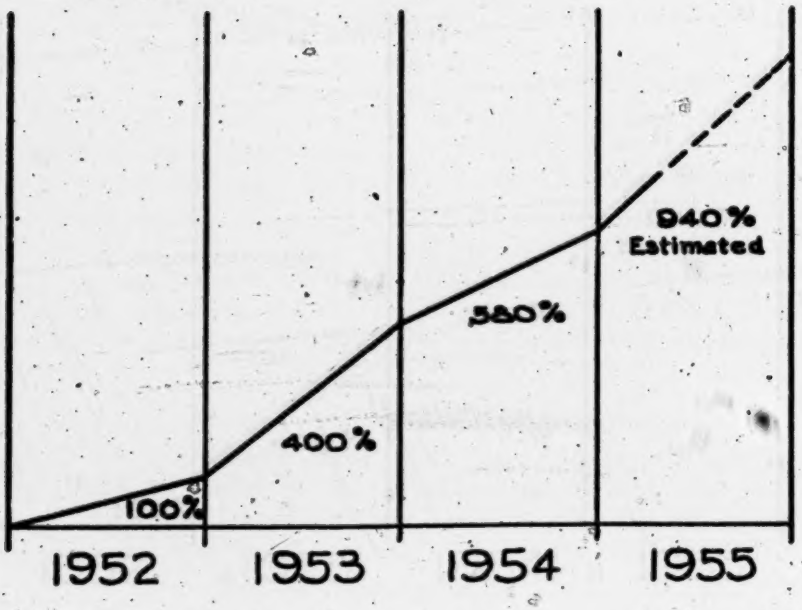
L. H. Hemeter.

LHH/elj

CC: Mr. P. T. Coffin, Mr. H. H. Rodee, Mr. F. R. Dallye, Mr. Dixon Lewis, Mr. G. H. Phillips, Mr. L. T. Guess, Mr. D. H. Sandell, Mr. R.E. Larson, Mr. L. L. Flaugher, Mr. Donald Paro, Massena

[fol. 5229]

Covered Conductor Shipments



[fol. 5230] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 139

February 23, 1955.

Philip T. Coffin,
Pittsburgh Office
Mr. J. P. Haight,
Pittsburgh Office

Re: Polyethylene Covered Conductors

For several months we have been watching the bookings, production and shipments of polyethylene covered conductors very carefully. It has been our thought that quite probably the time may have arrived for Alcoa to enter that field of production. We have now concluded that we should make a detailed study of the problem and arrive at a definite decision. A number of factors influenced our thinking and we believe it may be helpful to all concerned if I enumerate those factors:

1. Since our entry into the covered conductor field almost exactly three years ago via the medium of toll covering by Rome Cable Corporation, our business has increased (for all types of coverings) from zero to a predicted volume of somewhat over four million aluminum pounds for 1955. Despite two devastating price wars in electrical conductors during this period and despite our inherent "profit sharing" with Rome Cable Corporation, we have sold well over four million pounds of cable which we could not otherwise have sold, and at a profit.
2. Of the three predominant types of coverings—neoprene, polyethylene and textile, in that order—polyethylene appears to be running the best race. We estimate our conductor sales with that type of covering at about two million aluminum pounds for 1955.
3. Equipment costs and "know how" with respect to polyethylene are both much more favorable to the [fol. 5231] newcomer in the field of covered conductors than they are with respect to neoprene. Textile coverings may be disregarded since they are running a poor third.

4. The increase in popularity of polyethylene coverings has taxed Rome Cable Corporation's facilities to the point that for the past several months Rome Cable Corporation has been offering extended deliveries to its own customers, including Alcoa. This has resulted in our losing considerable business and some prestige.
5. We have lost and will continue to lose quite a volume of covered conductor business from a number of utilities who take the stand that Alcoa's toll arrangement with Rome Cable Corporation is "parasitic", i.e., to paraphrase: "Alcoa has done nothing constructive in the development and improvement of covering technics or lowering of prices and is, therefore, not entitled to any share of the business."
6. The fact that Alcoa does no covering of conductors is detrimental to the morale of our sales force. There is a fundamental pride in selling Alcoa made products which we constantly discern in our salesmen and which can best be illustrated by unanimous plea of our conductor salesmen that "we get into the covering game ourselves."

Our dealings with Rome Cable Corporation have been mutually frank and above board starting with the inception of our present toll arrangement. The Rome officials have felt right along that sooner or later we would probably enter the covered conductor field and we have never denied [fol. 5232] the possibility or even probability of such a step. The proposed study, therefore, need not be kept confidential in any way.

Sometime ago Mr. Vincent Matthews did make a confidential study with the help of Cost Accounting and our people at Massena to ascertain in a rough way whether our present volume of business would justify our entrance into the polyethylene covered conductor field. At the time we felt that if the study were favorable, the information would be extremely helpful in any of our future discussions with the Rome officials. I don't know whether the study has come to your attention or not, but it indicated that even with our present modest volume of shipments we

should break even and that increased utilization of the newly acquired facilities should bring a very satisfactory return on the investment.

On Monday, February 21, Mr. R. V. Davies and I spent several hours with Mr. A. D. Ross Fraser, President, and Mr. Glen Rolston, Vice President in Charge of Sales, of Rome Cable Corporation. The entire subject was discussed with complete candor and Messrs. Fraser and Rolston understand that we are going to make a detailed study and advise Rome Cable Corporation of our decision as promptly as possible so that they in turn may either expand their facilities to take care of the additional production load which would be imposed by Alcoa, or to perhaps take any other steps which might result from our decision.

If the proposed study verifies Mr. Matthews' earlier study and the decision is made to enter the polyethylene covering field, we would continue our toll arrangement with Rome Cable Corporation on neoprene and textile coverings and with the larger sizes of polyethylene coverings until such time as our volume of business might justify steps toward complete independence in the field. I believe, however, that we will always find it expedient to continue the toll arrangement on certain sizes of conductors and types [fol. 5233] of coverings because of the relatively small demand for those specialties.

I shall appreciate your expediting this study within reasonable limits so that if there is a favorable ruling from Management, we can take steps as promptly as possible. I have no personal knowledge as to estimated delivery on equipment and number of other factors affecting the time element, but the Rome people think that something on the order of six months to one year would be required until we could be in production. I think that any saving in time which can be gained without undue sacrifice to other important matters will pay good dividends.

Philip T. Coffin.

PTC:ags

CC: Messrs. D. Wilmot, R. V. Davies, R. B. McKee, Harry L. Smith, Jr., F. L. Magee, J. L. Patterson, M. E. Brooks, T. H. Kerry, A. J. Stewart, T. L. Gilbert, Vincent Matthews, Jr.

[fol. 5234] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 140

July 11, 1955.

Philip T. Coffin,
Pittsburgh Office
Mr. R. V. Davies,
Pittsburgh Office

Re: Covered Conductors

Proposal for Alcoa to do its own Polyethylene Covering

In my letter of February 23, 1955 to Mr. J. P. Haight, I pointed out that there were a number of reasons for our giving immediate consideration to the proposition of Alcoa's producing its own polyethylene covered conductors, and requested that engineering and cost studies be made so that the matter could be investigated, and if sufficiently attractive, be referred to management for appropriate action. I attach a copy of that letter for your convenience.

On May 11th Mr. A. J. Stewart submitted a proposal for the installation of facilities at Massena for the production of covered aluminum conductors. I attach that proposal together with Mr. Stewart's covering letter. It is my only copy, so I shall appreciate its return in due course.

A number of conferences and discussions preceded the submission of the proposal, and as a result, it embraces a step by step program wherein we would start polyethylene covering at a modest level in 1956, increase polyethylene covering capacity in 1959, and also enter into neoprene covering in 1959—if we so elect. The proposal also embraces the installation, on a step by step basis, of equipment for twisting and testing triplex service drop conductors.

In my opinion, the proposal is well conceived and logical. It calls for a new building at Massena with provision for step by step building expansion, so that no unnecessary expenditures need be made ahead of actual re-

[fol. 5235] quirements. Conversely, if the rate of growth

of our covered conductor business exceeds our expectations, the step by step program may be accelerated. That such a possibility exists is shown by a few facts and figures:

1. Alcoa's shipment of covered conductors of all types has grown progressively from 65,000# per month in 1952, to 132,000# per month in 1953, to 200,000# per month in 1954, to over 300,000# per month so far in 1955. 32.5% of 1954 shipments were polyethylene covered as compared to 44.0% thus far in 1955. Alcoa is presently enjoying about 8-10% of the covered conductor business.
2. A recent survey by *Electrical World* reveals that whereas reporting utilities show 46% use of aluminum service drops, they plan to jump to 64% in the near future. Corresponding percentages for secondary distribution lines are 36% and 53%. Many of the non-reporting utilities are "die-hards," who will only resort to aluminum when driven to that move by even stronger economic pressure. We know of several such utilities who are making studies and a good share of their covered conductor requirements alone would or could double our present volume of business.

Our present belief is that our monthly shipments of polyethylene covered conductors should reach 160,000# per month by July 1956, and probably 200,000# per month by January 1957. Our cost accounting people estimate that if the first step of the proposal, representing a new expenditure of $736,000 could be in operation by July 1956, the annual rate of return on the investment would be 13%. The 200,000# monthly level would correspond to a 17% [fol. 5236] return, and the 15 shift full capacity level of 292,000# per month a 26% return. The highest return we have reached on the present toll basis is 9%.

The several factors enumerated in my letter to Mr. Haight continue to grow in importance. Up to last fall we were able to roll with the punches when occasional order jams, equipment failures and miscellaneous reasons resulted in some loss of business or prestige. Alcoa has now, however, become so large a factor in Rome Cable's opera-

tions and in the eyes of industry that one bad incident —of whatever cause—could set us back very severely in the competitive position we are just now on the verge of enjoying. We are now getting "bloodied up" with fair regularity and even at the moment are taking steps to do considerable of our own triplexing at Massena on a makeshift basis for some months, and at loss of considerable revenue, because Rome Cable simply can't handle the order load until new equipment—overdue, to be sure,—is installed.

History is bound to repeat, and with more violence. I, therefore, urge that prompt approval of the proposal be granted.

Philip T. Coffin.

PTC:ags

CC: Mr. D. Wilmot, Mr. R. B. McKee.

[fol. 5237] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 141

Mr. A. J. Stewart, Massena

July 29, 1955.

Philip T. Coffin,
Pittsburgh Office
Mr. John L. Patterson.
Pittsburgh Office

Read eight-three by Harper, Wirner, Tittle, Gilbert

Re: Covered Conductors

On May 11th, Mr. A. J. Stewart submitted a proposal for the installation of facilities at Massena for the production of covered conductors. That proposal has been carefully studied by a number of us in the Sales Department and I have just been advised by Mr. R. V. Davies that I have his approval to initiate a Request for Authorization based on that proposal.

The purpose of this letter, therefore, is to ask that the R for A be drawn up as promptly as possible so that when, and if, it is approved the work may be undertaken in time

to avoid winter weather conditions and thus more quickly put Alcoa in the business of covering at least a portion of the covered conductors it is selling at an accelerated pace. I understand that quick action will also result in considerable savings in construction costs.

A number of conferences and discussions among members of the Sales, Operating, Engineering and Cost Accounting Departments preceded the submission of Mr. Stewart's proposal, and as a result, it encompasses a step by step program wherein we would commence polyethylene covering at a modest level in 1956, increase capacity for that operation in 1959, and also enter into neoprene covering in the same year—if we so elect. The proposal also embraces the installation, on a step by step basis, of equipment for twisting and testing triplex service drop conductors. In short, the proposal avoids the expenditures of any funds, other than those needed for the initial step, until the volume of business and profits clearly demonstrate the need and justification for each successive step, each of which may be accelerated if necessary. That there is a strong possibility for the need of such acceleration is [fol. 5238] shown by a few facts and figures:

1. Alcoa's shipments of covered conductors of all types have grown progressively from 65,000 pounds (aluminum) per month in 1952, to 132,000 pounds per month in 1953, to 200,000 pounds per month in 1954, to over 300,000 pounds per month for the first six months in 1955. June shipments were 338,000 pounds. 32.5% of 1954 shipments were polyethylene covered, as compared to about 44.0% thus far in 1955. There is a pronounced trend in favor of polyethylene over neoprene, although the latter apparently will always have a sizeable group of adherents.

2. A recent survey by *Electrical World* reveals that whereas reporting utilities show 46% use of aluminum service drops, they plan to jump to 64% in the near future. Corresponding percentages for secondary distribution lines are 36% and 53%. These increases in the *amount* of use tell only part of the story, for there is also a very noticeable increase going on in the *size* of both service drops and distribution conductors. Many of the non-reporting utilities are "die-hards," who will only resort to aluminum

when driven to that move by even stronger economic pressure. We know of a number of such utilities who are making studies and a good share of their covered conductor requirements alone would or could double our present volume of business. One such utility was "converted" only last week and placed initial orders for 5,000,000 ft. of line wire, of which we received about 40%.

3. Repercussions of the strike at the plants of the Kennecott and Phelps Dodge Copper companies have become so serious that at least one copper wire company has ceased to accept any more orders until further notice. According to current newspaper reports, there will be a copper shortage of major proportions for many months after the cessation of the strike, so quite obviously there will be much more impetus to the swing over to aluminum covered conductors. The swing over to bare aluminum [fol. 5239] conductors is, of course, a matter of history.

Our present belief is that our monthly shipments of polyethylene covered conductors should reach 160,000 pounds per month by July 1956, and some 200,000 pounds per month by January 1957. Our cost accounting people estimate that if the first step of the proposal, representing a new expenditure of $736,000, could be in operation by July 1956, the annual rate of return on the investment would be 13%. The 200,000 pounds monthly level would correspond to a 17% return, and the 15 shift full capacity level of 292,000 pounds per month a 26% return. The highest return we have reached on the present toll basis is 9%.

The several factors enumerated in my letter of February 23, 1955, to Mr. J. P. Haight continue to grow in importance. We have now become so large a factor in Rome Cable's operations and in the eyes of industry that one bad incident, such as a major equipment failure at the Rome plant, could set us back very severely in the competitive position we are just now on the verge of enjoying. Rapid entrance into our own covering operation would largely remove such a threat. We are currently going through a bad period in our toll arrangement with Rome Cable because Rome simply can't handle their own and our combined order load. This situation is temporary in nature

because of the delay in new triplexing equipment for Rome Cable which has been on order for some months, but the same situation may very easily repeat and with more violence.

Philip T. Coffin.

PTC:ags

CC: Messrs. D. Wilmot, F. L. Magee, R. V. Davies, R. B. McKee, H. L. Smith, Jr., J. P. Haight, M. E. Brooks, H. L. Hall, A. J. Stewart.

[fol. 5240] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 142

January 4, 1957.

Philip T. Coffin,
Pittsburgh Office
Mr. R. V. Davies,
Pittsburgh Office

Re: Rome Cable Corporation

I call your attention to the contents of Ross Fraser's letter of December 16th addressed to you as well as the contents of my letter of November 21st, 1955, to Glenn Rolston. As I interpret Ross Fraser's letter, the January 1st, 1957, date which I suggested to Glenn Rolston has been extended to May 1st, 1957, by means of Ross Fraser's letter. In other words, we would be free to make other arrangements with respect to neoprene covering any time after May 1st, 1957, unless the agreement is extended by mutual consent.

So far as a meeting with Ross Fraser, and I suppose Glenn Rolston as well, is concerned I am pretty well tied up on January 9th, will be at Massena on January 10th, and am again tied up on January 13th all day. I shall be in New York attending the AIEE Convention January 21st through 24th. I will try to avoid any further commitments until you have set up a date with Ross Fraser.

Philip T. Coffin.

PTC:ags

[fol. 5241] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 145

CC: Mr. L. H. Gray

December 6, 1956.

Earl B. Cox,
Cincinnati Office
Mr. P. T. Coffin
Pittsburgh Office

Electrical Conductor Sales Meeting

December 17-18, 1956

Our number one interest is the competitive price situation. We haven't been bothered very much in the bare conductor sales in our district so far this year, but have heard some serious rumblings recently. The bad situation in covered conductors still exists. The going rate is 5 to 10 per cent under our book price in this area. Are we planning to expand our covering facilities at Massena and go after it?

We are very much interested in Alcoa broadening its field of endeavor in the Electrical Conductor Industry. You know we have expressed our thinking on aluminum magnet wire application. We are also interested in seeing Alcoa take on insulated wire, building wire, welding cable, and other electrical applications. You are well aware that some of our competitors such as Kaiser are already producing some of these products in aluminum. Is Alcoa planning to do so? We hope Alcoa plans to continue to be the leader in the Electrical Conductor Field. In order to do that, we believe Alcoa must get into these other applications.

We are interested in the latest bus conductor situation. Are there indications of price cutting in that field? You probably know that Kaiser has tried to get in with G. E. in Cincinnati by offering them sawed plate bus conductor with a rolled edge at $.457 per pound. This is $.02 lower than our No. 2 EG alloy in 2,000 lb. lifts and is causing interest. We understand now that Kaiser admits they can

not do it. Our total with G. E. in 1956 is now past the [fol. 5242] 500,000 lb. mark. They plan to buy 1,000,000 lbs. in 1957 and we expect to get 80 per cent of that.

How is the program of bus conductor stocking at distributors progressing? As you know, Williams & Co., Cincinnati, is stocking 18 sizes of No. 2EC-T6 bus conductor. They have sold 40,000 lbs. since starting in August of 1956. We are estimating they will sell 200,000 lbs. in 1957. This compares to a tonnage of 500,000 lbs. of copper bus in 85 different sizes, sold in 1956. This includes sales through their Columbus, Ohio warehouse. The Williams people expect to be selling this much aluminum bus in the next three or four years.

Earl B. Cox.

EBC:gl

Earl—Very good. Do you have sizes?

Yes.

Guy.
L. H. G.

[fol. 5243] In United States District Court

Plaintiff's Exhibit 146

Alcoa
First in Aluminum

Aluminum Company of America
1501 Alcoa Bldg., Pittsburgh 19, Pa.

Master File Copy

For Further Information: William R. Shields,
ATlantic 1-4545, Ext. 467

For Release Wednesday, February 27, 1957 or anytime thereafter

Pittsburgh, Pa., February 27, 1957—Aluminum Company of America, long a supplier to the electrical conductor field, recently opened additional sales and use potentials with another new product—polyethylene-covered aluminum conductor. Simultaneously, Alcoa disclosed the fact that a completely modern covered conductor department at its

Massena (N.Y.) works is now in full operation, marking the first time the company has fabricated its own line of conductor covered with polychemicals.

Since making its first shipments in December, Alcoa has progressively stepped up production of covered conductors to the point where it has built up ample stocks and is in position to supply customers with covered conductor and service drops of the best quality and design available.

The plant's new equipment will cover single wires and stranded conductors in a large range of sizes. The finished product consists of wire or cable, covered with a relatively thin layer of protective and insulating polyethylene. [fol. 5244] In the process, cable is unreeled as it is fed through straighteners into an extruded head. Here the conductor *hets* its coating of polyethylene. Thickness varies with customer specifications. The covered conductor then passes through a controlled cooling unit which gradually reduces its temperature. After running through a series of pulling wheels, it undergoes thorough electrical testing before being wound into coils or reels for shipment.

This production method produces two similar products—line wire and phase wire. Line wire is single conductor distribution cable. Phase wire is a component of a twisted product, containing two or more conductors, and is employed in low-voltage, self-supporting secondary circuits and service drop cables.

To insure maximum quality control, both coils and reels of service drop are immersed in a test tank, where they are electrically tested for imperfections in the covering. Rejected reels are taken from the production line for further inspection and repair, if feasible. Those passing this final test are then carefully packaged for shipment.

[fol. 5245] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 149

November 8, 1957.

Minutes of Fall Meeting of Subcommittee on Electrical Conductors September 11-12, 1957

Conference Room—Alcoa Research Laboratories
Massena, New York

The following written reports were sent to the Members of the Subcommittee prior to the meeting:

Development Trends and New Applications—Mr. R. R. Cope, August 26, 1957
Production Situation—Mr. C. L. Kessler, August 26, 1957
Electrical Uses of Aluminum in Alcoa Plants—Mr. L. N. Grier, September 5, 1957
Review of Investigations at Alcoa Research—Messrs. Hartmann, McKee and House, September 3, 1957
Review of Investigations at Massena Works—Mr. C. L. Kessler, August 31, 1957

Mr. E. C. Hartmann, Chairman, called the meeting to order at 1.30 p.m. The following Members were present:

Members Present:

Mr. E. C. Hartmann, Chairman,
Mr. P. T. Coffin,
Mr. R. R. Cope,
Mr. F. R. Dallye,
Mr. L. N. Grier,
Mr. L. T. Guess,
Mr. H. E. House,
Mr. C. L. Kessler,
Mr. W. E. King,
Mr. J. S. Tompkins.

Visitors Present:
Mr. G. D. Welty, Chairman Technical Comm.,
Mr. J. H. DeKlyn,
Mr. E. G. Schoeffel,
Mr. N. B. Lane,

[fol. 5246] Mr. N. T. Bond,
Mr. H. H. Caldwell,
Mr. H. C. Dameron,
Mr. E. T. Engelhart,
Mr. L. C. Getsinger,
Mr. T. L. Gilbert,
Mr. A. C. Heath,
Mr. L. H. Hemeter,
Mr. A. E. Jennings
Mr. E. K. Lanctot,
Mr. W. F. Madden,
Mr. H. S. Marando,
Mr. G. H. Phillips,
Mr. C. B. Rawlings,
Mr. W. D. Stewart,
Mr. P. E. Stickley,
Mr. T. E. Simpkins,
Mr. O. F. Turner,
Mr. P. D. Tuttle,
Mr. J. C. Yedlika.

The minutes of the Spring Meeting were approved without changes.

Mr. A. J. Stewart, Member of the Subcommittee, who has been recently transferred to Cressona, expressed his regret, in a letter to Mr. Kessler, at being unable to attend the Meeting. The Subcommittee expressed appreciation for Mr. Stewart's services.

I. Market Conditions and the Competitive Situation

Mr. Coffin discused market conditions and the competitive situation. Although there is a good volume in Electrical Conductor sales, because of the price war which is believed to be the worst yet experienced, it is practically impossible to make a fair profit on Electrical Conductor products. Alcoa has one important asset, built up over the years of experience, to come out with new ideas and devices. This is especially true in conductor accessories. The outlook for future demand in electrical conductor products is very bright, for the use of electricity in the United [fol. 5247] States is approximately doubling every ten years. This of course calls for new construction and the

use of covered electrical conductor and accessories in addition to stranded conductors used for overhead transmission lines; bus conductors have become a very important phase of our operations. The use of sheet or foil for coils is expanding more and more as time goes on. Mr. Coffin stressed the importance of new ideas in the field of electrical conductors. He pointed out that the Members of the Subcommittee are well fitted to make valuable contributions along this line, with the consequent aid to sales. Mr. Lane raised the question as to the prospects for future business, and Mr. Coffin replied that with the expected growth in consumption of electricity that the volume for EC aluminum for 1957 should exceed the 250,000,000 lb consumption for 1956. This figure was released by the Department of Commerce, and it is estimated that 200,000,000 lb of this went into overhead electrical conductors. Mr. Welty raised the question as to the expected effect of the recent price reductions in copper on the aluminum conductor market. Mr. Coffin expressed the opinion that most authorities expect the price of copper to increase above the 25 cent per pound present price. It takes two pounds of copper to get the same current-carrying capacity as one pound of aluminum. Copper does have the advantage of lower fabricating costs than aluminum. The price of copper would have to drop to about 12 cents per pound, to make serious inroads into the electrical conductor market. The use of copper is coming back into the picture in the use of magnet wire and small transformers.

II. Development Trends and New Applications

Mr. Cope opened his remarks by stating that the present [fol. 5248] price of copper has not discouraged the activities in his division in extending the use of aluminum by electrical manufacturers. It is appreciated that the present low price of copper may prolong many activities and postpone switches from copper to aluminum in many products which require considerable fabrication, such as bunched conductors, but that eventually aluminum will be used in these products. None of the manufacturers expect the price of copper to remain at the present level. One important field in the development of the use of aluminum is strip or foil windings for transformers, relays, and simi-

lar apparatus. The Commercial Research Division has recently completed a study which estimates 200,000,000 lbs of aluminum will be consumed in the manufacture of windings using foil or strip. This type winding has a much better space factor than the winding made of wire. Provisions are being made at New Kensington to wind prototype coils made of foil to customer specifications. Methods are being developed to insulate effectively between turns and also methods to prevent short circuits at the end of the coil when large coils are sliced into smaller coils. A sales training program is planned to enable salesmen to sell foil and strip for magnet wire applications. This program is backed by the Technical Committee, the Capacitor Foil Committee, the Aluminum Process Development Laboratories.

Last June a meeting was held in Philadelphia to promote the use of aluminum in busway, which was attended by 168 people. This group consisted of architects, contractors, consulting engineers, distributors and other interested parties. Plans are under way to hold similar meetings in Los Angeles and San Francisco.

[fol. 5249] Edward Ashley and Associates have completed their study on the use of aluminum in the building industry. The report is quite extensive, and will be presented to a group in Pittsburgh on September 19. This study covers the use of aluminum, not only in electrical conductor, but such items as conduit, metal enclosures, switch boxes and so forth. They also made a survey of contractors to learn their thinking on the use of aluminum in the building industry. Edward Ashley and Associates are the consulting engineering firm who did the Alcoa Building and the office building at the Davenport Works.

III. Production Situation

Mr. Kessler reported on the production situation at Massena. There is quite a large forward tonnage for Expanded ACSR on the books, but for standard types of ACSR the future appears to be uncertain at the moment. There is quite a backlog of armor rods; there is quite a heavy load of both tapered and straight armor rods. About 140,000 sets of Alcoa armor rods were sold, compared to 23,000 sets preformed armor rods. All of the equipment author-

ized by the Committee for the Covered Conductor Department has now been installed. Operations are proceeding satisfactorily, each month production is becoming more efficient, costs are improving nicely.

At this point Mr. Kessler asked Mr. Jennings of the Massena Cost Accounting Division to review the cost analysis of the Covered Conductor Department. Production was begun in November 1956. Production has increased steadily and costs have been reduced. 236,000 lb aluminum weight, covered conductor was produced on the average [fol. 5250] the first six months of 1957. Mr. Jennings presented charts comparing Massena production costs for covered conductor compared with covered conductor made for Alcoa by Rome Wire and Cable Company. Each successive month showed improvement in Alcoa cost figures. It was pointed out that Rome costs include profit for Rome, and Massena costs are expected to get still lower so that the margin of profit will be better. Mr. Guess said that it would be easier to analyze the operations if the costs were broken down so that direct comparison between our operations and Rome could be made for separate items. Mr. Kessler pointed out that the starting material costs of bare conductor was the same whether we covered at Massena or whether Rome covered it. It was agreed there is still room for considerable improvement in reducing Alcoa costs of covered wire. Mr. Kessler reported that the initial troubles which were experienced in covering 600 volt conductor were overcome.

Recently an inquiry was received from the Long Island Lighting Company for #8 Conductor insulated with 110 mils Polyethylene. A quotation was not made on this item because the test equipment required to meet the 11,000 volt a-c and 33,000 volts d-c test is not available at Massena. The present maximum a-c test voltage is 5,000. $8,000. would be required to increase a-c test voltage to 20,000 volts. Mr. Kessler asked for an expression of opinion from the committee on the advisability of securing this necessary test equipment to meet such specifications. Mr. Coffin and Mr. Guess both expressed the opinion that we would not be justified in purchasing this equipment at this time. Perhaps later on when we have more experience in this field we could branch into the higher voltages. Mr. Grier

pointed out that with higher voltages, more problems would [fol. 5251] be encountered, one of which is shielding, and it appears that until all the problems are successfully solved in the manufacture of 600 volt class conductor, higher voltage conductors should wait. It was agreed by the members of the Subcommittee that this is the course that should be followed, and no high voltage test equipment should be purchased at this time.

There are now 330,000 lbs, aluminum weight, of covered conductor scrap which have to be salvaged. Recently, the amount of scrap received per month has exceeded the amount reclaimed. An engineering study indicates that about $10,000 would be required for new equipment to adequately take care of scrap. Mr. Kessler inquired of Mr. Coffin if it would be the continued policy for Alcoa to take customer scrap for reclaiming, and Mr. Coffin replied that this would be a necessity to maintain customer relations. Methods of reclaiming scrap were discussed, and it was pointed out that a great deal of scrap comes in briquettes, which is Polyethylene and Neoprene mixed, in which case the only method practical is by burning. In the case of long lengths the insulation can be stripped. It appears that both methods of reclaiming scrap will be necessary. Polyethylene scrap can be reused, neoprene cannot. It was recommended by Mr. Coffin that suitable scrap handling facilities be provided.

About 756' non-returnable reels are being shipped each month. There has been a big demand for non-returnable reels, although some customers do not ask for them. Mr. Turner reported that Vancouver is going to have some 66" reels on experimental basis, of the non-returnable type.

Mr. Phillips reported that non-returnable reels had been quite successful even when used in very rough terrain in [fol. 5252] new line constructions. Mr. Kessler reported that 50 96" aluminum reels were on order and scheduled for shipment in November. These reels are made of 6061-T4 aluminum alloy. It is planned to use these reels for expanded conductor. An economic study will be made comparing aluminum alloy reels and steel reels to determine which is the more economical. Recent shipments received of returned wooden reels at Massena showed 48% had to be scrapped. The returnable type wooden reels are only

averaging about two trips. Mr. Kessler reported that the August 1st inventory of 84" reels in steel was 1,117. These reels cost about $200. each. The reels occupy two Massena Works Smelting Plant buildings for storage. Mr. Kessler asked for an expression from the committee as to what should be done with the reels. Mr. Coffin pointed out that 300 had been sold to Kaiser after they had been used for two years. Steel reels at Vancouver are even a greater problem than at Massena because of the lack of indoor storage facilities. The reels must be painted every time they are sent out. Mr. Coffin spoke of the various tests for mechanical strength and corrosion, and the aluminum reels had passed these tests successfully. It is believed these reels would be good for a minimum of twelve trips compared to a long time average for returnable wooden reels of only two and a half trips. The one question on aluminum reels is whether the customer will accept the full cost of the reel as a deposit. The Sales Department will investigate possible purchasers of surplus steel reels. Mr. Kessler pointed out that it would be quite helpful if the conductor salesmen used every effort to get the customers to use steel reels, especially in view of the very poor performanc of wooden ones. Mr. Coffin and Mr. Phillips both advised that this was being done.

[fol. 5253] Mr. Dallye pointed out the Massena production figures, comparing Alcoa preformed armor rod sales and Alcoa armor rod do not reflect industry sales of armor rods. A better comparison would be arrived at if we took orders for 6061 Redraw rod sold to the preformed armor manufacturers and multiply that figure by three. This would give somewhere near the total weight of preformed armor rods being sold. Mr. Dallye reported that several large jobs for tapered rods had been sold this year. Sales seem to be increasing in the large size rods and decreasing in the smaller size rods. Mr. Dallye said that approximately four times as many sets of preformed armor rods are being sold as Alcoa rods. Mr. Lane inquired if there was a possibility of improving the manufacturing process of tapered armor rods. Mr. Coffin and Mr. Dallye explained that the method of making tapered and preformed rods are quite different, but perhaps costs could be reduced.

At this point Mr. Kessler opened the discussion on the

need for bunching equipment at Massena. He stated that a number of different samples of fine wire had been supplied to the General Electric Company for bunching in their Asheboro, N.C. plant, and that the material had been in their hands since August. At the present time a satisfactory date to try out the different materials had not been established. The points in question concern the proper alloy and temper most suitable for bunching. The question as to the most preferable make of buncher was discussed and Mr. Kessler said that he believed the Watson buncher to be the type in general use. However, Mr. Coffin pointed out that the American Insulated Wire Company preferred the Cook buncher. It was reported that most of the trouble the American Insulated Wire Company had with Watson buncher was that the Watson buncher was in [fol. 5254] poor repair. Mr. Kessler stressed the need for accelerating the program with General Electric in order that we may evaluate what alloy and temper are best suited for lamp cord. Mr. Kessler expressed the opinion that it would be well to have the recommendation of the Subcommittee as to the need for bunching equipment so it could be mentioned in the R for A. Mr. Lane said that more facts should be presented concerning return on the investment of the buncher, such as supplying the company's own need for bunched wire, which is now purchased from outside sources. Mr. Coffin recalled that one of the manufacturers had offered to install a buncher on a free trial basis. However, it is unknown whether this offer is still open.

Mr. Cope raised the question if any progress is being made toward supplying American Insulated Wire Company with fine wire for bunching. Mr. Kessler explained that for American Insulated to bunch wire they require wire wound on forty-four of their own special spools. It is believed that until the G. E. trial has indicated the best alloy and temper it would be better to hold off on American. Mr. Cope said that American had offered to bunch some .006 wire if we supplied the wire. The opinion was expressed that if G. E. was going to continue to delay bunching operations that perhaps we should supply American with a supply of wire for bunching. Mr. Kessler stated that the problem of making wire was a minor one, the main prob-

lem was making arrangements with American to get their spools.

Supplying the company needs would be one outlet for initial production. The question was raised as to the price of the buncher and Mr. Kessler stated that it would be [fol. 5255] around $15,000 installed. Mr. Coffin expressed the thought that this was probably too high and that someone had reported to him that a buncher could be purchased for $1500. Mr. Kessler stated that the buncher is only a part of the equipment needed to manufacture bunched conductor. Auxiliary equipment is required. Mr. Kessler advised that he would review the quotations they had received after the last E. C. Meeting but that he believed his estimate was quite close. After checking with the Engineering Department Mr. Kessler reported that bunching equipment, exclusive of auxiliaries, costs between $6,000 and $7,000. Mr. Kessler said that additional equipment and installation expenses would run the total costs to approximately $15,000 which is the estimate arrived at by the Engineering Department. This equipment would take care of control wire requirements down to lamp cords. It was pointed out that over $36,000 worth of this type conductor is now purchased outside the company, which could be fabricated by our own works. Mr. Cope remarked that if we could develop a satisfactory method of making lamp cord it would open a tremendous market for aluminum. It would be expected that American Insulated Wire, General Electric, and others, would enter this market. Mr. Kessler stated that approximately 95% of the bunchers that are used today are Watson bunchers. The Cook machine is a very good machine but there are very few on the market. Most of our customers would be using Watson bunchers, which would be an advantage in having this type equipment.

Mr. Hartmann asked for an expression from the Subcommittee on the advisability of taking action on the purchase of a buncher so that when the R for A is prepared, this [fol. 5256] may be so stated. Mr. Tompkins raised the question of manufacturing control type cable with Polyvinyl Chloride covering, for use in company plants. Mr. Gilbert advised that to cover small wire necessitated additional extrusion equipment costing approximately $45,000. A new extruder would also be required to make lamp cord

fixture wire. Mr. Dallye suggested that perhaps it would be better to wail until we found an aluminum alloy that can be successfully bunched. Mr. Coffin suggested that accurate estimates be prepared on the buncher plus other necessary equipment to turn out small insulated wires. It was decided that after the prices were determined Mr. Coffin, Mr. Cope, and other interested parties would get together and decide if the market potentialities justify this expense. Mr. Cope expressed the opinion that he didn't believe our uses of the extruder could be supported on the basis of fine wire and appliance cord. Mr. Grier inquired as to the smallest wire that can now be covered on the existing extruder, and Mr. Gilbert replied that #6 solid is the smallest size. Mr. Grier said that additional sizes that Alcoa buys, which could be made on the new extruder, in addition to No. 6, would be 8, 10 and 12 size wire. It was agreed, after questions by Mr. Welty, that the present price of copper makes the entrance of aluminum into the appliance cord field at this time economically infeasible. Mr. Kessler stressed that the program right now is to determine the proper alloy and temper so that the finished product will have the proper flexibility and will stand the stranding and other operations. Mr. Tompkins inquired if the surface treatment of bunched conductor is being investigated, and the answer was that it is.

IV. Electrical Uses of Aluminum in Alcoa Plants

Mr. Grier reported that the use of aluminum covered con- [fol. 5257] ductor in company plants was discussed last year and the general needs outlined for this type of conductor. The bulk of this conductor had been purchased from the U. S. Rubber Company before their covered wire manufacturing facilities were sold to Kaiser last spring. Massena has been in production of covered conductor for about a year. Most of the initial operating problems have been solved. The range of sizes goes from #12 conductor to 1,000,000 cm. Part of the company needs are being supplied by Rome, Okonite, General Cable, and others. Mr. Grier explained he was not satisfied with the source of supply. He reported that the rumor that Alcoa had placed a large order for covered conductor with U. S. Rubber, since this company was taken over by Kaiser, is untrue. Alcoa

did buy some accumulated stocks U. S. Rubber had on hand, with Alcoa aluminum conductor. Mr. Grier expressed the thought that he was looking forward to the time when all the company needs could be filled by Massena, and no orders would have to be placed outside.

Mr. Grier reported that high voltage switches of 23,000 volts class made of aluminum are on order with I. T. E. Circuit Breaker Company. Aluminum has very extensive use in bus work in company plants, and G. E. is turning out considerable aluminum switch gear purchased by Alcoa. Westinghouse has not developed their line to the same extent that G. E. has. Burndy has been the chief supplier of aluminum terminals for covered conductor, and Mr. Grier expressed the hope that we eventually might make all our own terminals. Terminals for small wire were formerly made at Richmond, and are now being turned out by a small independent manufacturing company in Covington, Kentucky. This supplier will eventually replace Burndy. [fol. 5258] Alcoa is now specifying aluminum terminals on transformers.

Mr. Grier reported high voltage cable failures at Davenport recently, where the aluminum shielding tape apparently caused the trouble because of corrosion. Mr. Grier displayed samples of the damaged cable. Sample shielding tape taken from storeroom stock, which had never been energized, was bright on one side and stained on the side next to the insulation. The cable was insulated with an oil base compound with a neoprene jacket. Mr. Coffin reported that before the shielding tape is applied the cable is given a tank test so that it is wet. When the shielding tape was applied that was probably the cause of the water stain. Mr. Grier pointed out that the failure could be caused by a combination of moisture and induced a current in the cable shield. This is a very serious problem and it is open to question whether aluminum shielding tape will be used unless the problem is solved. Mr. Coffin suggested that perhaps an alclad foil will give better service. Mr. Grier stated that if it was only a water stain he is not too worried, but if it is corrosion then it is a cause for real concern. Mr. Engelhart explained that water stain itself is a uniform formation of aluminum oxide, but that in corrosion some metal is removed. In his opinion this is

a case of corrosion, as there are signs of metal being removed. Mr. Gilbert explained that Rome did not use tank testing on shielded cable and for that reason it appears that the water stain theory would not hold up. Mr. Tompkins reported that the one cable that failed was Rome and one was Okonite. It was agreed that these samples of cable should be submitted to ARL at New Kensington for complete examination. Mr. Cope reported that efforts had [fol. 5259] been made to develop a market for aluminum shielding tape, and that it is quite important that this problem be solved. Mr. Cope expressed the opinion that Polyvinyl and Polyethylene insulation would be superior insulation to neoprene, as neoprene is fairly porous, and will admit moisture to the cable. This was confirmed by Mr. Engelhart. The question was raised about an Underwriters' approval of insulated cable made by Alcoa, and if this approval was necessary for use in company plants. Mr. Grier replied that this was the case in the States of Washington and California, where the Underwriters' code is mandatory. Mr. Cope expressed the opinion that we might want to get into this business and that it would be a good idea to make up some samples for tests by Underwriters. The question was raised as to the advisability of Alcoa getting into the business of insulated cable. Mr. Coffin was asked the question if he was considering selling insulated cable and he replied that we are not yet ready to enter into this business, which is totally different from bare conductor marketing.

V. Electrical Users of Aluminum by the Power Engineering Division

Mr. Tompkins reported that about 900,000 lbs of aluminum was being used in the Warrick plant. Aluminum includes all types of conductor, switch boxes, cubicles, conduit and so forth. Mr. Tompkins said that the new compression joint filler, Unoba A2 with tabular alumina, had been used at the Chilhowee project in Tennessee, and was quite successful. Consideration was being given to using some General Cable mineral insulated cable which they have developed. This cable would have aluminum conductor under the new type insulation. If turned out, however, that General Cable was not able to supply this new type

[fol. 5260] cable, and Mr. Grier pointed out that he had had the same experience when General Cable offered to make some for the Trinidad project and then were unable to do so. Mr. Grier said that the total use of aluminum at Warrick is about 6 pounds of aluminum per installed KW. Mr. Coffin recalled that slightly over 5 pounds had been consumed for non-electrical uses, that is, pounds per KW installed capacity. Mr. Tompkins said the figure was about 2,000,000 lbs for mechanical uses exclusive of electrical uses. Mr. Guess called attention to the fact that if we had been able to sell all of the plants in excess of 100 megawatts we would have sold approximately 120,000,000 lbs aluminum in 1956 for steam stations.

VI. Review of Investigation in Alcoa Research Laboratories, Messrs. Hartmann, Engelhart and House

Mr. Hartmann stated that if anyone present had ideas on priorities on any research projects, it would be very helpful if they would present them as the prepared report was reviewed. These projects are all covered in the detailed Progress Report of the Alcoa Research Laboratories, Dated September 3, 1957. [7-C-12].

Mr. Hartmann pointed out that when the scheduled tests [9-10338] on the mechanical properties of busconductor are completed an [9-10466] ARL Technical Paper should be prepared and distributed to bus [7-E-5, 9-10503] conductor users. Mr. Hartmann stated that because of budget requirements extruded and rolled bus are kept separate in the research projects. All the tests of mechanical properties of bus conductor are on "A" priiority.

Next item for discussion was insulated Wire and Cable [7-E-7, 16-204] Mr. House reported that Job Order 16-204 [fol. 5261] had been completed [7-E-7, 16-204] and the other item on the Effects of Short Circuits had a B priority and no work had been done on it. The question was raised if the tests are still desired, and the general consensus was that the 7-E-7 item, "Short Circuits on Terminations of Insulated Wire and Cable", be removed from the Problem List.

Mr. Tompkins asked which of the Scotchlok Connectors [7-E-7, 16-357] are showing up the best. It was stated that the Type M is showing up a little better than the

Type R and that the Burndy KS90 seems to be better than either Scotchlok.

Burndy aluminum compression terminals installed with [16-346] experimental Alcoa dies in the Alcoa Model 60A compressor have been tested. The dies require further modifications for optimum results.

Mr. Bond reported it would still be several months [7-E-8, 16-149] before Job Order No. 16-149 covering the report of Bus Conductors in Stacks will be completed. There was considerable discussion concerning the advisability of having Mr. Lanctot's AIEE Conference Paper on Test of Bus Conductors published, and it was finally decided Mr. Guess would take it up with our publications department in Pittsburgh and that they would [16-324] take the matter up with AIEE and get the necessary reprints made, as there has been a good demand for this paper from customers and other interested parties.

Mr. House reported that a large test involving lap [7-E-8] joints of Bus Conductors has been under way for some time [16-222, 16-351] JO-16-351. Mr. Cope inquired if bus test, Job Order No. 16-222, included the various types [fol. 5262] of silver plating, Rapid Process, Powder Weld process and so forth, and it was stated that these would be included in the present Job Order 16-351. This mainly consists of aluminum-to-copper connections in an effort to develop a satisfactory connection for use in the Alcoa Potrooms. It was reported that the Alcuplate bimetallic wafer interposed between aluminum and copper contact surfaces, or joints with the aluminum silver-plated by the Powder Weld process were giving good results. Aluminum-to-aluminum and copper-to-copper were installed as control joints. All joints using grease type sealers between the aluminum and copper with or without metallic particles are continuing to show increased resistances. There was considerable discussion for the theoretical reasons why copper-to-aluminum joints present the problem not present in aluminum-to-aluminum or copper-to-copper. It was stated that Mr. Fred Keller believes that possibly there is some alloying taking place which causes increasing resistances. Mr. Tompkins expressed doubt, and thought it was merely a difference of coefficients of thermal expansion. Mr. Cope showed particular interest in the aluminum

which had been silver-plated by the Powder Weld process. These joints are performing very satisfactorily. In general, where the surface of the aluminum can be successfully covered, the joint will give good performance. Mr. Tompkins inquired if any tests with No. 2 EC-to-copper were being made. It was reported that they are now on test with the No. 2 EC coated with silver by the Powder Weld process. It was reported also that tin-plating on the copper alone did not give a satisfactory joint, but that tin-plat- [fol. 5263] ing on both copper and aluminum has given satisfactory service. Mr. Hartmann raised the question if the joints using the bimetallic wafer should be continued, and Mr. Tompkins stated that this is being used in apparatus terminal connection at the Warrick steam plant. Mr. Hartmann reported that work was being done in New Kensington on flash-welded bimetallic connections between aluminum and copper.

Mr. Schoeffel reported that the Smelting Division [7-E-8] is considering installing Alcuplate wafers in the aluminum- [16-351] to-copper connections at the St. Lawrence plant. He estimated that over $1,000 per year is being spent per potline in remaking joints. The use of No. 2 EC with copper was discussed and there was considerable discussion concerning aluminum-to-copper joints in potrooms. Mr. Tompkins expressed the opinion that silver-plated aluminum should be tested with copper. Mr. Schoeffel discussed the possibility of silver-plating aluminum bus in potrooms to which copper connections were made. Mr. Cope agreed to work with Mr. Schoeffel on various Powder Weld platings for Potrooms bus connections. It was reported that Handy and Harman of New York now have a silicone silver paint which they claim to be very successful, and that G. E. is very enthusiastic about it. However, considerable doubt was expressed as to the value of this type joint compound.

There was considerable discussion concerning relative [7-E-8, 16-75] creep rates of hard alloy aluminum and copper. It was pointed out that tensile creep tests showed the copper to be quite superior to aluminum alloys. Mr. Hartmann requested that E. C. Lab. data on compressive tests of bus bar stack comparing copper and high-strength [fol. 5264] aluminum alloy be sent in letter form to Mr.

Guess [7-E-8, 16-75] and Mr. George Stickley rather than wait for a formal report.

The "B" priority was assigned to Job Order 16-319, [7-E-8, 16-319] Tests of Potroom Aluminum-to-copper Button Type Anode Bus Connections.

A Job Order No. 16-250 Aluminum Washers of Different [16-250] Diameter and Thickness was removed from the Problem List.

Job Order #16-106, Tests on Sandow Bus was removed [16-106] from the Problem List.

There was considerable discussion concerning the advis- [7-E-8] ability of additional tests on the 8" Extruded Integral Web [16-322] Bus with holes spaced at distances greater than 6". Mr. Guess reported that considerable integral web channel bus with holes drilled on 12" centers had been sold and is operating quite satisfactorily. It was decided to schedule no more tests on integral web bus at the E. C. Lab.

It was agreed that Mr. Engelhart would give Mr. Kessler [7-E-9a] a list of Massena-produced Polyethylene covered conductor [XE-157] for corrosion tests at New Kensington. It was decided to leave the tests of soldered and mechanical electrical connections and new floodlight circuit at New Kensington under test.

Mr. Coffin raised the question if the test for aluminized steel core wire had been put up to the ASTM for inclusion in [7-G-1] their Standards. Mr. Kessler advised that Messrs. H. H. Rodee [PK-20] and E. J. Holcomb are on this committee and Mr. Coffin agreed he would check with them.

It was decided to reexamine the present status of the [7-G-1] use of stainless steel core wire in ACSR and investigate any [XE-11] possible new types of stainless steel which may be available for core wire.

[fol. 5265] It was decided to discontinue corrosion exposure test [7-G-1] work on electrical conductor wire made from tilt mold ingot [XE-12] and the problem was removed from the Problem List.

It was decided to continue the test XE-17 of elec- [XE-17] trical conductor containing Boron.

Mr. Dallye reported that a meeting is scheduled for the 19th of September in Pittsburgh to be attended by inter-

[XE-154] ested parties to discuss the possibilities of securing Unoba #2 instead of Unoba A2. Recent tests using compound made with No. A2 have revealed that there is considerable bleeding of thin oil from the compound under pressure, which is undesirable. Mr. Turner agreed to find out if Unoba #2, as originally manufactured, is available on the West Coast.

It was decided that the program on filler twine tests [XE-184] for Expanded ACSR would be discontinued for the present. Mr. Phillips reported that the filler now being used is apparently as good a product as we can obtain, and it was decided there would be no further work at present, but to keep on the lookout for any improved paper filler product. Mr. Dallye requested, and Mr. Hartmann agreed to exert efforts to have the word "Lub- [7-G-3] ricant" removed for protective coatings for ACSR products, as lubricating qualities are not of importance, and the protective properties are what are required.

Recent developments in the use of X-ray for the detection of strand failure was discussed. It was pointed out [7-G-4a.1, 16-203] that Mr. C. W. Cline, Physical Metallurgy Division, is actively following this in search of suitable equipment for use in the E. C. Lab.

[fol. 5266] It was decided to leave the 1000 ft spans of 397,500 [7-G-4a.1] cm with various grease protective coatings throughout the [16-199] coming winter to gather data concerning self-damping characteristics. After that the program will be discontinued.

There was considerable discussion concerning the best [7-G-4a.1] use to put our test data comparing the Alcoa armor rods with [16-159] preformed armor rods and reduction of vibration. It was pointed out that comparative test data with Alcoa products and preformed rods could not be published in such magazines as "Electrical World" but that this information had been effectively used for our sales forces in combatting preformed propaganda.

It was decided to change Job Order No. 16-108 to read [16-108] "Development of Dampers for Structural Members". The work would also be applicable for lamp standards. The meeting was recessed at 6.00 p.m.

The meeting was reopened at 8.15 a.m. September 12, with a discussion of the vibration problem, and it was de-

cided instead of using the expression "P/P max" to refer to this [7-G-4a.3, 16-97] as "damping efficiency". It was announced that Technical Paper #13, covering the vibration problem, is now in the hands of the printer after acceptance by the Alcoa Editorial Committee, as is also a short paper on the Application of Stockbridge Dampers, which was presented to the Poles, Towers and Conductor Subcommittee at the AIEE Summer Meeting at Montreal. Mr. Hartmann reported that the publications department wishes to combine these two Technical Papers, but that he advised them that this was inadvisable, as they were two [fol. 5267] separate publications and should not be combined or even put in similar bindings. Mr. Tompkins expressed the opinion that efforts should be made to get popular articles published in "Electrical World". It was reported that our negotiations with them in the past had been most unsatisfactory, as they wished to rewrite papers to [16-97] suit themselves, which is considered undesirable. It was pointed out that the early work that was done by Alcoa on vibration had not been exploited as much as it should. Mr. Hartmann advised that this is now under study. There was considerable discussion concerning the merits of tapered armor rods and preformed armor rods and straight rods. It was agreed that power input curves of straight armor rods over Drake conductor would be run in the indoor lab to supplement previous data on preformed rods and Alcoa tapered rods.

Mr. Rawlins reported that the analog computer work in connection with the design of new dampers has progressed very satisfactorily. There was considerable discussion concerning [16-97] the material used in damper cables and the advisability of using aluminized steel wire, or combination of steel wires and aluminum; it was pointed out that aluminized core wire is superior to galvanized core wire because of resistance to corrosion. [7-G-4a.3] It was decided that the main effort should be exerted along [16-237] the line of improved damper performance and some work should be done toward the investigation of the use of aluminized core wire for damper cables. It was decided to experiment with the 10 lb damper, using aluminized steel core wire.

Mr. Dallye reviewed the deterioration of dampers sup-

plied to a customer because of rusting of cadmium plated parts. [16-364] Mr. Englehart remarked that vinyl base [fol. 5268] paints were not satisfactory for the type of test being run in the high humidity [16-364] cabinet. Mr. Dallye advised that he would check with Mr. Ray at ARL to see if they could not secure an improved type paint.

Mr. Phillips reported that radio influence work at [7-G-5] Leadville, Colorado, is under way and that the last six months had been spent in instrument calibration, no actual tests have been run yet.

It was reported that the new type tubular compression [16-297] sleeves for large diameter ACSR eliminate the use of spheres at the end of this sleeve to prevent radio interference, which is considered a great improvement over th old cast connector.

It was reported that as the result of a great deal of work both analytical and experimental, it is now possible to [7-G-5] compute a-c resistance and reactance of any type stranding [16-276] of ACSR within 1% accuracy. It was reported that three companion AIEE Papers will be presented at the AIEE Winter Meeting [16-334, 16-318, 16-330] covering "Magnetic Effects of ACSR Core Wire", "Computation of a-c Resistance and Reactance of ACSR" and "Current-Carrying Capacity of ACSR". It was emphasized that it would be quite important to follow these AIEE Papers up with the Alcoa publications on "Electrical Characteristics of ACSR". It was pointed out that personal contact with the Editorial Committee is helpful in expediting the review of Technical Papers and arriving at a constructive solution to questionable points in Technical Papers to be released for publication.

There was discussion concerning the damping of long [7-G-4.a] river crossing spans at high tension on the West [fol. 5269] Coast. Recent tests at Massena with two dampers at the third points, and other tests with festoons were reported. It was decided as soon as complete test data are available on the model span at the indoor test span that the information be passed on to P. G. and E. It was reported that in efforts to damp small conductors Alcoa armor rods have proved to be a better damping device than any festoon tried so far. It was reported that we are in

the process of securing new type preformed festoon type dampers which we plan to test.

It was reported that artifical galloping has been excited [7-G-4a.3] at the outdoor test span, obtaining amplitudes of 3 to 4 [16-294] feet, using a torsional tuning bar on the span having neoprene air foils.

It was recommended that a short article reporting the [JO-16-318] solar absorption test be worked out for publicity along this [16-330] line.

The emissivity test work at Purdue is now progressing [7-G-5] and it is expected this work will be complete this year. [16-274]

It was recommended that the tensile tests on conductors [7-G-5] annealed to various degrees at Purdue University be run by the [16-160] P. T. Lab. as soon as practical and a final report on the work issued.

It was decided that PVC covered Triplex should be [7-G-5] tested in addition to the other samples on the 300 amperes [16-345] failure to destruction tests now in progress.

It was decided to give A-Plus priority to Job Order [7-G-6] 16-291 covering tensile creep tests, stranded aluminum conductor [16-291] at elevated temperatures.

Job Order 16-340 should be known as "Exposure Tests [fol. 5270] [7-G-6] of Conductor at Jenner Test Site, Pacific Gas and Electric [16-340] Company" instead of "Test Site Near Bodega Bay".

The question was raised as to the amount of good [7-G-6] Alcca would derive from Cold Room Icing Tests of Stranded [16-355] Conductor run at the Cleveland cold room. The consensus was that in addition to the customer good-will it would possibly lead to other advantages for Alcoa.

Mr. Dallye reported that samples of Unoba A2 and [7-H-2] Tabular Alumina Filler Compound was being used by some [16-344] customers and company plants. However, a better product is still being searched for. This has had a very good acceptance and is greatly superior to zinc chromate.

Mr. Dallye stressed that it is important to find a more [7-H-2] uniform and satisfactory method of scratch-brushing grooves [16-356, 16-359] in p. g. clamps. Con-

siderable numbers of clamps have been returned from our customers because of poor contact resistance. Mr. Guess stated that any specific recommendation for scratch-brushing for both hand and power type brushes should be available to pass on to customers when requested. Mr. Kessler agreed to work out recommendations on the proper brushes to use for both hand and power applications. This information would be reviewed with the E. C. Laboratory before it was forwarded to Mr. Guess. The relative merits of cleaning by scratch-brushing versus chemical cleaning of p. g. clamps was discussed. Mr. Kessler stated that it was purely an economic problem as to which process is best, as both methods can produce satisfactory results if properly used.

Mr. Kessler advised that 50% zinc and 50% tin solder [fol. 5271] is to be used in place of lead-tin solder in the production of copper bushed p. g. clamps. It was expected some savings will result.

It was agreed that on Job Order XE-249, Alcoa #2 [7-H-4, XE-249] Electrical Joint Compound Test should include a corrosion test to study the effect of Alcoa #2 Joint Compound on silver-plating. Mr. Cope agreed to look up the letter concerning this subject which gives the full requirements. Mr. Dallye reported that he had a test report made by Alcan on various joint compounds which he would have copied and sent to various interested parties. Mr. Dallye stressed the fact that we are still looking for a joint compound better than #2 Electrical Joint Compound. Mr. Dallye pointed out that in the wording of Item 7H5, the [7-H-5] word "Lubricant" should be changed to "Sealing and Filler Compounds for Conductor and Accessories". The word "Lubricant" is very misleading as it is not a lubricant that is needed.

Mr. Dallye stressed the need for short-circuit tests on parallel groove clamps. Also data are needed concerning the effect of conductor tension on bolt torque and contact pressure. The effect of different lubricants on bolt torque and pressure should be investigated more fully.

Mr. Engelhart raised the question as to the advisability of a research program on wiring harness under various conditions of corrosion. Such a program would take about five years. It was agreed by the committee that the Sales

Development Division would handle this when the need for such work arises. Mr. Engelhart also raised the question concerning underground corrosion of aluminum grids used in grounding systems. It was the consensus of the [fol. 5272] Subcommittee that it is not particularly interested in this project. This problem should also be reviewed by sales development and also any other interested parties. It was the consensus that work should be done on soil corrosion of insulated aluminum conductor for direct burial in the ground.

VII. Review of Investigations at Massena Works

Mr. Kessler called attention to his letter dated August 31, 1957. Mr. Kessler reported on the work to develop a high strength alloy for all-aluminum stranded conductor. A smooth body conductor constructed of five strands of 3004-H18 Wire with two EC-H19 strands could be produced at a cost of 15% to 20% above equivalent ACSR. Some experimenting had been done on 2 EC + .25% copper in a T81. The production trial is nearing completion. However, it is expected this will cost approximately 30% over ACSR. It was recalled that the goal for this type conductor would be perhaps 10% above ACSR in price, and have a conductivity of 56% with a tensile strength of 40,000 to 45,000 psi. Best results so far in conductivity are around 53%.

Recent advertisements by both Kaiser and Reynolds concerning high-strength all-aluminum conductor were discussed. Mr. Kessler emphasized that the Reynolds products using 5005 alloy cannot possibly result in a conductor anywhere near the equivalent strength of ACSR, size for size. It was agreed that a strong alloy conductor having the strength of about 10% less than equivalent size ACSR and about 15% maximum price increase over ACSR would have possibilities and that the efforts would be exerted to find such a product. The possibility of stranding com- [fol. 5273] binations of 2 EC-T81 with EC-H19 will be investigated by Mr. Kessler and Mr. Coffin.

Smooth body Stranded Conductor was discussed at length. Mr. Guess pointed out that because of the current price war this product had not been pushed. It was emphasized that the increased cost of this product over stand-

ard conductor would eliminate it as it appeared that a premium price cannot be realized on this type conductor. It was the opinion that smooth body has a real field in covered conductor because of the consequent saving on covering material and also the saving of space. However, this depends on holding the cost down to that of standard stranded conductor. It was decided that Mr. Kessler and his group would study the problem further, and if such conductor can be made on a proper cost basis it will be introduced to the market at a proper time, when prices have become stabilized.

The Identification of Massena Stranded Conductor by means of Panniers 127-½ red marking ink was discussed. Mr. Turner pointed out that this ink will bleed through into any protective grease that may be applied to the conductor for protective purposes. Mr. Turner advised that Southern California Edison had requested that conductor manufactured for them be identified by an orange color paint, and after considerable investigation by paint manufacturers and ARL at New Kensington, a lead-free orange paint had been successfully applied and that this paint will not bleed through Calol White Grease No. 2 which is standard protective grease used by Southern California Edison Company. It was agreed by the Subcommittee that this entire subject should be reopened and that Mr. Turner should send samples of painted wire to Mr. Engelhart [fol. 5274] for examination and that the Product Identification Subcommittee should be informed of the findings.

It was reported by Mr. Kessler that recent attempts to improve the quality of ACSW had been unsuccessful and the question was raised if this problem should be further pursued, in that the Bell Telephone people no longer contemplate the use of ACSF for open wire telephone circuits, as they are now using an aerial type cable using aluminum communication wire insulated with Polyethylene in pairs carried by a steel messenger. Mr. Guess commented that the railroads and telegraph companies are still interested in the product. Mr. Coffin reported that he had received information from two different sources to the effect that Copper-Weld now has an aluminum-clad steel wire similar to Copper-Weld which they are just about ready to introduce to the market. Mr. Coffin pointed out

that it might be of considerable advantage to Alcoa to secure a patent license for the process Copper-Weld is using for the manufacture of this product. The possibility of an all-out program to develop the process at ARL New Kensington was discussed. It was estimated the first year's work would amount to $25,000 and may continue through three years with no guarantee of success. In light of the possibility of Copper-Weld already having a process worked out it was agreed that no further work on this problem should be done at the present and that Mr. Coffin would initiate negotiations through suitable channels to explore possibilities of securing a license from Copper-Weld. Mr. Hartmann stated that he would advise, in light of the present situation, the Process Metallurgy Divi-[fol. 5275] sion not to put an item in their budget for Research on ACSW and that if the situation changed, it will be put in as a special item later. Mr. Kessler reported that Triplex with ACSW Neutral had very poor customer acceptance and had been used by one company outside of Alcoa, the Nantahala Power & Light Company. It was decided that no indoor test span space should be used for testing fatigue characteristics of ACSW but some should be installed at the outdoor test span for natural vibration tests.

Mr. Kessler reported that the production of the 62% minimum conductivity EC was moving along, but that there were considerable quantities of old stock. Mr. King reported that this project was also coming along well at Vancouver. It was pointed out that in light of this higher minimum conductivity conductor that the precision of conductivity measurements should be closely checked and that samples from Vancouver and Massena be sent to the E. C. Laboratory for additional checking on the Kelvin Precision Bridge. It was pointed out by Mr. Hartmann that the conductivity measurements had never been placed under the type of control that mechanical testing and chemical analysis had been, and perhaps in light of this new development the matter should be looked into to set up a regular program for conductivity tests and checking. Conductivity samples should also be sent to Mr. House for test from both Vancouver and Massena.

Mr. Turner reported that the Kaiser people on the west

coast were already aware of the fact that we had sold A.G. & E. some 62% minimum conductivity conductor. It was the recommendation of the committee that Mr. Coffin take steps to set up a meeting in Pittsburgh for interested [fol. 5276] parties to study the introduction of 62% minimum conductivity EC Wire to the market, which would include exploration of the possibility of placing a small premium price on 62% minimum conductivity wire of ¼ cent.

VIII. Miscellaneous Items

It was emphasized that the work of the Subcommittee on Electrical Conductors includes electrical conductors and accessories which should cover the full scope of conductors as well as overhead transmission circuits. One exception to this is the work on the foil coil project which is being followed by the Capacitor Foil Committee.

The Armour Research Foundation proposal that Alcoa sponsor a continuation of their research work on aluminum connectors was considered by the Subcommittee. This program was originally initiated by the Edison Electric Institute and upon completion the sum of $70,000 will have been expended. EEI have decided to terminate the program when the present funds are exhausted. Accordingly, Armour approached Alcoa as an exclusive sponsor for the continuation of the program. The first year's work would entail an expense of $30,000. After considerable discussion the Subcommittee recommended that the program should not be pursued by Alcoa and Mr. House was delegated to write Dr. Colnar of the Armour Research Foundation advising him of the Subcommittee's action.

Recrystallization temperature and creep rate of aluminum conductor was discussed. Mr. Bossert has already advised Armour that we would think about the project and [fol. 5277] that if we decided to go into it we would let them know so that so further reply to Armour is in order. After considerable discussion it was agreed not to go into this program, but to conduct a modest investigation of our own, which was reported to be already under way, using 12 ft lengths of wire which had been flexed and straightened. These will be checked for creep rate and the effects of flexing on the temperature of recrystallization.

Advertising programs on stranded conductors being car-

ried out by one of our competitors was discussed. It was pointed out that these advertisements do not include cost in their claims of efficiency of transmission and other advantages. However, it was agreed no counter-moves concerning these advertisements should be taken, and it was pointed out that misleading advertisements usually boomerang.

Mr. Cope advised the Subcommittee of a request made by the Square D Electric Company, through our Detroit Sales Office, to conduct test on aluminum fittings manufactured by their company. It was pointed out that similar requests of this nature had been turned down in the past, and that we should not become involved in commercial testing. It was decided by the Subcommittee that Mr. Cope should advise Mr. Wooldridge of our Detroit office that we are not in a position to undertake these tests for Square D.

The manufacture of a special type ACSR which is hoped to have self-damping characteristics was discussed. Confidential negotiations have been carried on with Okonite and they have agreed to make covered strands which would be part of the 795 MCM ACSR 26/7. The Subcommittee agreed that this project should be pursued in an effort to develop this new type conductor.

[fol. 5278] An experimental type damper designed by Mr. W. E. Michalke was discussed and it was decided to advise Mr. Michalke that based on information already available it appeared doubtful that this type damper would be effective.

Investigation covering welding of electrical conductors was discussed. It was reported that present specifications are the same as those used for welded pressure vessels and are quite unrealistic for welding electrical conductors. Mr. Cope agreed to get a group together to discuss this which would include Mr. Guess, Mr. Sandell and Mr. Wagner, to see if a satisfactory specification for welding electrical conductors could be drawn up. Mr. Hoglund and Mr. Rogerson would also be included in the group. Mr. Kessler suggested that the results of this committee be submitted to the ASTM committee B2. It could be made a part of the section known as "Specifications for Aluminum Bus" Committee B2 ASTM. Mr. Grier emphasized the

need for an acceptable specification for welded bus which could be used by consulting engineers. The only code available now is the ASME test code for pressure vessels, which is entirely too severe for this application of welding.

The question of getting out a report on Chemical Cleaning for Weathered ACSR was brought up. It was stated that so far a satisfactory method of chemical cleaning had not been arrived at, although one was still desirable. Mr. Coffin expressed the opinion that he did not think it advisable to circulate information on the method developed because of the fume and safety angle and also the fact that [fol. 5279] it did not do a very good job on the inner layers of the conductor. Apparently at this time scratch-brushing is still the best method of cleaning.

The question was raised concerning publicity on the tests of the DuPont explosive type joint. It was stated that DuPont is not interested in publicity on this process at this time and Mr. Coffin expressed the opinion that he thought any publicity should be up to DuPont if and when they are ready.

IX. New Projects

Under new projects Mr. Guess stated that information concerning the relative effect of creep on Polyethylene, Neoprene and PVC covering for aluminum conductors would be helpful. It is pretty well established that PVC is quite susceptible and appreciably deteriorates on conductor strung under tension. Many customers have found this out for themselves and consequently refused to use either Neoprene or PVC covered Triplex claiming that the neutral would cut into the covering, causing failure. Various possible tests of this type were discussed. Mr. Hartmann suggested that Mr. Guess draw up a brief outline of what information he required as a sales aid so that a possible test program could be arranged.

Mr. House reported that Mr. Rawlins had been invited to give a talk on conductor vibration before the Alabama Section of the AIEE next March and that he expected to give the same talk before the New York section of the AIEE this coming December. Clearance to give these talks has been obtained from the Editorial Committee.

The possibility of Technical Papers on the Sleet Melt-

[fol. 5280] ing Tests carried out at Massena was discussed and it was agreed that such paper should be prepared as soon as posible for presentation to the AIEE. It was agreed also that a paper on the Conductor Icing Tests at Cleveland should be prepared as soon as practicable.

X. Budget

Mr. Hartmann presented a sheet showing the consolidated Budget items for all research on electrical conductors. This covered work by the Physical Testing Division, the Lubricants Division, the Chemical Metallurgy Division and the Electrical Engineering Division at Massena. Engineering Design Division should also be included. The budget was discussed at length; Mr. Dallye pointed out that there is still work in accessories that he would like to have done, namely, the short circuit tests on parallel groove clamps, tests on 356 alloy scratch-brushed and unscratch-brushed should be done. Mr. Kessler made the remark that he did not believe consistent results could be obtained on F castings without scratch-brushing. Mr. Hartmann asked for an expression from the Subcommittee if they considered that the budget was satisfactory for 1958 operation. Mr. Grier made the motion that the budget be accepted in its entirety and this was seconded by Mr. Coffin and unanimously carried by the Subcommittee. Mr Hartmann stressed the point that it was the purpose of the research program to work on the problems which would bring Alcoa the most return and prestige, and that any suggestions from the members of the Subcommitte would be most welcome. Mr. Coffin stated that one particular project in which he was interested in getting on a commercial basis was the use of M475 alloy conductor.
[fol. 5281] Mr. Coffiffin referred to contacts that he has in the Hawaiian Islands. It was agreed he would investigate the possibility of erecting some M475 stranded conductor in the Hawaiian Islands, where the corrosive conditions are among the worst in the world.

HEH:ip

Hazen E. House.

[fol. 5282] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 150

Internal Correspondence

October 11, 1957.

From: C. A. Appel
Portland Office

To: Mr. E. P. Burton
Portland Office

Re: Electrical Conductor—Covered

We have for some time been in a negative sales position with respect to covered and insulated electrical conductors. Relying on others for mfg. of material and latterly putting in limited facilities of our own, we have yet to convince the customers Alcoa is firmly in the business and will make technical contributions to the industry. Kaiser's purchase of U. S. Rubber's Wire and Cable division only accentuates our position and will in the future, I believe, place us in severe jeopardy of a proper share of the aluminum cable market.

The announced plans to rectify this condition consist of a three stage growth in Alcoa facilities, beginning with a polyethylene line at Massena, a neoprene line at Massena and another polyethylene line at a location to be determined. Barring an acquisition of another company's facilities, there is reason to believe the plan should now be altered to include a polyethylene line at the Vancouver plant as the next step. I believe we should support this view and suggest we work closely with the Vancouver plant on the problem.

Last spring a study was made of the economics of Massena shipments v.s. Vancouver shipments of poly-thylene covered conductors to the territories of Seattle, Spokane, Portland, San Francisco, Los Angeles, Kansas City, Denver, Omaha, Wichita offices, as well as the El Paso area. Using 1956 booking figures and the freight savings on pig and ingot shipments east and finished product west, the net savings to the company of a Vancouver installation

[fol. 5283] were approx. $7,000/year. This, however, did not amount to 20% on an investment of $130,000. It appeared an additional 160,000 lbs. of West Coast aluminum weight business on top of the 400,000 lb. total would be required to reach this goal.

A recent cursory review of 1957 business seems to indicate a more favorable position to the proposition. Massena is running a full three-shift operation of which one shift is for West Coast destination. Since accommodation of further increases in polyethylene business will require additional facilities, West Coast bookings and shipments are up 50% in spite of a San Francisco decrease, and the change in the Los Angeles area to polyethylene has yet to take place, it would seem logical we should support a West Coast facility before further development at Massena.

Certainly we have a stake in a Vancouver operation. Even though Seattle district shipments of covered wire reflect the majority of the West Coast increase in business, a mill here would definitely generate further income for us. COPCO, now no factor in our covered business, would support the mill and I am sure P.G.E. and PP&L would of necessity enlarge on our share of their market.

I feel it will be to our own best interest to promote and aid Vancouver in the R for A currently being prepared.

C. A. Appel.

CAA:mrk

cc: Mr. H. A. Faisst, Seattle, Mr. W. A. Carleton, Seattle.

[fol. 5284] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 151

November 22, 1957.

Earl B. Cox, Cincinnati Sales.

Mr. P. T. Coffin, Pittsburgh Office.

Re: Electrical Conductor Sales Meeting, December 9, 10, 11, 1957

Our main interest is the competitive price situation in bare and covered conductors. Things are temporarily quiet but none of us are naive enough to believe the trouble is over. We have gone through the worst price war we have ever experienced. Did the percentages of the market obtained by Alcoa and our competitors change, or did our relative positions stay the same? Have our competitors been convinced that we all can get full-profit price and still obtain the same percentage of business? We hope it is not necessary to repeat this costly solution.

We seem to detect the feeling that most of our Utility customers would pay full price if the major conductor suppliers would hold firm. This probably is wishful thinking on our part, but we are wondering if other districts detect any of this feeling. We have noticed an encouraging sign. Southern Electrical Corporation seems to be holding to the price schedule since Olin-Mathieson bought them.

You know the situation that developed at General Electric, D.A.D., Cincinnati. We started at a price of $.84/lb on flattened wire bus conductor cut to ten foot lengths. After numerous discussions about price with the customer, they decided to get competitive prices. This resulted in Alcoa having to cut the price to $.45/lb to keep the business. It was difficult to convince General Electric that we were not gouging them at the start. I believe we [fol. 5285] should review our costs and selling prices on our products so we do not appear excessive when compared to our competitors.

What is the competitive picture on extruded bus conductor? General Electric now has a lower price on extruded bus from an independent extruder. We are trying to con-

vince them our quality control on such things as electrical conductivity and tensile properties makes our product worth more. The customer, however, is extremely price conscious.

What is Alcoa doing to expand its activities in the Electrical Conductor Industry? Are we going into the insulated wire, building wire, and other conductor applications? It seems that Alcoa cannot continue as leader in aluminum conductor if we do not produce some of those other conductors. It is disturbing to see Kaiser expand into all conductor applications and threaten to take over first place.

We have one customer showing interest in Reynolds Metals Company's new alloy 5005 conductor. I assume Rodee will have the complete story on that for the meeting. We would like to have samples available to give to customers to keep Reynolds out.

We suggest Dixon Lewis cover the up-to-date Conduit situation. The fact that we are now competitive with steel conduit on an installed basis should result in increased good business.

I am sure we will hear from the Development Division. I would like to have the latest information on silver plating aluminum. I notice Reynolds Metals Company is making some claims.

Earl B. Cox.

EBC:le

cc: Mr. L. H. Gray, Mr. George A. Bibens—Cincinnati.

[fol. 5286] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 153

August 21, 1956.

T. L. Gilbert,
Covered Conductor Department,
Massena Works.

Mr. P. T. Coffin,
Pittsburgh Office.

T. L. Gilbert Suggest You Send a Copy to Kent Van Horn & T. W. Bossert, N. B. Lane

Dave 8/27/58.

Re: Facilities for Neoprene and Rubber

Please accept my apologies for breaking into your meeting on Friday. Had I known ahead of time that my vacation schedule would permit me to stop off in the Alcoa Building, I could have made arrangements ahead of time to see you and L. T. We are naturally very much interested in your reactions to my letter of August 8, and I am glad you questioned my opinion that we do not need a high-priced rubber chemist to produce neoprene and rubber products.

This statement reflects our immediate thinking on producing the standard neoprene line wire and triplex items that we now obtain from Rome Cable, as well as the two-shot rubber-neoprene triplex. I see no reason why we cannot handle the technical problems of these products.

As far as the broad problem of development of new products is concerned, we certainly agree that an experienced technical person is called for. Without such a person, we would, as you intimated, just be following behind our competitors. We all agree that Alcoa would not want to be in such a position.

However, we believe that such a person, with the department and facilities that must ultimately come, should be a part of Alcoa Research Laboratories and not a member of our fabricating organization at Massena. If we hope

to compete development-wise with Rome Cable and the like, we will no doubt need research and development facilities approaching those that we have seen at Rome.

[fol. 5287] To sum up our position, we can undertake the manufacture of our present standard neoprene product without the benefit of an experienced technical man. To go further into the development of new products would require, as you stated, a technical body of appropriate background, size and facilities.

T. L. Gilbert.

TLG:jom

CC: Messrs. J. L. Patterson, Pittsburgh, J. A. MacLeod, Pittsburgh, N. B. Lane, Massena, C. L. Kessler, Massena.

(File)

Copied 8/27/58
TLG:jom

CC: Mr. K. VanHorn—ARL—New Kensington, Mr. T. W. Bassert—Pittsburgh.

[fol. 5288] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 154

Confidential

Minutes of Fall Meeting

Subcommittee on Electrical Conductors Massena, New York, September 10-11, 1958

The following detailed reports were submitted by members of the committee prior to the meeting.

Conductor Accessories—F. R. Dallye, Sept. 3, 1958.
Electrical Windings—R. R. Cope and S. R. Chapman, July 10, August 20, 1958.
Development and New Applications—S. R. Chapman, Sept. 9, 1958.
Massena Production Data—C. L. Kessler, August 25, 1958.

Massena Fabricating Works Development—C. L. Kessler, August 26, 1958.

Alcoa Research Laboratories—Progress Report—E. C. Hartmann, Sept. 4, 1958.

The minutes do not include the detailed information given in the above reports. Only matters discussed during the meeting are included herein.

Members Present

Mr. E. C. Hartmann, Chairman, Mr. S. R. Chapman, Mr. P. T. Coffin, Mr. F. R. Dallye, Mr. L. T. Guess, Mr. H. E. House, Mr. W. E. King, Mr. C. L. Kessler, Mr. N. B. Lane, Mr. J. S. Tompkins, Mr. R. N. Wagner.

Guests

Mr. L. M. Arbegast, Mr. E. T. Englehart, Mr. L. C. Getsinger, Mr. T. L. Gilbert, Mr. R. W. Knapp, Mr. E. K. Lanctot, Mr. C. B. Rawlins, Mr. T. E. Simpkins, Mr. W. D. Stewart, Mr. C. B. Travis, Mr. O. F. Turner, Mr. P. D. Tuttle, Mr. Y. C. Yedlicka.

[fol. 5289] Mr. Hartman called the meeting to order at 10:30 A.M. on September 10. All members were present. Mr. Hartmann welcomed two now members, Mr. Wagner and Mr. Chapman, also Mr. Otto Turner who was representing Vancouver. It was the wish of the Vancouver management that they be represented informally on the committee, without any regular membership.

I. Market Conditions and the Competitive Situation

Mr. Coffin reported that market conditions at present show a very mixed trend. Apparently little business has been placed with our competitors since June 13, when Alcoa went back on price schedule in an effort to end the price war. Most competitors, except two or three small ones, have held to this price schedule. Mr. Coffin reported most of the conductor business had gone to Alcoa, which would be good if it weren't for the fact that to keep their mills going, competitors may cut prices. There are several million pounds on our books and it is hoped that most of this

can be shipped before any further price cutting. Mr. Coffin expressed pleasure with the prestige and good salesmanship of Alcoa. Price cutting in the past has resulted in a general depression of prices as it has been Alcoa's practice to meet these prices, consequently it does not result in any increased business for competitors, but just make profits poorer for all. The present outlook is that the 1959 business level in conductor will be as good as 1958.

Mr. Lane asked if we were bothered by foreign manufacturers in our domestic market. Mr. Coffin replied that because of the tariff barrier this was not a problem. However, it is practically impossible for us to get any foreign business because of their low price schedules. Government subsidies in Sweden enable them to cut prices drastically. [fol. 5290] Combined shipments from Vancouver and Massena during July were the heaviest in 4 years. August and September also look good. The Covered Conductor Department at Massena had the best month in August that they have had since they began production. In spite of vicious price cutting, Massena has been able to show a profit on covered conductor. A profit has also been shown in expanded conductors. Mr. Coffin reported on the tie-line between Commonwealth Edison of Chicago and Indiana Michigan, a subsidiary of American Electric Power Corp.

Mr. Coffin reported that Kaiser is having almost identical trouble with popped strands that Alcoa had with Bonneville. Considerable mileage of Kaiser conductor will have to be replaced. As pointed out, most of Alcoa's trouble with Bonneville was caused by the contractor, whereas the contractors on the Chicago-A.E.P. Corp. tie line were two of the most experienced in the U.S. It is understood that 200 miles of 159 MCM ground wire will have to be replaced by Kaiser because of aluminum strand failures caused by very short length of lay of steel core. Because of these troubles Kaiser is presently somewhat fed up on the conductor business.

Mr. Coffin reported that after years of negotiating and studying, a transmission line with all-aluminum towers is about to become a reality. Negotiations are underway with Public Service Electric and Gas of N.J. The only other line with all-aluminum structures known at this time is the Kitimat line in British Columbia.

Mr. Lane said that he wished to go on record that Massena be given a chance to figure on furnishing the transmission tower structural shapes. He believed Massena can compete price-wise, both for company-use shapes and [fol. 5291] customer-use shapes. In all probability the shapes could be cut to size and punched at Massena, and delivered to the job-site at a price as low as extrusions. Mr. Lane reported that Massena definitely needed the structural business, as they were down to 2 to 4 shifts on the 26" mill, whereas some of the extrusion plants were on 20 shifts.

Mr. Coffin pointed out that Commonwealth Edison of Chicago and Philadelphia Electric Company are interested in aluminum structures. Sales Development has shown that aluminum towers weighing about 40% of steel are adequate and can be profitably sold at 50¢/lb. Galvanized steel towers require painting after 1 year in heavy industrial areas such as New Jersey, and after, at most, 3 years in other locations. Painting costs vary from $600 to $1200 per tower, and of course it is necessary to deenergize the line.

Mr. Coffin reported that the Copperweld Steel Co. had made contracts with Alcoa and Anaconda to join Copperweld as the sole outlets of Alumoweld wire. Mr. Coffin believes that the biggest outlet for Alumoweld wire will be the neutral for triplex. Alcoa has an exclusive contract to supply the aluminum powder for making Alumoweld. It was reported that interest in the Alumoweld product had been shown by Aluminum Development Assoc. in London. Their request for test data and samples will be forwarded to Mr. Coffin.

Mr. Hartmann called attention to Mr. Dallye's letter of Sept. 3, commenting on accessories for aluminum conductors. Mr. Dallye elaborated on the EEI standardization work on compression fittings. A number of manufacturers have complained about the cost of this test program. The initial stage will be on 4 sizes which will involve about 760 tests of various combinations of 6 manufacturers' fittings used with each other manufacturers' [fol. 5292] tools, etc. The main question is finding a suitable laboratory for doing this work. Mr. Dallye has contacted the Detroit Edison Co., who have equipment and

manpower for the work. There is also the possibility that some of this work could be done at our Vancouver Works, as Mr. Turner advised that their testing machine is not very busy. It was agreed that Mr. Turner would look into the probable costs of running these tests at Vancouver, on the basis of making a modest profit. There are no known commercial laboratories who have the proper type horizontal testing machines to make such tests.

II. Development Trends and New Applications

Mr. Cope called attention to 2 reports prepared for the Electrical Winding Subcommittee, dated July 10 and August 20. An illustrated talk has been presented to educate our own sales people and our customers on the advantages of strip foil windings. Coil designs from about 30 different customers have been received. To date coils for about 6 different customers have been prepared. No. 3 EC having 61.0% minimum conductivity has been designated as the alloy for strip windings.

Mr. Cope reported that Alcoa is now in the magnet wire business. Rea Magnet Wire in Fort Wayne, Indiana, who are the leading independent producers of magnet wire, will make 10 to 24 gage magnet wire for Alcoa which will be insulated for high temperature operation. This will be manufactured by Rea as an Alcoa product, and will be marketed by Rea as Alcoa agents. The price will be about 6 to 14% lower than copper 2 sizes smaller. Mr. Coffin said that Rea's sales force is well known in the magnet wire industry and that they are best suited to sell this product. Perhaps later on they might buy redraw wire rod instead [fol. 5293] of the small wire. In applications where space factor is not of much importance, as in small appliance motors, there may be a good market for aluminum magnet wire.

Mr. Chapman reported a great need for a report on silver-plating for distribution to our sales forces. Present information on silver-plating techniques and thicknesses required are conflicting. Mr. Chapman asked for an expression of policy on silver-plating. Mr. Coffin reported that he had prepared an initial Memorandum on June 6 on this perplexing problem. It was pointed out that G.E. does not use a copper flash and have gotten into no trouble,

whereas our findings show that the copper flash is beneficial. It is appreciated that the commercial angle, the scientific angle and the customer-relation angles are all very important in any Alcoa release. It was agreed that Mr. Coffin would revise his Memorandum in an effort to produce instructions to our sales forces that will give harmonious results.

Mr. Chapman brought up a recent letter in which he indicated the need for Underwriters' approval on unplated aluminum bus. Mr. Wagner reported that Alcoa had sent out a specification some time ago that all our purchases would be unplated aluminum bus. The former specification said that we would accept silver-plated aluminum but would prefer bare. It was decided that the Underwriters' Lab should not be contacted on this subject, and that a requested article for Plating Magazine should not be written at this time, because of a number of unanswered questions.

Mr. Chapman reported that it has been established that copper-plated aluminum wire cannot compete with tin-plated copper unles it can be drawn down after plating. [fol. 5294] Mr. Hartmann reminded the group of the R-168 Process developed some years ago at ARL for solder-covered wire. Further work could be done on this process if justified. Mr. Chapman expressed the opinion that the present low price of copper would not hold up very long and any substantial price increase in copper would make solder-covered aluminum wire competitive. The process used by the Steel Protection and Chemical Co. at present gives only a mechanical bond and will not stand drawing into small wire. Mr. Coffin spoke of the need for higher speed methods of applying the solder coating to aluminum. Mr. King reported on a new type process where the wires form a helix and a mile of wire fits in a 60-ft tank. This process is being further investigated.

Mr. Chapman reported there is considerable interest in copper-plated aluminum for electronic applications. Mr. Chapman exhibited 2 samples of copper-clad aluminum, similar to Alcuplate, made at ARL. It was pointed out that this product has many electrical uses and should be followed up. Mr. King pointed out that one danger of rolling copper-clad aluminum in aluminum rolling mills was copper contamination of other aluminum products.

Aircraft and Marine Products is offering a line of compression connectors for both transmission work and distribution, which will be in direct competition with Alcoa.

III. Production Situation

Mr. Kessler referred to his letter to Mr. E. C. Hartmann of August 25, 1958, reviewing the production situation at Massena Works. Mr. Kessler pointed out that money could be saved if grease was applied only to the outer strands of 19-strand steel core. Mr. Coffin pointed out [Vol. 5295] that about 40 cents a pound is being realized for 22-cents-per-pound grease. Furthermore we must usually apply grease to all layers or not get the order. There was considerable discussion on methods of applying grease to 7 and 19 strand core wires and it was finally decided that this would be discussed between Mr. Kessler and Mr. Turner.

After considerable discussion Mr. Kessler agreed that they would study the advisability of requesting revision of ASTM Specification B-230 for hard drawn aluminum wire for electrical purposes. The proposed method would tighten the specifications and reduce the amount of testing necessary.

The advisability of being able to apply Neoprene insulation to conductors was discussed. Mr. Kessler advised that an investment of approximately $437,000 is required with a period of about 2½ years necessary to return the investment. This proposal had been submitted to Mr. Coffin for study. Mr. Gilbert reported that the Covered Conductor Mill was running 3 shifts now. Consideration is being given to trading in the extruder purchased 2 years ago for a new one which would give 60% more capacity.

Mr. Guess raised the question if we would be interested in taking the order for control cable which could be color coded. Mr. Gilbert advised that we are in the initial stages of placing an order for a buncher and saw no reason why such control cable could not be fabricated. Mr. Guess said Mr. Gunther is very anxious to have a trial run made of control cable. Mr. Guess pointed out the desirability of having test facilities to meet the required specifications. Mr. Kessler was asked to look into the question of con-

ducting adequate tests and will get in touch with Mr. Guess to work out an adequate program.

[fol. 5296] Mr. Kessler pointed out that costs of conductor accessories are being reduced. There was considerable discussion concerning fluctuation of production costs and it was pointed out that there are many variables that affect these figures.

Mr. Lane raised the question if Alcoa had considered the purchase of Belgian core wire which sells for a considerably lower price than domestic products. Mr. Coffin explained this was now in the hands of top management.

Mr. Turner reported that the reason he was requiring additional 84" steel reels from Massena was reels were not being returned but were being held up because of customer right-of-way difficulties and other things beyond his control. There are still 1550 84" steel reels at Massena Works on July 31.

Mr. Coffin reported that the new committee for Wire, Rod and Bar Association had been formed, for which he was appointed temporary chairman, and one of their most important goals is to try to standardize reels. Most of our competitors are represented on this committee and it is hoped that within a year manufacturers will be able to achieve standardization which would, of course, be a saving to both customer and manufacturer. Mr. Lane asked if some of our reels would have to be scrapped. Mr. Coffin said no. Mr. Coffin advised that the eventual goal of this committee would be 2 types of reels, an aluminum reel and a nonreturnable wooden reel. Mr. Turner asked what effect it would have if the customers requested longer lengths of cable. Mr. Coffin replied that Mr. Rodee was working on this problem.

IV. Electrical Uses of Aluminum in Plants

Mr. Wagner reported that the new pot rooms at Massena [fol. 5297] and Warrick had more aluminum than any other potrooms built by Alcoa. The construction program of course has been very much curtailed during the past year, so that not much new equipment is being bought. They are now specifying that switchgear bus not be silverplated. The use of tubular bus instead of flat bus is being investigated. Mr. Wagner said they were interested in the

buncher for Massena, so that our requirements for control cable can be purchased within Alcoa.

Mr. Wagner reported interest in Cadweld. The question of the use of insulated aluminum conduit for use under ground and in highly corrosive chemical plants was discussed and the economy of its use was questioned, although all agreed that the problem should not be dropped. It was agreed that the covering of any conduit should not be undertaken in Massena at present. Mr. Guess reported that some of the newer plastic type conduits are very strong structurally and would be more economical than insulated aluminum conduit. Mr. Guess asked if we could make polyethylene pipe at Massena to cover orders from duPont. It was pointed out that it would not be profitable to tie up the extruder line in Massena and that this pipe would be best farmed out to makers of plastic pipe. Mr. Gilbert pointed out that the competitive situation was quite strong, so that chances of getting a good price are excellent.

V. Electrical Uses of Aluminum by the Power Division

Mr. Tompkins reported that all the silver plating on the apparatus contacts at Warrick is being removed where connection is being made to unplated aluminum conductors. He reported there has been considerable interest by visitors [fol. 5298] to the Warrick Power Plant on the wide use of architectural and structural aluminum. Serious consideration is being given to the use of aluminum towers at the Suriname Power Project. There is also a great deal of aluminum being used in the new St. Lawrence switchyard. Mr. Coffin advised that an attractive brochure of the Warwick Power Plant, telling of all the uses of aluminum, will be released in a few weeks.

VI. Review of Investigations at Massena Works

Mr. Kessler reported requests for 50,000 ft of 5005 No. 4 Conductor. Apparently it can be sold at the same price as equivalent size ACSR. Mr. Tompkins asked about the amount of alloy conductor being sold for overhead transmission lines. Mr. Coffin reported there has been very little 5005 alloy sold and he had been informed that less than a million pounds of Kaiser AAAC were sold since they first

introduced it. He expressed the opinion that when Alumoweld wire is fully developed, we will have a strong conductor far superior to 5005 or AAAC. Mr. Coffin pointed out that tests run in the past on all-aluminum alloy, all-aluminum, copper or any other type non-reinforced conductor show it will not take abuse of overloads or excessive currents as well as ACSR, a very important point with all utility customers. Alumoweld should perform more like ACSR in this respect.

Mr. Kessler pointed out there is some confusion in aluminum clad steel wire. It was pointed out Public Service of Colorado buy No. 4 ACSR .203 by .0916 in. whereas the combination is .236 by .016 in. aluminum over steel for all other customers. It was pointed out that the No. 4 wire furnished to Public Service of Colorado was really No. 5, but they refused to accept this designation. Mr. Kessler cautioned that sooner or later this situation will cause [fol. 5299] trouble. Mr. Guess will make efforts to get this ambiguity cleared up. Delays in recent ACSW orders have been caused by delay in receiving stock from New Kensington. The question of what the actual cost of ACSW is, and whether a profit is being made will be investigated.

There was considerable discussion of the merits of Alumoweld both for use as conductor and core wire, and Mr. Coffin expressed high hopes for this product. Mr. King thought there was a good possibility of raising the conductivity of Alumoweld by better control of the impurities in the aluminum powder.

Mr. Kessler reported that we have one customer, Louisiana Power and Light, using a great deal of 7-strand all-aluminum smooth body conductor in the form of polyethylene covered service drop, purchased through our Graybar distributor. 418,000 ft had been purchased since the first of the year. Mr. Kessler is investigating disposing of 23,000 ft of surplus inventory of No. 2 Smooth Body Conductor.

Mr. Kessler reported that unfortunately we have been unable to obtain any information from G.E. on bunched conductor made at their Asheboro, N.C. plant. This conductor was to be used for electric blanket control wire. However, due to the lower price of copper G.E. seems uninterested in this project at this time. Mr. Cope suggested

that after we get the buncher we can go back through American Insulated Wire and get some results. Mr. Kessler agreed and commented it would be easier to work with AIW as they were closer to Massena and had indicated more interest in the problem. However, he warned that aluminum lamp cords were going to appear rather bulky because of the difference of conductivity compared with [fol. 5300] copper. In the past AIW did not want to release a buncher for experimental work thus reducing their overall plant profits.

Mr. Kessler reported his recent difficulties in obtaining 62.0% minimum conductivity and that studies were being made for better control. It was pointed out that the ore being received by Vancouver is much better grade from an electrical conductivity point of view than that received at Massena, which is higher in silicon. Mr. Kessler anticipates further trouble until the new potrooms are well broken in but that this will be watched with diligence. Mr. King questioned that serious troubles were being experienced. Mr. Kessler reported that although we are having periodical difficulties we are riding along on the narrow edge. However, all EC conductor meets the 62.0% minimum conductivity.

There was considerable discussion concerning the application of 10/64 in. thick covering on conductor. It was pointed out that there is a sizeable amount of business in this product, but at present Massena has no facilities for testing the finished product. Additional electrical testing apparatus costing between $25,000 and $30,000 would be required. Mr. Coffin suggested that Rome Wire and Cable be contacted to determine at what price they would make these tests for us in case we get an order. Mr. Gilbert agreed to check.

The subject of identification of Massena Stranded Conductor was discussed at length. Identification by mechanical indentation or by ink or paint were discussed. Prices quoted on mechanical devices in the past were considered excessive. Apparently the method used by Vancouver to identify conductor furnished the Southern California Edison Co. using orange paint has been satisfactory and the [fol. 5301] cost has been nominal. Mr. Coffin's objection is that there is no certainty the paint will last 20 to 30

years. Mr. Coffin insisted that it is very important to find a practical way to identify Alcoa Conductor. Mr. Guess pointed out that this problem had been on the agenda for years. Mr. King described a method where certain impurities are cast in the ingot and the product can be identified metallagraphically, but convincing the customer might be difficult. Mr. Lane asked for an investigation through sales research and operations to study the problem of identification, and to come back to the next E.C. Subcommittee meeting with an answer. It was pointed out that a Task Force had been in existence and that many suggestions were on record but all appeared too costly or were otherwise unacceptable. Mr. Englehart reported that the tests on paints submitted by Vancouver had not been going long enough to come to any conclusions. Mr. Turner said they buy their paint from Walker Paint Co., Salem, Oregon. Mr. Hartmann pointed ou that lamp black would be satisfactory for changing the color of the orange paint used at Vancouver. An Alcoa blue color would be more desirable but additional tests would be required. Mr. Kessler moved that the committee suggest to Massena and Vancouver that all stranded conductor be identified by the orange paint similar to that used by the Southern California Edison Co. if Southern Cal has no objection to such use. Mr. Coffin seconded and the motion carried. Mr. Guess was asked to secure the Identification Committee's O.K. for this procedure. It was pointed out the original purpose of the orange paint was to identify conductor stolen from Southern California Edison property. However, in case they object to our use of the orange color, lamp black or yellow paint can be used with reasonable chances of success. Mr. [fol. 5302] Dallye reported a recent case indicating the importance of proper identification of Alcoa products. Kansas City Power and Light had some copper bushings made by an outside contractor and installed in Alcoa clamps. Without the Alcoa marking numbers indicating that the clamps were originally unbushed, this would indeed have been very puzzling, but because of our marking was easily solved.

Mr. Kessler reported on the covering of No. 8, 10, 12, and 14 AWG solid and stranded insulated control conductor for Alcoa requirements. Mr. Wagner recalled numerous

complaints from plant people on certain conductors supplied by Massena. Mr. Guess pointed out that this difficulty had been cleared up and that Mr. Gunther was preparing specifications for Massena to work from.

Mr. Kessler reported that stranded conductor with steel core made of Alumoweld for 1/0 ACSR 6/1 and 636 MCM ACSR 24/7 is planned. Fabrication of these conductors is being delayed by the heavy mill schedules, around 5,000,000 lb a month. It was agreed that the manufacture of these conductors would be worked into the schedule as a research project.

VII. Review of Investigations at Alcoa Research Laboratories

7-C-12 & 7-E-5. Mr. Hartmann made reference to the Sept. 4 progress report of ARL covering work of all divisions on electrical conductor and proceeded to report on the first several items covering static properties of No. 2 EC in various tempers, effects of temperature, creep and fatigue, flexural creep of No. 2 EC and properties of No. 2 EC-T84. This work is nearing completion and formal reports will be issued as soon as possible.

[fol. 5303] *7-E-7.* Mr. House reported that heat cycle tests on "pigtail-type" connectors (JO 16-357) run for Mr. Gunther to evaluate connectors to be used in Alcoa plants was complete and the information passed on to interested parties. Final report is being prepared.

7-E-8. Mr. Tompkins asked about the status of the work on bus conductor in stacks (JO 16-149). Mr. House replied that Mr. Bond would resume work on the report as soon as possible. This work had been delayed by the investigation of bolted lap joints in bus conductor and the unforeseen difficulties arising from the use of unplated against silver-plated conductor. Mr. Keller is continuing the study of this problem. Recent heat cycle tests of thick silver plated bus against thin plated bus indicate that no trouble is to be expected from this type joint.

A rather intensive test, JO 16-351, has been under way for some time in an effort to find a more satisfactory aluminum-to-copper connection for use in Alcoa potrooms. Aluminum-to-copper joints abraded through No. 2 EJC

increased approximately 30% in resistance while aluminum-to-aluminum and copper-to-copper control groups were stable. Mr. Tompkins raised the question of whether joining aluminum to copper was a serious question outside of the potrooms, and Mr. Wagner questioned the seriousness of this problem even in the potrooms. However, it was reported that at the Massena Works the aluminum-to-aluminum joints will last the lifetime of the pot, which is about 3 years, whereas the aluminum-to-copper joints must be remade once a year. Mr. Wagner said he doubted if this was done, certainly not on a company-wide basis. Mr. Guess recalled that the Alcoa Tennessee Smelting Operations had reported essentially the same results as [fol. 5304] Massena on copper-to-aluminum joints. Mr. Tompkins and Mr. Wagner agreed that the deterioration which takes place in aluminum-to-copper joints should be further investigated but they believe it is not a serious problem in the plants, certainly not as serious as aluminum-to-silver joints. Mr. Tompkins does not like the use of Alcuplate. It was pointed out that one of the old St. Lawrence potlines which will be restarted in the future will have Alcuplate wafers in aluminum-to-copper joints.

It was decided to drop JO 16-369 covering Handy and Harman Silver Particles Products for Joint Compounds because of unsatisfactory results both here and at G.E. Under JO 16-408 Mr. Dallye asked if the work Dr. Lewis was doing on X & R of Bus Conductors would be similar to that by Prof. Higgins. Mr. House reported that this would be an entirely different approach in which the 650 IBM machine would be used in conjunction with help from Dr. Whidden's group to provide tables for the Alcoa Bus Conductor Handbook. The cost will be less than $2,000/year.

It was explained that JO 16-416, "Contact Resistance Measurements of Experimental Joint Compound in Stacks of Bus Conductor", was being carried on because of sales resistance to No. 2 EJC. Mr. Tompkins asked if much of this work had not been done before, but it was explained that a thorough review, taking into account the older work, seemed to be justified in the light of recent developments. No. 2 EJC is meeting sales resistance because of the safety warning on the can and for other reasons. Mr. Hartmann

advised that Mr. Keller also has money in its budget for studying joint compounds. One problem is the part played by zinc particles in Penetrox. Mr. House explained that a technical paper is now in preparation that will present [fol. 5305] the long successful history of No. 2 EJC for bus conductors and other evidence to show that it makes excellent electrical joints. The purpose of this paper is to give our sales force ammunition to combat aggressive competition and sales resistance they are now encountering.

7-E-9a. Mr. Tompkins raised the question of continuing tests on mineral insulated conductor (JO-XE273). General Cable has not been able to supply this type conductor in commercial quantities. It was agreed that the tests be discontinued. Mr. Englehart advised they are designing a large-scale experiment on all types of silver-plating. Mr. Tompkins said as long as the test was purely for resistance to corrosion the use of bolted joints in the corrosion test did not seem justified. However, Mr. Hartmann and Mr. Englehart both pointed out that different results were obtained from bare bus and bolted joints and to make the test complete both should be tested.

Mr. Englehart said there is no difference in performance in salt spray test between economy grade and quality grade fixtures manufactured by Leviton Manufacturing Co. Mr. Cope pointed out the reason for these tests was to assist Leviton in going to Underwriters to get approval on outdoor lamp sockets. It was pointed out that Leviton has not made fixtures to specifications for outdoor use and that their product could be classed as extremely light duty. These products were not intended for industrial applications such as Alcoa has, but since Leviton is a good Alcoa customer we should do what we can to help improve their products.

7-G-1. It was decided to remove XE-17, Electrical Conductor Containing Boron, from the Problem List.

Mr. Englehart reported that aluminized steel wire after [fol. 5306] one year's exposure to 3½% salt spray, 100% relative humidity at 125°C has continued to show superiority to standard hot dip galvanized wire. Mr. Kessler raised the question of the necessity of the continuity test on aluminized core wire, pointing out that if enough tests are

made, almost any lot will eventually pass. Mr. Coffin pointed out that recently Mr. Holcomb had been setting up a statistical quality control system with Page. After they have this going he thought test work which we are doing, which is in a sense a repetition of their tests, would indicate improved quality, and for this reason did not wish to discontinue our tests. Mr. Coffin pointed out that we are getting considerable business because of aluminized core wire and it would be a mistake to discontinue our test programs because it is very important to be able to tell customers we are making every effort to see that they get a first-class product. Mr. Engelhart reported that investigation is under way for obtaining a more rapid evaluation of the continuity of aluminized steel core wire in the hydrogen evolution test.

Mr. Englehart reported that Alumoweld wire under JO XE-296, has shown up quite satisfactory, although they are rather extensively contaminated with copper smears. Alumoweld steel wire could possibly be used for cables for Stockbridge Dampers and may have superior damping characteristics. Such cables have been prepared using aluminized core wire.

7-G-3. Mr. Hartmann read Mr. Sawyer's report, Protective Coatings for Steel Core Wire. Mr. Hartmann pointed out that three greases are being investigated by ARL, the most promising of which appears to be Kenlube B-521. Mr. Coffin made the motion that the use of Unoba A2 be continued until the results of research study were avail- [fol. 5307] able at which time the problem would be reviewed for decision on what product to use. Mr. Kessler seconded the motion and the motion was carried.

7-G-4.1. There was considerable discussion on the proper use of test data showing the superiority of Alcoa armor rods over Preformed, both as to the reduction in conductor vibration and increased fatigue life (JO 16-202). It was agreed that until the full story is developed it would be unwise to make any publication. Mr. Hartmann suggested a printed report for internal circulation. This type publication would not hurt our relationship as much with Preformed Line Products Co., who are also a customer.

It was decided that JO 16-76, Effects of Various Armor

Rods on Lengths of End Loops on 397,500 cm ACSR and 795,000 cm ACSR, be dropped from the Problem List.

There was considerable discussion concerning the development of dampers for structural members (JO 16-108) and the promotion of aluminum transmission towers and substation structures. It was agreed that most of the vibration of transmission tower members was induced from the transmission conductors rather than wind forces acting on the members themselves. Mr. Coffin pointed out that early in October a group from the Philadelphia Electric Co. were coming to Massena and that he would like to have a good story on the use of aluminum towers from ARL. Mr. Hartmann replied that this suggestion would be followed up. Mr. Kessler pointed out that on the radar towers constructed of structural aluminum on the DEW line in Canada, many of the component parts were manufactured at Massena and that there were no complaints because of vibration, where winds occur all the way from 0 to 100 mph. Mr. Wagner pointed out that in all substation struc- [fol. 5308] tures at Alcoa plants no trouble had been caused by vibration induced by wind. It was pointed out that the cross-arms on the Cedars Towers had shown no signs of vibration and it was generally conceded that aluminum towers would have no more tendency to vibrate than most steel towers. However, it is appreciated that aluminum has less fatigue strength. Mr. Tompkins pointed out the need for an effective damper for tubular bus such as used at Wenatchee, which would preferably go inside the bus. Mr. Hartmann cautioned that when aluminum towers are used an educational program on the use of aluminum bolts will also be necessary as many riggers using these bolts for the first time will twist them off.

Mr. Dallye raised the question if reports on the Sacramento River Crossing and Joppa Crossing, JO 16-177 and 16-152, should be dropped. Mr. Tompkins pointed out that a great amount of work and money had been spent on both of these projects and it would be well to have a final report. It was pointed out that the trouble on the Sacramento River Crossing has not been solved yet as they are having trouble with damper failures and have recently ordered a new supply.

Mr. House reported the development of a new hot line

recorder for vibration records which works very satisfactorily (JO 16-370). Mr. Hyde in his recent visit to Massena thought that it would fill the bill for the field men. Mr. Tompkins suggested that it be installed on the St. Lawrence River Crossing Towers, in the Cedars circuits, as he wished to have vibration information on this span. It was agreed that this should be done. Mr. House reported that natural vibration tests of 795,000 cm ACSR 26/7, containing 2 coated strands had been in progress for some time (JO 16-393). Visual inspection of these conductors from the ground does not indicate that much damp-
[fol. 5309] ing is taking place.

It was agreed to discontinue JO 16-119, Vibration Fatigue Tests of X6064 Alloy Wire, and JO 16-200, Tests of 400-ft Spans of ACSR and Galvanized Steel Wire to Compare Self-Damping Characteristics.

Mr. Hartmann spoke briefly about the proposed papers on Early Vibration and Fatigue Tests on Stranded Conductor (JO 16-419). All members of the committee who have any information on early dates were asked to write Mr. Simpkins. It was suggested that perhaps Mr. Hemeter could be helpful.

7-G-4.2. Mr. House reported on JO 16-242, Natural Vibration Tests on Bundle Conductors. These tests indicate that armor rods do not have the same beneficial effect in reducing vibration in bundle spans that they have on a single conductor. Mr. Dallye asked about the use of armor rods on the G.E. Extra-high Voltage project, pointing out that dampers were going to be used and most of the spans would be bundled. With the large shielding rings there would be practically no chance of flash-over near the suspension clamp. Mr. Tompkins pointed out that the only reason for using armor rods other than to suppress vibration and protect against flash-over, would be to protect the conductor at the suspension clamp. He did not feel that this would justify the use of armor rods, as modern clamps would not be expected to damage the conductor. Mr. Dallye also pointed out that the contemplated changes during the test program on the G.E. EHV project were considerable and in many cases the conductor would probably have to be moved in the suspension clamp in which case the presence of armor rods would greatly complicate the work and in-

crease costs. It was agreed that armor rods should not be used on this project.

[fol. 5310] Mr. House reported on JO 16-259, Investigation of Longitudinal Motion of Bundle Conductors, which is a fatigue test of the spacers. Mr. Turner reported on the Bonneville system, where bundle conductors had wrapped around each other. It was pointed out that Mr. Mather of Bonneville considers our test much too severe and Mr. Tompkins agreed. However, it was pointed out that every type spacer that had been in service in Europe is now beginning to give mechanical difficulties, consequently there is no proven spacer on the market. By such a test as ours we may develop a spacer that would be far superior to any yet made available commercially. Mr. Dallye reported that he had checked with Mr. Gross concerning the condition of the Alcoa articulated spacers which had been in service on the Muskingum-Tidd circuit of the American Electric Power Corp. Mr. Gross reported that some had been taken off. After 2 years of service there were no markings on the cable and no wear on the spacer. They were quite pleased with the service so far. It was pointed out that Preformed has probably had trouble with Preformed spacers abrading the cable which might be the reason for the polyvinyl jacket on the end portions of the Preformed rods. Closed spring spacers were discussed and it was pointed out that the closed spring must be made of stainless steel or some other noncorrosive material. The possibility of an aluminum alloy spring was suggested but it was thought that such a spring would probably take a permanent set during unusual movements that occur during nonuniform ice unloading. Mr. Dallye raised the question if all 3 type spacers should be installed in the G.E. EHV project, namely, articulated type, unibal type and closed spring type. It was agreed that this should be done.

[fol. 5311] *7-G-4.3.* Mr. Rawlins reported on JO 16-97, Study of Stockbridge Dampers, being carried out by analog computer. It was though at the time of the last meeting that we were very near a circuit which accurately imitated the performance of dampers. Recently 2 series of check tests have been made, the first of which checked very well, the second of which did not check close enough. Ac-

cordingly, further steps are being taken to get a more accurate circuit. Once a satisfactory check has been obtained a complete line of dampers will be devised that will cover the full range of conductor size and span lengths to be protected. Mr. Dallye pointed out that when this system is developed it will be very helpful in dealing with the customers. Mr. Tompkins raised the question if we should go ahead with what we already know and design an improved set of dampers. Mr. Hartmann replied that this could have been done 6 months or a year ago, but that we are so near a more complete solution that he believes that the work should be completed, which he hopes will be soon. Mr. Coffin raised the question of there being a patentable damper design arising from this work and Mr. Hartmann replied that that was a good possibility and was being investigated. Mr. Coffin advised that he had been approached several times by the Anderson Electric Co. to get into the damper business. Mr. Coffin feels in light of the amount of money and time Alcoa has invested in this program that we should not let any other manufacturers in on the deal. Mr. Coffin pointed out that if a new line of dampers is developed it would be a sales advantage to have them look different from the present line. When the new line of dampers comes out a technical paper should be published, to exploit the work that has been put into the new design.

[fol. 5312] Mr. House explained that JO 16-292, Investigation of In-Span Damping Devices, is in effect a model test of the Sacramento River Crossing. The damper and weights at the third point were quite effective, indicating that Mr. Tompkins' original solution is sound. Mr. Coffin inquired if this information has been passed on to P. G. & E. Co. Mr. House advised it had been. Mr. Coffin said he was expecting to be in San Francisco in the near future and would discuss the matter with them. Mr. Tompkins pointed out that the mathematics of the weights at the third point with the 2 dampers on each side had been analyzed very well but the use of 2 dampers only at the third point had not been analyzed mathematically. He suggested that this be done, perhaps securing outside services of such a person as Dr. Merrill who has done work in the past for Alcoa. Mr. Hartmann advised that he thought

Messrs. Rawlins and House should work out a plan and, if it seemed desirable, Mr. House could contact Dr. Merrill.

Under Investigation of Festoon Dampers, JO 16-201, Mr. Simpkins reported that we now have the test spans of 400, 300 and 500 ft in series and tests to check the vibration characteristics of undamped spans are now progressing. Mr. Coffin pointed out that he recently discovered that Copperweld has a patent on a spiral damper which they have been selling for use on Copperweld conductor. This could be the damper we need for small conductors. Mr. Coffin advised that if the E. C. Lab would tell him what we need for the outdoor spans he would get these from Copperweld for evaluation.

Mr. Tompkins questioned the value of high humidity tests for Stockbridge Dampers or other products (JO 16-364). Mr. Englehart said this was a good comparative test and was quite useful in evaluating the differences be-
[fol. 5313] tween platings, paint and other types of finishes. It is planned to compare Stockbridge Dampers which have been immersed in No-Ox-Id and those that are perfectly clean.

7-G-5. Mr. House explained that there had been no testing done at Tidd for over a year (JO 16-187). Considerable testing was done on grit-blasted conductor but supplementary tests on mill-run conductor had never been made. Mr. H. L. Rorden of the American Electric Power Corp. advised that it would take approximately $5,000 to relocate the power supply which was necessary because of new construction. It has never been clear who was to spend the $5.000, whether it would be American Electric Power, Alcoa, or both. Mr. Rorden said that before anything could be done they would need a communication from us stating that we were interested in completing the tests. After considerable discussion it was finally decided Mr. House should write Mr. Rorden to obtain full details, then the matter would be taken up with interested parties on the committee.

Mr. House reported on the recent inspection trip made to the experimental test circuits of Public Service Co. of Colorado at Leadville (JO 16-263). A brochure on the project, containing a number of photographs, was passed among the members of the committee. It was reported

that all of the data had been recorded graphically and was sent to East Pittsburgh for processing. No information has been released by Westinghouse concerning any of the results. However, considerable newspaper publicity was given to the AIEE group that made the trip to Leadville. Mr. Tuttle raised the question as to who in Pittsburgh was contact man between Westinghouse and Alcoa on this project, and Mr. Coffin replied that since Mr. Phillips' death no one had been assigned to this, but that it would be Mr. Sandell.

[fol. 5314] Mr. House reported that a report on the emissivity project with Purdue has been received in the form of a thesis by Mr. Rigdon, with supplemental letter reports (JO 16-274). The question was raised concerning tests of about a dozen more samples which were exposed in our Santeetlah and Alcoa installations which would give a relationship between emissivity and time of exposure from one month up to one year. It is estimated that this work would cost between $500 and $1,000. It was the consensus that this work should be completed and the results reported in a technical paper. Mr. House will write Dr. Grosh.

Mr. House reported on the status of the X & R Tests and Electrical Characteristics Booklet (JO 16-276, 16-339, 16-397). The thermal characteristics data have been approved by the Editorial Committee and are now in the hands of the printers. Work on the reactance and resistance is being rushed. Mr. Guess explained that the new policy on the Electrical Characteristics Booklet was to have several component parts in a loose leaf binder all in the same style printing. Mr. House inquired if the new Thermal Characteristics Booklet would be out by the first week in October for distribution at the EEI meeting in New York, and advised that Mr. Sanford had asked him to prepare a Table of Current Values for Stranded Aluminum Conductor over the full size range so that the current required to bring any given conductor up to 125°C could be immediately read off. This has been done and on the same sheet are the so-called normal ratings of conductor for both still air and 2 fps. Mr. House advised that he did not like to distribute this information prior to the coming out of our new booklet and Mr. Guess hoped we could stall until the

book would be out. The Publications Department later [fol. 5315] suggested advising that the material had been abstracted from a copyrighted Alcoa publication.

Mr. Coffin commented that he would like to have some X & R data of Alumoweld Wire, both when used for a core wire and when used as a 7-strand conductor. Mr. Tuttle advised that at present the conduit test is scheduled and then these tests on Alumoweld could be worked in. Mr. Guess emphasized that Mr. Tuttle should not spend any time on other tests until the X & R Booklet is out. He would like to have the data by November 1st in order that we can get booklets out before any other manufacturers get out similar data. It was agreed that Mr. Wagner contact Mr. House to discuss using one of his men who has completed his work in the construction of the St. Lawrence Plant additions. This was subsequently arranged and Mr. Greathouse is assisting in the drafting of the booklet. It has also been arranged that Mr. W. B. Howitt will assist Mr. Tuttle in the computations.

It was reported that the High Current Tests Relative to REA Approval of Polyethylene Triplex (JO 16-345) had been completed and 8 reports sent to Mr. Lewis for presentation to the REA. Mr. Guess reported that Mr. Lewis is making good progress toward getting polyethylene approved.

The Extra High Voltage Project which G.E. will conduct near their Pittsfield Plant, in which Alcoa is a participant, was discussed at length. It now appears that the project will probably cost $250,000 over a period of 4 or 5 years instead of the $125,000 originally estimated. This is because of a large number of added features such as all-aluminum substation structure and aluminum lightning rods on various towers. It was agreed that if we did not [fol. 5316] fully participate it would mean the entrance of our competitors into this project. The general plan for handling the expenses would be for ARL to prepare an R. for A. based on estimates by Mr. Larson and Mr. Dallye. It was suggested that the 1959 ARL Budget should carry an item under 10-J.

7-G-6. Mr. Tompkins inquired if annealing tests of ACSR at Purdue, JO 16-160, would be worked into a paper. It was reported that this had been agreed to at the last meet-

ing and would be done. It will also be part of Mr. Rodee's paper on sag tension. There was considerable discussion concerning the use of tensile creep tests of 397,500 cm 19-strand all-aluminum conductor at room temperature and at 95°C which was covered in an ARL formal report, by Mr. W. B. Howitt. Some of this information had been used in a paper by Mr. George Phillips for South Eastern Electric Exchange Meeting in Biloxi. Mr. Coffin advised that portions of it would appear in an article in "Electrical World" in the near future. Mr. Tompkins pointed out that this is very valuable information and should be worked into an AIEE Transactions Paper. It was agreed that this should be done. It was agreed that tensile creep tests on 1.75 in. diameter Expanded ACSR would be left on the Problem List.

There was considerable discussion concerning the merits of Properzi Rod (JO 16-329). It was reported that this process was very good for small operators but for large concerns such as Alcoa it would require too many machines. The actual cost of conventional rod at both Vancouver and Massena is estimated to be only a small fraction of a mill higher than Properzi Rod made at Vancouver.

The question was raised concerning the publication of the icing tests of stranded conductors (JO 16-355) origi- [fol. 5317] nally suggested by Mr. E. L. Peterson of the American Electric Power Co. Mr. Coffin expressed the opinion that it should be a joint paper by Alcoa and Mr. Peterson, as he had been a faithful friend of Alcoa even though A. E. P. Co. is throwing business to Kaiser at the moment. However, Mr. Coffin feels that Mr. Sporn has had some unpleasant experience with Kaiser products and is beginning to mellow toward Alcoa. It was agreed that Mr. House should work through Mr. Gross on the joint paper with Mr. Peterson.

Mr. Simpkins reported on tests on EC-H19 Wire which had been flexurally hardened through rollers (JO 16-372, 16-373). The higher tensile creep strength and recrystallization temperature predicted by Armour has been confirmed. Mr. Kessler raised the question as to the practical use of this information. After considerable discussion it was agreed that Mr. King would take this up with the Central Metallurgical Department.

It was reported under JO 16-396 that rotating beam fatigue tests on additional samples of Alumoweld wire revealed an endurance limit of 35,000 psi as compared to 29,000 psi for the original samples. Mr. Hartmann pointed out that all the Alcoa test data on Alumoweld was covered in a recently issued summary report.

It was reported under JO 16-417 that losses in aluminum conduit would be determined and compared with losses in steel conduit obtained during tests that G.E. made several years ago. This test is designed to show the superiority of aluminum conduit both during normal operating conditions and under short circuit conditions and to investigate the integrity of standard coupled conduit joints under short circuit conditions. The results should be valuable to both our sales and engineering departments.

[fol. 5318] Mr. Kessler discussed under JO 16-422 the proposal made by Kaiser to the ASTM Committee B-1, Subcommittee VII—Task Group 17, concerning the use of cold welded joints on the outer strands of 7-strand conductor. No welds would be in the center strand and the welds on the outer strands would be limited to 50-ft intervals. The reason for this proposal is to obtain longer lengths of conductor. Mr. Coffin expressed the opinion that this move should be killed if possible because it would confuse the competitive situation and lead to complications in reels. Mr. Kessler said he felt there was a good chance of discouraging its adoption because fatigue tests show the wire with these welds to be inferior to normal. It was agreed that Mr. Kessler should discourage the Kaiser proposal.

7-H-2. Mr. House called attention under JO 16-141 to the test results on the remaining connectors of the first group installed at Sutro and the performance of connectors installed about a year ago. At the last meeting it was decided to taper off at Sutro and when all connectors were out of circuit to put no more in. It was pointed out however that this is a very excellent contact with P. G. & E. and once we pull out it may be hard to get back in. Mr. Englehart expressed the opinion that if we could produce a product that would stand up under this severe environment we would really have something to shout about. The test has been relatively inexpensive and the site is convenient

to San Francisco as compared to the Jenner Test Site which is 75 miles north. It was the consensus that we keep something going at Sutro as long as the P. G. & E. people were willing to have us participate.

Under JO 16-387, Evaluation Test of Modified Alcoa No. 2 EJC with Acrawax, Mr. Dallye questioned the use [fol. 5319] of term "unstable resistance" and suggested "erratic resistance ratio". Mr. Lanctot will check the records and make any necessary corrections. Mr. Hartmann called attention to Mr. Sawyer's report, starting on page 38 of the ARL Progress Report, covering other work on Alcoa No. 2EJC.

The heat cycle tests at 150° and 200° C operating temperature of conductor, JO 16-413, were initiated because of the EEI Performance Specification Task Force work where tests above 100° C were advocated. The clamps have operated satisfactorily for over 500 heat cycles. The temperatures have been raised by increasing the current and now the conductor temperature is approximately 400° C. None of the p. g. clamps have failed, although those that were assembled without any joint compound have considerably higher resistance ratios than those with No-Ox-Id and Alcoa No. 2 Joint Compound. These connectors have a resistance ratio below 1. The reason for these higher temperatures was to check a theory advanced by Armour Research Foundation that at 212° C an aluminum joint completely disintegrates and resistance ratio and temperature take a very sharp increase upwards. Our tests have not borne out this contention.

7-H-4. Mr. Englehart reported that the Chemical Metallurgical Div. had been overloaded with a considerable amount of work on the panel testing and consequently a great deal of the electrical work in their division had been delayed. He reported that additional help has been secured and better progress is expected. Under XE-238 Mr. Kessler raised the question whether the 50-50 solder was enough better than 802 solder to warrant its more difficult application. Mr. Kessler advised that they would like to go back to the 802 because it is more economical. It was agreed that 50-zinc and 50-tin solder would be discontinued and 802 would be used in the future. [fol. 5320] It was pointed out that development work is

underway for an improved 805 solder for use for sale through commercial outlets. Mr. Kessler reported it was his understanding that there is a flux of 805 solder which is water soluble, and noncorrosive so it need not be removed from the finished product. Mr. Kessler said that he would not use this new 805 solder till Mr. Englehart gave the word to go ahead.

10-F-35. Mr. Hartmann reported on Mr. Howell's work on the standardization of electrical conductivity measurements of various alloys and temper (JO 9-10644). Mr. Hartmann asked Mr. King to introduce the subject of the improved conductivity of No. 2 EC. In connection with his work with Cressona and Lafayette discrepancies in conductivity were discovered. This was traced to the use of the Magnatest Meter for conductivity measurements and Mr. King advised that he considered the variation in measurements entirely too high for this type work. He pointed out that Mr. Howell had recommended that all plants go to the potential drop method as recommended by ASTM. Cressona does not feel that they are justified in going to the potential drop method. They claim that measurements by the potential drop method will cost over ten times as much. There was considerable discussion concerning the relative merits of the Magnatest and the bridge method for measuring conductivity. Mr. Coffin strongly urges that the standards not be lowered and all agreed that the Magnatester was not accurate enough for the conductivity measurements which our advertising claims. Mr. Guess made the motion and Mr. King seconded it, that this Committee go on record as stating that the bridge method for conductivity measurements is necessary to maintain proper high standards. Mr. Guess pointed out that we should watch any new developments in method of measuring con- [fol. 5321] ductivity and if some quicker and cheaper method of the required accuracy becomes available that we should investigate it. Mr. Coffin pointed out that he expected to get out a letter to all conductor salesmen, pointing out that all electrical conductors could be guaranteed 62.0% minimum conductivity. Mr. Guess reported that he had checked into this with the Central Metallurgical Division and they agreed that we could safely guarantee 62.0% conductivity on all EC Conductor, bus bar and wire

products. There was considerable discussion on the material to go into Mr. Coffin's Memorandum. It was pointed out that General Cable was buying Alcoa rod where they have to meet the 62.0% specification. It was reported that 62.0% conductivity material was costing Anaconda 5 cents more per pound.

VIII. Miscellaneous Items

The cooperative test program with Okonite was discussed briefly and it was pointed out that samples covered with polyethylene had been sent to Okonite for comparative tests with Neoprene insulated conductor which had failed in service at some of the Alcoa plants. It is believed this test will convince Okonite that polyethylene is much more effective as a cable covering than Neoprene which will admit moisture causing corrosion.

Mr. Kessler reported that degassing equipment for improved quality cast accessories has been installed.

There was considerable discussion concerning the preparation of a paper on the aluminum bus in the Massena Powerhouse which has been in operation over 50 years and will be dismantled in the near future. It was emphasized that all necessary pictures should be taken without delay. Mr. Wagner thought that it would be helpful if Mr. Lanctot [fol. 5322] assist in the preparation of this paper. However, subsequent to the meeting Mr. Lanctot checked with Mr. Prashaw and found his work was well under way and that this assistance was not needed. Mr. Pitman is heading up the actual preparation.

Mr. Kessler reported that in accordance with the minutes of the last meeting, greater activity in the Wire Association was under way. He pointed out that in presenting papers at these meetings, Kaiser has led the field by far. Mr. Coffin urged that in any papers we present we do not want unwittingly to give away any of our know-how. It was pointed out that the Wire Association does not concentrate wholly on electrical conductor but is interested in all applications of wire. Mr. Kessler reported that Alcoa had not been invited in the original setup of the Wire Association but Mr. Kessler, through negotiations, became a member of the committee.

Mr. Kessler reported that as part of the cost reduction

program changes in the length of lay have been investigated. He reported that Mr. Rodee was against any change. Mr. Rodee's position is borne out by recent difficulties Kaiser has had with having to take back considerable amount of ground wire which had an extra long length of lay of aluminum and a short preformed length of the steel, resulting in failure of the aluminum strands.

Mr. House reported on the work of the Edison Electric Institute, Steering Committee on Aluminum Connectors, and pointed out that Alcoa is the only manufacturer that has been against their proposed method of test, maintaining that such a method would allow inferior clamps to be accepted and result in a great deal of harm to both the public utilities and the use of aluminum for such fittings. The so-called performance specification is not really based on any work done at the Armour Research Foundation, al- [fol. 5323] though that supposedly was the goal of this program. The difference in measurements and ratings of clamps was explained and it was pointed out that the proposed method favored poor clamps and did not particularly help good clamps. It was pointed out that the proposed method penalizes a connector with a resistance ratio below 1 and aids a connector with a resistance ratio above 1. Mr. Hartmann asked if we should work through ASTM where a standard method of comparing joints might be adopted. It was pointed out that perhaps Mr. George Stickley's group could handle this through ASTM, to get a standard method of making comparisons of electrical connectors. Mr. Hartmann agreed that he would contact Mr. Stickley.

Stab connections to aluminum bus bar were discussed and Mr. Chapman pointed out Mr. Gunther's opposition to silver plated aluminum bus bar. However, it was recalled that it had been previously decided not to approach the Underwriters' Lab on this problem. It was agreed that Mr. Chapman would procure several different types of silver-plated stab connectors in order that Mr. Englehart could start some corrosion tests.

The question was raised by Mr. Hartman concerning the tests of aluminum anode bus connectors which had been on the books for some time. All the samples are on hand. It had been previously decided that since the new designs

had been completed the information from the tests was not badly needed now. Mr. Wagner pointed out it would be better to wait until the new potrooms have had experience with their present connections, so it was agreed to let the matter remain inactive for the present. It was estimated that any work on anode bus tests could not be started before the next meeting of the Subcommittee and probably [fol. 5324] not for a year. It would require 2 months to run the tests. Mr. Wagner agreed that if the tests were needed sooner he would advise interested parties.

Mr. House asked for an expression from the committee on the purchase of a creep machine for elevated temperatures, advising that he had recently secured a firm quotation on a suitable piece of equipment. Motion was made by Mr. Guess and seconded by Mr. Cope that the R. for A. be prepared showing that the Subcommittee had recommended purchase of this machine. The motion was unanimously carried.

Mr. Wagner reported that Mr. Gunther had brought up the use of aluminum in safety switches, which are now universally made of copper. This would be an excellent outlet for aluminum if the details of the application could be worked out. It was pointed out that there were many homemade aluminum disconnect switches at some of the company plants, however, these are merely isolating switches and do not break load. Mr. Wagner reported that good progress is being made in the manufacture of aluminum outdoor disconnect switches for high voltage switchgear. However, the use of aluminum in safety switches is at a standstill. It was agreed that Messrs. Cope and Chapman would follow this project and report back to the committee as to the possibility of developing this market for aluminum. Mr. Wagner said that they would be glad to try any equipment in the plants and give any assistance in the design of terminals and other features.

Mr. Guess reported that Messrs. Rodee and Sandell had been working with IBM people to develop an IBM method for sag tension calculations. Mr. Hartmann reported that considerable work had been done at ARL on IBM programming. Mr. Tompkins reported that they were doing work with Dr. Whidden on studies for the new plant in Suriname.

Mr. Tompkins inquired if there was any effort to increase [fol. 5325] the staff of the ARL Electrical Engineering Div. and Mr. House reported that 2 new men had been acquired this year. Mr. Hartmann pointed that while we were not actively searching for new men we were interested in knowing of outstanding prospects from outside or through plant transfer.

Mr. Tompkins asked about the status of the electrical measurements laboratory and extending its use. It was pointed out that if the services of the measurements laboratory were widely used by the company plants more personnel would be needed. Mr. Wagner expressed some doubt as to just how much the measurements laboratory could be used by the plants and it was pointed out that when standards are checked, such as rotating standards, the work is done by the local power companies, so that errors resulting from shipment would be avoided. It was generally agreed that the measurement laboratory was in excellent position to help Massena Works and has done so.

IX. New Projects

Mr. Coffin said he would like to get some X & R tests run on stranded Alumoweld as soon as possible.

It was reported that duPont had shown considerable interest lately in aluminum blasting wire and that we are supplying them with some 5005 samples for evaluation. One of the main difficulties is joining to the blasting cap. Mr. Chapman reported that the customer usually does not know what properties they want, some want extra elongation so as to avoid breakage of the wire, and there seem to be a great many unanswered problems. Mr. Kessler had previously pointed that one of the things that made aluminum wire attractive was that there are some blasting operations where minerals are being mined that could not stand any contamination from copper but that aluminum is [fol. 5326] satisfactory. Mr. Coffin pointed out that Alcoa's own Mining Division had put the use of aluminum blasting wire on the shelf because of difficulties in trying to use it. Mr. Coffin stated there is quite an extensive report on this. Mr. Kessler reported that Hercules had an aluminum clip that seems to work satisfactorily with the clamp to connect

the cap to the wire. It was estimated that there is a potential market of 3,000,000 pounds annually in this product.

X. Priorities

The question of priorities was discussed and the possibilities of a more formal list with serial numbers which would separate the various projects in respect to the laboratory equipment needed and personnel required. It was pointed out that such a system would require more paper work and it was the opinion of Messrs. Lanctot, Simpkins and House that such a system would not be justified. Priorities are fairly well taken care of under the present informal system. It was pointed out that there are always new projects coming up, some of which take priority over all other work, in which case the whole schedule would become obsolete. It was the consensus that the present handling of priorities was working out satisfactorily and that this scheme should be continued. Any members having projects in mind which they think should be given top priority were urged to communicate with interested parties to help arrange the necessary changes.

[fol. 5327] 1959 Budget

The 1959 Budget was discussed by Mr. Hartmann and he called attention to the addition of three $2,000 items to the previously prepared budget summary. These items are conduit, bus bar, and foil used for shielding. Mr. Hartmann explained that the work on bus bar would be work carried out by the Metallography Div. on the study of theory of electrical joints, while the other two projects were by the Chem. Met. Div. It was pointed out that Item 7-H-6 should be corrected to Electrical Tests of Bus Accessories. The budget was discussed at some length and especially the question of the cooperative EHV project with G.E. Mr. Tompkins raised the question if some of the items on the budget should not be joint projects with other aluminum producers, and Mr. Hartmann pointed out that this is under study but generally Alcoa likes to publish its own data on the properties of its products, and not depend on competitors' data. It was pointed out that the results

of the research work we report in our publications and papers brings great prestige to Alcoa, and Mr. Coffin expressed the opinion that this was a valuable sales aid and good advertising. It was pointed out that the Electrical Engineering Div. is one of the divisions of ARL whose work is most closely tied in with Sales. It was pointed out that the Budget is about 1% of electrical conductor sales. Mr. Tompkins made the motion that the budget be approved, seconded by Mr. Guess, and unanimously carried.

The meeting was adjourned at 2:45 P.M. on September 11.

HEH:ECH/F
10-30-58

[fol. 5328] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 155

Mr. T. L. Gilbert

July 27, 1959.

From: D. R. Little
To: Mr. J. R. Pellegrino

Re: R/A M-2520

Please cancel R/A M-2520—Purchase and Install Neoprene Extruding Equipment and Rehabilitate the Balance of Bldg. 14 for Occupancy.

D. R. Little.

DRL:CM

CC to Messrs. E. G. Schoeffel, N. B. Lane & L. M. Arbegast, K. O. Cogger, T. L. Gilbert, J. A. Hagen, C. L. Kessler, J. S. MacKillican, G. E. Martin, R. W. Knapp—Pgh. Office.

[fol. 5329] Mr. T. L. Gilbert

Nov. 14, 1958
M-2520

Aluminum Company of America, Massena Fabricating

Purchase and Install Neoprene Extruding Equipment and Rehabilitate the Balance of Building 14 for Occupancy.

475,000	11-14-58
34,825	
440,175	HBL

[fol. 5330] This request is for funds to:

1. Purchase and install equipment for a continuous vulcanizing extruder line for rubber and neoprene insulating of aluminum conductors.
2. Revise the unclosed and unheated portion of Bldg. 14 to house this equipment and provide area for in-process material handling and storage.
3. Purchase and install test equipment in Bldg. 83 for in-process control of neoprene compound.

All of Alcoa's neoprene and rubber insulated conductors are presently being produced by Rome Cable Corporation under a toll arrangement. The facilities covered in this R/A would make possible the almost complete elimination of Rome Cable's services on our present line of covered conductors; i.e., line wire and service drop. At the same time, an annual savings of $165,000 to $190,000 would be realized, based on the 1957 sales of our neoprene products. Since the total required for the installation will be $475,000, contingencies included, the project would return the investmently in roughly 2.7 years. This savings is particularly important because all of it represents "out-of-pocket" money that the Company is spending at the 1957 level of business.

For our cost savings analysis, the following assumptions were made:

1. Neoprene scrap loss is figured at 15% Vs. actual 10% for current polyethylene scrap loss.
2. Using extruding techniques recently developed by DuPont, we should realize machine speeds from 2 to 2½ times those of Rome Cable's extruder speeds.

3. R&M for neoprene equipment is estimated to be 50% higher than the present plastic extruder line, partly due to the necessary high-pressure steam system.
4. Neoprene materials costs will amount to $.258 per lb., based on recent quotes from a custom compounder.
5. Rome costs were obtained from the most recent cost statements and represent the actual cost to Alcoa for the work performed by Rome Cable.

[fol. 5331] 6. Transportation savings would be the actual 1957 cost to Massena for shipment of conductor to and from Rome.

7. With the addition of the proposed equipment, burden rate on existing equipment would be modified to reflect better utilization of fixed expense and certain items of variable expense.

A number of favorable aspects that we see accruing to Alcoa from such an installation follow:

1. Customer acceptance of Alcoa neoprene products may be improved if manufactured by ourselves instead of by Rome Cable.
2. Rome Cable would be needed only for special constructions that amount to less than 1% of our present covered conductor sales.
3. Rome Cable would not be in as favorable a position to know Alcoa's covered conductor sales picture. Such information may be used to Alcoa's detriment at present.
4. Control of neoprene product quality within Alcoa's own organization would insure a higher level of quality.
5. More producing equipment, and thus more salable product, will give us better absorption of our Covered Conductor Dept. fixed expenses.
6. The new facilities would enable us to produce neoprene products at a rate of 3,000,000 pounds aluminum weight per year on a 15-shift operation.
7. We would be able to produce rubber-insulated high-voltage cables if required.

8. Traffic problems would be simplified, and deliveries could be bettered, especially in cases of combined bare and covered shipments.
9. Warehouse stocks of neoprene products could be considerably smaller than the present combined stocks at Rome and Massena.
10. Enclosing and lighting the balance of Bldg. 14 will eliminate a bad winter working condition, as we use the unheated portion of the building for in-process storage, and below-zero temperatures within the building are not uncommon.
11. Experience thus far will allow us to avoid many of the modifications that were costly R&M items during our first 18 months of operation of the present polyethylene line.
12. This proposed continuous vulcanizing line could readily be used for insulating with the new cross-linked type of polyethylene that gives promise of improved abrasion and heat resistance, as well as lower material costs.

[fol. 5332] It is estimated that the equipment would be in operation in 12 to 16 months from the approval of this R/A. At the 1957 neoprene product sales level, the equipment would be utilized 1.2 shifts per day.

[fol. 5333]

Summary	Estimated Cost Material	Labor	Burden	Total
Revisions to Bldg. 14	$ 76,700	$30,000	$16,300	$123,000
Substation & power distribution	20,800	3,400	2,100	26,300
Equipment including P.T. Lab. Equipment	234,325	32,375	16,425	283,125
Total	$331,825	$65,775	$34,825	$432,425
Contingency				42,575
				$475,000
Bldg. 14 Revisions	$ 31,000	$15,200	$ 8,450	$ 54,650
Heating	8,000	9,000	4,500	21,500
Lighting	21,000	4,800	2,800	28,600
Sprinkler system	15,000	.....	.....	15,000
Misc. Services	1,700	1,000	550	3,250
Total	$ 76,700	$30,000	$16,300	$123,000
Substation & Power Distribution	$ 20,800	$ 3,400	$ 2,100	$ 26,300

Equipment				
Entry section	$ 41,550	$ 4,575	$ 2,200	$ 48,325
Extruder section	19,975	800	425	21,200
Vulcanising section	21,600	3,050	1,575	26,225
Take-up section	57,400	5,550	2,800	65,750
Quality control	7,700	800	475	8,975
Physical Test. Equip.	7,600	.....	.....	7,600
Steam generation	9,500	5,200	2,600	17,300
Major Elect. drives	59,500	8,200	4,250	71,950
Foundations & trenches	1,000	4,000	2,000	7,000
Neoprene dicer	8,500	200	100	8,800
Total	$234,325	$32,375	$16,425	$283,125

Firm quotations on all major equipment have been obtained and sufficient engineering has been done to make this estimate realistic.

11-14-58 G. E. Martin:EM
11-14-58 GEM
11-14-58 TLG
11-14-58 KOC
11-14-58 DL
11-14-58 LMA
11-14-58 JAG
11-14-58 CLK

[fol. 5334] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 156

This Copy for: Mr. T. L. Gilbert, Massena Works

Internal Correspondence

January 13, 1959.

From: T. I. S. Boak, Jr.
Pittsburgh Office
To: Memorandum

Re: Capital Expenditure Committee Meeting Notes
January 8, 1959

The following matters were discussed in the meeting noted above. Approval of all of the items noted below was recommended by the full Capital Expenditure Committee.

Detroit—CDV-669-R—Furnace Repair Revision—$4,500 revision. This revision covers an increased cost of repair to the furnace which was not foreseen until the repair job was well under way.

Franklin—NP-514—Extension of Rural Lines—$70,000. NP-513—Expansion of Service on Existing Lines—$220,000

These requests have to do with the Nantahala Power and Light Company's being able to extend service as the requirements of its customers demand. Approximately $250,000 each year has been spent since 1950. It is estimated that $107,000 income will be generated as a result of the service extension.

Lafayette—L-29972—14,000-Ton Press. Mr. Jones discussed with the committee the critical situation surrounding the need for the installation of the 14,000-Ton press at Lafayette. He strongly urged the release of approximately two million dollars to complete the installation. The committee will recommend this action to Mr. Haight.

Massena—M-2520—Neoprene Extruding Equipment—$475,000. Messrs. Coffin, Gilbert, and Knapp discussed this request, pointing out that savings of $165,000 to $190,000 annually would be realized by the purchase and installation of this equipment. It will completely eliminate toll fabrication of covered line and service drop wire which is now done by the Rome Cable Corp. Doing the work ourselves is felt necessary in order that we compete with Kaiser which owns U.S. Rubber and Kennecott which now owns Okonite. Mr. Knapp also pointed out that there will be another request for approximately $130,000 for twisting equipment to come should this request be approved. If this is not approved, the amount will be $200,000 since renovation of the building for the twisting equipment, now planned under M-2520, would still be necessary.

[fol. 5335] *Vernon*—CDLA-1405—Purchase of Two (2) 9" x 14" Roll Truing Machines—$33,160. The lack of capacity for roll truing soft alloy extrusions has been giving great difficulty in Vernon's meeting promises. In order to improve this situation and to prepare for acceptance of available additional business, the purchase of these two machines was requested. Savings of $49,700 will be made

by the elimination of current overtime, and the bottleneck of this operation will be eliminated.

Pittsburgh — P-2475 — Metallurgical Development Expense—1959—$319,000.

Pittsburgh—P-2487—Purchase N.C.R. Posting Machine—$4,978.60. This machine is needed in cashier's office for handling Imprest Fund accounts and will save hiring additional help.

Pittsburgh—P-2470—Investigate the Release of Thermal Distortion in Forgings—$7,500. This will continue experimental work in the release of thermal distortion and forgings of more complicated cross section.

T.I.S. Boak, Jr.

TISB:MFB

Copies to:

Committee Mempers Present: Messrs. R. W. Andrews, Wm. Boyd, L. H. Crudden, T. O. English, Krome George, C. I. Johnson, J. A. MacLeod, D. C. Mathewson, H. F. Robey, Jr., M. W. Stanley.

Committee Members Absent: Messrs. J. H. Alden, L. P. Favorite, J. S. Harrison, L. B. Kuhns, J. A. Neustaedter.

Guests: Messrs. P. T. Coffin, H. H. Gnuse, C. C. Jones, R. W. Knapp, T. L. Gilbert, Massena.

[fol. 5336] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 158

Internal Correspondence

July 8, 1957.

From: Philip T. Coffin
Pittsburgh Office

To: Mr. R. V. Davies
Pittsburgh Office

Confidential

Re: Rome Cable Corporation

Here are a few thoughts and figures which may be helpful to you in discussing the possible acquisition of Rome Cable Corporation by Alcoa.

From almost any standpoint, the move would seem to be advantageous to Alcoa assuming, of course, that the cost was not too high. I can see the possibility, if not the probability, of some difficulties with respect to the handling of managerial personnel problems in both the Alcoa and Rome organizations, but I think that if the general matter of personnel is given careful consideration and percipient moves are made that everything should work out smoothly.

From other viewpoints I fail to uncover any angles that could not be taken rather easily in our stride. It seems to me that assuming that the physical plant could be acquired at a reasonable figure, by far the biggest other asset would be the acquisition of experienced personnel in that particular field of endeavor. Rudy Schatzel, of course, is considered to be one of the top men in the industry; and he has a number of younger men reporting to him who should be quite capable of carrying on after Rudy's retirement. In both operating and research, Rome happens to have very capable key men. So far as Rome's Sales Department is concerned, I think that we would have to give that particularly careful thought inasmuch as their method of distribution and direct selling differs considerably from ours.

[fol. 5337] Another very large asset which we would acquire would be that of almost complete participation in the

insulated conductor field in either aluminum or copper. In many cases, the so-called package deal is of extreme importance; and in many other cases, the mere prestige of carrying almost everything on the shelf makes a big impression on customers. If my memory serves me right, I think that Ross Fraser made the statement in front of you and me one time that if all wire sizes are included, their card index shows something like 300,000 items for which they have specifications on file. Rome Cable covers the entire field with the exception of the so-called high voltage, power cables which are in excess of 15,000 volts. I think Rome Cable has been smart in making that dividing line, and I think that we would be equally wise not to try to enter the high voltage field.

As I pointed out to you the other day, a study made by Anaconda Wire and Cable in cooperation with Alcoa indicates that at the present time EC aluminum has invaded the EC copper field only to the extent of 25 per cent. Granting that there are a number of fields which will probably remain in the copper camp until such time as copper might become virtually a precious metal, I think it is quite easy to visualize a reversal of the figures wherein aluminum will have invaded the copper field to the extent of some 75 or 80 per cent. I attach a photostat of product classifications taken from the Rome Cable catalog wherein the products have been check marked as to whether or not they would appear to be reasonable uses for aluminum. There are a number of uses such as magnet wire, the larger sizes of building wire, welding cable, power cable, etc., which I think could be spurred on at a much accelerated pace if we and the Rome people were working hand in hand. So far as covered conductors are concerned, I attach to this letter a chart show-
[fol. 5338] ing our progress since we entered the field. You will note that despite the set back in 1956 and 1957, which is chiefly attributed to lack of housing starts and a temporary retrenchment on the part of the utilities in distribution expenditures, the Alcoa trend is still upward. I have gathered from a few remarks here and there on the part of the Rome people that their volume is probably about the same as Alcoa's in aluminum covered conductors. It could be anticipated, therefore, that with the acquisition of the Rome Cable Plant our monthly shipment of aluminum covered

conductors and triplex would probably at least double and with a very satisfactory profit margin which would no longer have to be shared in part as a result of the acquisition.

Rome Cable's activities in steel conduit and their recent acquisition of the Cope Company would undoubtedly give us some additional outlets for Alcoa aluminum, but at the moment I have no way of evaluating those outlets.

From the standpoint of the Rome Cable stockholders, it seems to me that with the increasingly vicious competition which is found in the electrical conductor field the Rome stockholders would be far more secure if they were part of the Alcoa Organization. Just this past week Ross Fraser, as I explained to you, was certainly given an opportunity to see just how far the present price cutting campaign had gone; and at the moment there seems to be little relief in sight. Even granting the beautiful earning record of Rome Cable Corporation, it seems to me that those earnings would be very seriously jeopardized if Rome, due to the heavy competition in electrical conductors, would have to drop out of the picture and be content to deal only in copper. It appears at the moment that they may be exactly what some of the independent conductor people will have to do.

Philip T. Coffin.

PTC:ags

[fol. 5339] Product List

Today, Rome Cable offers to the purchaser of electrical wires and cables a well-rounded line of bare and insulated copper and aluminum conductors in sufficient variety of constructions to service adequately the requirements of practically any installation involving the transmission of electrical energy, both low and high voltage. Listed below are product types regularly manufactured. Our Engineering and Research Departments are ever ready, however, to study any special problem to the end of creating such cable design as will best serve your requirements.

Bare and Tinned Wires and Cables

Solid and Stranded (Copper and Aluminum), Round, Square, and Rectangular, ACSR

Weatherproof Wire and Cable
Copper and Aluminum

Braided-Type URC, RoLene (Polyethylene) Covered, RoPrene (Neoprene) Covered, Tree Wires

Magnet Wire

Cotton, Paper, Asbestos, Glass Covered.

Building Wires and Cables

Rubber and Braided, Rubber and Lead Covered, Rome Synthinol*, Thermoplastic Insulated, RoFlex Nonmetallic Sheathed, FlexAll* Thermoplastic Nonmetallic Sheathed.

Conduits

Rome—EMT, Rome—Rigid.

Radio and Instrument Wire

Rome Hi-Temp Rubber Insulated, Rome Synthinol*, Thermoplastic Insulated, Army-Navy Specification Types, RoTran Radio Frequency Transmission Lines, Balanced or Coaxial, Microphone Cables, Television Camera Cable.

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*T. M. Reg.

Signal and Supervisory Cables

Flexible Cords

Rubber Insulated, Rome Synthinol* Thermoplastic Insulated.

Machine Tool and Control Wires

Rome Synthinol* Thermoplastic Insulated.

Heavy-Duty Cords

Rubber Sheathed, Rome 60* Neoprene Sheathed, Rome Synthinol* Thermoplastic Sheathed.

Heavy-Duty Portable Cables

Rome 60* Neoprene Sheathed, Mining, Welding, Power (Types W and G), Shovel Power—Type SH, Diesel Electric Locomotive Cable.

Power and Control Cables

RoPrene (Neoprene) Sheathed, RoSeal (Thermoplastic) Sheathed, Rubber Insulated and Lead Covered, Rome Synthinol* Thermoplastic Insulated, RoLene (Polyethylene) Insulated, RoMarine-RoPrene Low-voltage Distribution, RoZone* Insulated High-voltage Distribution, RoZone A Insulated High-voltage Distribution, Series Street Lighting, Self-supporting Aerial.

Service Drop and Service Entrance Cables—Copper and Aluminum.

Specify Rome Cable.... It Is Your Assurance of Dependable Quality.

*T. M. Reg.

[fol. 5340] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 159

Mr. R. V. Davies

July 11, 1957.

F. L. Magee
Pittsburgh Office

Mr. I. W. Wilson
Pittsburgh Office

Confidential

Re: Rome Wire and Cable Company

Ralph Davies and I were at Rome yesterday and met with Messrs. H. T. Dyett and J. H. Dyett and A. D. R. Fraser. We had lunch with the following officers, who are also members of their Board of Directors:

H. W. Barnard
H. T. Dyett
J. H. Dyett
C. H. Ellis
A. D. R. Fraser
G. E. Rolston
R. A. Schatzel
F. S. Marks

Most of the talking on Rome's side was done by Mr. H. T. Dyett and Mr. Fraser. The atmosphere was most friendly all the time.

The reasons for any possible interest we might have in the Rome Wire and Cable Company were discussed in some detail. This was rather important because it laid the ground work for a further discussion and impressed on them the importance of Alcoa's further development in the insulated aluminum wire and cable business.

Mr. Dyett described the development of the Rome Wire and Cable Company and his anxiety to maintain the fine organization for which he felt responsibility. As you know, he took with him a number of important people from the General Cable Company when he formed the Rome Com-

[fol. 5341] pany. Mr. Davies and I described as best we could how we believe his organization and facilities could best be operated on a divisional status if a merger should be consummated. We pointed out that many details would have to be covered in the event of further discussions, but that, generally speaking, we felt the production and marketing of various types of aluminum and copper electrical conductors might best be handled on a divisional basis with, of course, the natural coordination that would be necessary with respect to policies and practices of the parent company. We pointed out that only experience could develop the best working arrangement. For example, it seemed quite logical that as time went on our electrical conductor marketing organization might best be combined with that of the Rome Division, even though Alcoa's present Fabricating Division might well continue to be the production unit for our present products or even some added electrical conductor products. We did emphasize that there was every evidence that the Rome organization and its experience could be fully utilized in the event of a merger. This type of approach to the problem seemed to be acceptable to Mr. Dyett.

There ensued considerable discussion about the present competitive situation on both aluminum and copper electrical conductors, and there was evidence that the Rome people recognized the growing importance of integration of metal production and electrical conductor fabrication. Tax considerations of divisional operations as against subsidiary companies seemed also to be thoroughly understood. They have the same problem with two small diversified divisions.

The recent DuPont decision was raised and Mr. Davies gave them Mr. Hickman's latest opinion. They empha-
[fol. 5342] sized this by pointing out that their business in bare A.C.S.R. was of a very minor nature.

Mr. Dyett suggested that, without getting into details, he would be curious to know whether we had discussed methods of accomplishing a merger. We said that we had discussed the matter only with you and again in generalities, and one of the ideas we had discussed was an exchange of stock. He and Mr. Fraser then indicated that if we felt we needed information additional to that in their annual

statement and in their SEC reports, they would be glad to give us whatever we asked for. However, they indicated that they believed there was sufficient in these reports for us to come to our own conclusions as to what we might wish to put as a value on their company. It was pretty obvious to Ralph and me that they were building a pretty good case for a substantially higher figure than would be indicated by the book value. For example, Mr. Dyett pointed out that some years back, when Bill Price tried to buy their company, the offer was so ridiculously low that about all he could do was fold up his papers and bid them a pleasant goodbye. They both pointed out, however, that Westinghouse and Rome have been very close friends through all the years. In any event, we got very little of any definite nature as to what they might consider as an acceptable valuation.

Finally, Mr. Dyett said he would like to give the matter further consideration and hoped that we would return to Pittsburgh and do the same. He said that in the course of a few days he would phone Ralph and let him know whether or not they were at all interested in a further discussion on the subject.

Ralph's and my conclusions are that Mr. Dyett is definitely interested, but at terms and conditions that might [fol. 5343] be pretty difficult for us to swallow.

F. L. Magee.

FLM:RAH
Cc—Mr. R. V. Davies

[fol. 5344] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 161

August 14, 1957.

P. T. Coffin
Pittsburgh Office

Mr. W. K. Unverzagt
Pittsburgh Office

Legal

Re: Rome Cable Corporation

Please consider this letter as a partial reply to your letter of August 9 having to do with the legality of Alcoa's possible acquisition of Rome Cable Corporation. Mr. F. L. Magee had written me more briefly on the same subject on August 6. Accordingly, I am sending copies of this letter to both Mr. Magee and Mr. Davies, and also to Mr. Wilmot.

I hope to have considerably more information on your numbered paragraphs 1, 4, 5 and 7 by Friday the 16th. That additional information is being gathered for me by Rome Cable Corporation.

In order to meet your deadline of August 14, I have already gathered the following information in answer to your nine numbered paragraphs. The numbered quotations are yours.

1. "I assume Rome purchases pig from Alcoa. If so, what is the dollar amount of such purchases? If it purchases from others, what percentage of Rome's requirements does Alcoa supply?"

Rome purchases EC pig from Alcoa as well as from others. The dollar value purchased from Alcoa was approximately $1,096,000 in 1956 and $233,000 to date in 1957. The salesman handling the account believes that Alcoa receives about two-thirds of Rome's EC pig purchases. It is believed that the balance is divided between Kaiser and Alcan. Rome gave all its pig business to Alcoa from about 1953 to 1956, but commenced dividing the business at Alcoa's suggestion when a severe metal shortage began to develop.

[fol. 5345] 2. "If we sell Rome any other materials such as redraw rod, wire, etc., what is the approximate dollar value of those sales, and what percentage of Rome's total requirements for such products does Alcoa supply?"

Rome purchases a very small miscellany of Alcoa products other than pig. In 1956 the aggregate value of purchases of such products—EC wire, bare cable, covered conductors, cable accessories, foil and chemical products was less than $3,000.00. In 1957 to date it is less than $1500.00. It is believed that Rome purchases virtually all such requirements from Alcoa.

3. "List the products which Rome sells and indicate those which Alcoa also sells."

The following summary of Rome's products is copied from Dun and Bradstreet's July 3, 1957 report. The individual items of course run into the thousands. The products underlined are also sold by Alcoa:

Copper: Manufactures rolled rods, bare and tinned wires and cables, magnet wire, weatherproof wire and cables, rubber insulated building wire, rubber insulated flexible cords, neoprene sheathed heavy duty rods and cables, control cables, low voltage power cables, high voltage power cables, service drop and service entrance cables, miscellaneous rubber insulated wire and cables, thermoplastic insulated building wire, thermoplastic insulated flexible cords and thermoplastic insulated instrument and radio wire (S C 3392-3631). Aluminum: *Rolled rods, bare wire and cables,* magnet wire, *weatherproof wires* and *cables,* insulated power cables, and *self-supporting service drop cables.* (SIC 3352-3392).

Steel: Electrical metallic tubing, rigid conduit, conduit [fol. 5346] fittings, television mast tubing and commercial tubing (Sic 3611). Under new T.S. Cope Division, manufactures cable trays, racks and troughs and accessories for the installation of cable. Direct defense contracts are small. Many of the products manufactured are used in defense industries, either directly or indirectly.

Although you do not ask the question, it is perhaps of importance to bear in mind that Alcoa manufactures most of the weatherproof wire and cable as well as service drop

in thermoplastic coverings, only. It *sells*, however, rubber and synthetic rubber coverings applied to its bare wires and cables by Rome on a toll basis. Up to less than a year ago Rome also applied the thermoplastic coverings for Alcoa.

4. "Give as well as you can Rome's percentage of the market in each product which it sells, and to the extent that Alcoa sells the same products show Alcoa's percentage of the market."

I have no really constructive reply to this question at the moment. I have the impression that Rome is probably an overall factor of perhaps ten percent in its overall field of endeavor. It enjoys an excellent reputation and in some products is doubtless a much larger factor. It limits its field in high voltage cable (very wisely, I think) to not over 15,000 volts.

In the area where Rome and Alcoa are competitive, I must again resort to considerable guesswork. So far as aluminum weatherproof (covered) conductors and service drop are concerned, the BDSA (Department of Commerce) figures indicate that Alcoa is about a ten percent factor. My guess is that Rome is a smaller factor than Alcoa in this field—say 5 to 7½ percent. Alcoa is currently about a one-third factor in bare conductors. Up to the present [fol. 5347] Rome has only occasionally shown itself in this field and can hardly be considered a factor.

5. "Describe the method by which Rome distributes its product. If it sells through distributors or jobbers, do any of them also handle Alcoa's products or the products of any other manufacturers?"

I do not have much concrete information on Rome's selling outlets. We do know that they have some thirty-five to forty salesmen—about the same number as Alcoa has on conductors—and that they have fifteen sales offices and six warehouses located at:

Sales Offices		Warehouses
Atlanta, Ga.	New York City, N. Y.	Chicago, Ill.
Boston, Mass.	Philadelphia, Pa.	Dallas, Tex.
Chicago, Ill.	Pittsburgh, Pa.	Los Angeles, Calif.
Cleveland, Ohio	Salt Lake City, Utah	San Francisco, Calif.
Dallas, Tex.	San Francisco, Calif.	Seattle, Wash.
Detroit, Mich.	Seattle, Wash.	Torrance, Calif.
Houston, Tex.	Torrance, Calif.	
Los Angeles, Calif.		

We know that they have quite a number of distributors, but I shall have to await further particulars.

6. "How many companies are engaged in selling the products which are sold by Rome at the same distribution level at which Rome sells?"

I understand this question to inquire, in effect, how many manufacturing competitors Rome may have. The answer [fol. 5348] will vary a great deal, depending on the product. For many of the copper products such as building wire, lamp or appliance cords, and many other products sold across the counter, the number of manufacturers might well be 50 to 100 or more. Probably not over one out of ten of these dabble in aluminum. Manufacturers of covered or weatherproof wire and cable, and service drops probably number about 35 to 40, and most of them dabble in aluminum, and certainly about 15 of them are very competitive factors. Of these, Kaiser is the biggest. About twelve companies regularly compete in the bare aluminum conductor field, and another eight or ten who do not handle aluminum compete with Rome in bare copper products, such as trolley wire, rail bond cable, etc.

7. "What has been the history within approximately the last five years of any mergers or acquisitions of one company by another in this industry?"

I do not have much information as yet on this question other than what I remember. My recollection is that probably a dozen mergers or acquisitions have taken place during the 1950-1957 period. The Kaiser-U.S. Rubber deal and the Olin-Mathieson-Southern Electric combination seem to have been the most "industry rocking" announcements, and certainly the most threatening to Alcoa's position.

8. "Would the acquisition of Rome aid Alcoa in competition with other cable producers?"

My answer to this question is a most emphatic "Yes". Alcoa, through many years of experience in the bare conductor field, long since became and continues to be a leading factor in aluminum. Until rather recently its competi- [fol. 5349] tion—domestically at least—was almost entirely with bare copper conductors. In the last decade Alcoa's

bare conductor competition has changed almost entirely to aluminum. This phenomenon in itself was not unexpected, but it introduced a new competitive phase which can well put Alcoa "on the ropes" in the broad electrical conductor field unless prompt steps are taken to head off the threat. The steps in cause and effect are quite simple:

A. As the spread between copper and aluminum prices became more and more favorable to aluminum one copper conductor manufacturer after another assumed the dual role of a producer of either class of product.

B. Copper had been the accepted standard since the birth of the electrical industry for all electric conductor purposes, and until the era of definite aluminum price superiority arrived never was seriously challenged in the many fields of electric conductors other than bare transmission.

C. Copper conductor manufacturers with the "know how" in the fields of manufacture, research, technology, competitive tricks or gimmicks and distribution, introduced aluminum into new areas of electric conductors—covered or weatherproof conductors, power cables, welding cables, etc. They and the aluminum people are probing in many other areas.

D. The "dual rolers" are in a most strategic position to exploit existing copper uses for aluminum, and to take advantage of that great gimmick knows as the "package deal", wherein a customer requiring certain aluminum as well as copper requirements is given a bargain by placing orders for both at the same time.

E. The "package deal" and the possession of "know [fol. 5350] how" have already lead two integrated aluminum producers to acquire "dual rolers"; Kaiser bought out the conductor division of U.S. Rubber, and Olin-Mathieson bought out Southern Electrical Corporation. Rumors have been rife for months that Reynolds is looking around for a similar buy. Anaconda Wire and Cable is now, of course, in every practical sense, a double integrated "dual roler".

F. Rome Cable, with its fine personal and in general excellent "know-how", is by far the best acquisition, in my opinion, that Alcoa could hope to find. The step would be the answer to the present Kaiser threat to push Alcoa out of first place in the electrical conductor field. Kaiser re-

cently took Baltimore Gas and Electric Company's 1958 requirements through the medium of an aluminum-copper "package".

9. "If Rome is engaged in the manufacture and sale of products which Alcoa does not manufacture and sell, what problems would Alcoa encounter in getting into that business if it did not acquire Rome?"

The answer to this question, I believe, is largely reflected in my effort to reply to #8. Instead of acquiring a going concern in every sense of the word—plant, personnel, goodwill and "know-how"—all in one move, Alcoa would be faced with attempting to pick up all kinds of information and technical "know-how" in particular. A large part of the physical plant and equipment would take at least two years to complete, and I question very seriously whether Alcoa could acquire piecemeal "know-how" to be fully competitive within less than five to ten years; even this statement may be conservative, for certainly our competitors would not be standing still while we were trying to catch up. It may be just a simple matter of whether or not we decide that the present opportunity is too risky—finan- [fol. 5351] cially, legally, or both. From what we can gather statistically, it appears that aluminum today has invaded electric current carrying uses of copper to the extent of about 25%. I believe that aluminum has at least another 50% natural invasion to exploit.

P. T. Coffin.

cc: Messrs. F. L. Magee, R. V. Davies, D. Wilmot.

[fol. 5352] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 162

Mr. R. V. Davies, PGH

August 16, 1957.

F. T. Coffin,
Pittsburgh Office.
Mr. F. L. Magee,
Pittsburgh Office.

Re: Rome Cable Corporation

I think that most of the material you would like to have in mind when you discuss the Rome Cable Corporation matter with Messrs. Wilson, Davies, and Hickman will have been contained in my letter to Mr. Unverzagt. However, a few other aspects are certainly of importance; and one of them was touched upon in passing in a luncheon conversation I had in Pawtucket, Rhode Island, yesterday. The acquisition by any of the integrated producers of any of the independent wire and cable companies or various combinations of mergers are not nearly as obnoxious to the people who are already active in the wire and cable industry as is the entrance of a newcomer with bright, shiny new equipment. Acquisitions and mergers have the common denominator of not adding to existing capacity in the industry, and everybody in the industry is very conscious of the fact that the entire industry would be much more healthy if each manufacturer were to toss about two-thirds of his equipment into the Atlantic Ocean. Yesterday I had lunch with some of our people and some of the Leviton Manufacturing people including the young Ben Leviton, whom I believe is now Executive Vice-President. Right out of a clear sky Ben asked me if I was aware of the fact that Reynolds Metals was trying to get hold of a wire and cable company. I told him that I had heard the rumor and was not particularly surprised to hear that he had heard it. He then made the statement that he guessed there was no way to keep Reynolds from expanding the way Kaiser did but that it at least would not make the picture any worse from the standpoint of additional fabricating capacity.

Another point that perhaps I should have stressed in my letter to Bill Unverzagt is the fact that in acquiring a company like Rome Cable another important part of the "know-how" is the contact that exists between that com- [fol. 5353] pany and all of its customers. For example, no matter how good we may think our electrical conductor boys are as salesmen, we could not expect them generally speaking to invade fields like magnet wire, building wire, etc. and compete on an even basis with salesmen who have been acquainted with those particular groups for many years; and, of course, as a corollary to this statement, it is self-evident that we would not have enough electrical conductor salesmen to cover all these bases, if we started from scratch, without probably at least doubling their number.

One more good commercial reason for our wanting to acquire Rome is the fact that the Cope Division is a manufacturer of cable racks, and I think it is almost inevitable that a good portion of that business can be swung over to aluminum. I notice that Rome's annual report intimates the same thing. This one factor, of course, would not be anywhere near justification for the acquisition in itself, but it is an additional factor to be considered.

P. T. Coffin.

PTClelj
CC: Mr. R. V. Davies, Pittsburgh.

[fol. 5354] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 163

Internal Correspondence

September 20, 1957.

From: T. H. Kerry,
Accounting Department,
Pittsburgh Office.
To: Mr. S. T. Gustina,
Pittsburgh Office.

Re: Rome Cable Corporation

Attached is a schedule showing weight and revenue, by major product, of our sales to Rome Cable Corporation since 1952. You will note the change in pattern of business over this period, from wire and cable to redraw rod and subsequently to almost exclusive sale of pig. I believe this is due to the conversion of their wire-drawing machines and stranders from copper to aluminum, and subsequently the installation of Properzi units, so that they are now completely equipped to fabricate cable from pig.

Since 1955, practically all of these sales have been pig, and we believe it is safe to assume that sales in the future would be confined to pig. Therefore, we have completed the estimated margin on pig sales only for the last three years. The margin shown is based on bone cost excluding G.A. & S.E., and currently averaging a little over 11¢ per pound. Therefore, if sales in future years to Rome Cable should average 4,000,000 pounds annually, the total margin accruing to Alcoa from this source would amount to about $450,000 annually.

Rome Cable currently toll converts all of Alcoa's requirements for Neoprene covered cable and certain odd sizes of Polyethylene covered cable. This is probably a temporary arrangement since we plan to install Neoprene covering facilities sometime in the future. It is significant [fol. 5355] to the present problem to note that, if Alcoa were to acquire Rome Cable's assets, it would not be necessary for Alcoa to make a future capital expenditure for installing Neoprene covering facilities. Conversely, if Rome

Cable's assets were purchased by some other corporation, it might become necessary for us to make the capital expenditure in Neoprene covering facilities at an earlier date than is now contemplated.

T. H. Kerry.

THK:SPC
Attachment

[fol. 5356]

Product	Weight	Revenue	Cost Excluding G.A. & S.E.	Margin Amount	Margin Per Pound
1952					
Pig	.....	.....			
Alloy Wire	54,128	15,636			
EC Wire	125,120	36,360			
Cable	416,425	152,046			
Foil	614	339			
1953					
Pig	1,218,135	242,204			
Alloy Wire	55	64			
EC Wire	84,520	29,111			
Cable	604,466	226,874			
Rod and Bar	100,423	26,310			
1954					
Pig	1,581,233	320,622			
Alloy Wire	108	108			
EC Wire	11,648	5,079			
Cable	5,211	4,353			
Foil	1,977	1,291			
Rod and Bar	514,710	136,072			
1955					
Pig	3,174,620	691,553	444,764	246,789	.078
Alloy Wire	284	264			
EC Wire	810	240			
Cable	8,174	3,452			
1956					
Pig	4,526,290	1,096,410	658,123	438,287	.097
EC Wire	1,172	420			
Cable	2,112	1,275			
1957 (Jan.–July Incl.)					
Pig	1,114,816	284,277	158,750	125,527	.113
Cable	855	532			

[fol. 5357] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 164

September 26, 1957.

T. H. Kerry,
Accounting Department,
Pittsburgh Office.
Mr. S. T. Gustina,
Pittsburgh Office.

Confidential

Memorandum

Re: Rome Cable Corporation

A meeting was held in Mr. Hickman's office at 2:00 P.M. today to discuss the Rome Cable negotiations. I attended this meeting in view of the absence of both you and Norm. Mr. Hickman stated that at the meeting which he and Mr. Davies held with these people, they offered $22,500,000, which would amount to 308,000 shares of Alcoa common stock at current market. This was firmly rejected. Nothing specific was given as to Rome's asking price, although Mr. Hickman gathered they were thinking in terms of three-quarters of a share of Alcoa stock for one Rome share, which would amount to $31,000,000. Mr. Diet apparently is interested only in stock transfer and not in debenture, although the idea of convertible debentures was apparently a new thought to them.

Another meeting in Rome will be held next Tuesday, which will apparently be decisive. In preparation for this meeting, Mr. Hickman requested the calculation of the effect to Alcoa of an offer of $25,000,000 and of $24,000,000. There is apparently some feeling that Rome might be receptive to such an offer. He also requested that we compute the amount which we could afford to offer in terms of debentures, which would leave us in the same net position after taxes as a stock offer of $24,000,000.

[fol. 5358] Matt Stanley will prepare tables showing relative stock values based on past and present market values. A member of the Legal Department will prepare a draft of an agreement of sale. Keith Pouder will prepare tables

showing the economics of a $24,000,000 or $25,000,000 price in terms of stock and debentures.

I am determining the manner in which such a transaction would be shown on our balance sheet, assuming payment in terms of stock at current market value. I will also attempt to develop arguments pointing up the advantages and favorable position to Rome of accepting sale at the proposed prices.

A meeting will be held at 11:00 A.M. Monday in Mr. Hickman's library to present the foregoing data.

T. H. Kerry.

THK:SPC

[fol. 5359] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 165

October 2, 1957.

Mr. John L. Loeb,
Claridge's Hotel,
London, England.

My dear John:

Our visitors from a certain aluminum company were here yesterday and after several hours of conference they made their offer in common stock only. The offer, in our unanimous judgment, was one that neither or Directors or stockholders would have approved. We, therefore unanimously rejected this offer and expressed our high opinion of their company and our desire to continue cooperation with them in any way possible in the future.

There are certain reasons why they felt the offer as liberal as they can make. Under all circumstances I feel confident you would agree with me. They and we both hope to keep this matter out of the papers and, therefore, are seeking to keep the information contained here in confidence. For your own private information, I am advising their offer was for $24,000,000 of their common stock, which at $75 a share figures out 320,000 shares. These shares pay dividends of $1.20 per annum. I trust that this may be

held in confidence within our group and I sincerely trust you approve of our action.

One of the strong reasons that led us to promptly reject the offer was the dividends that they are paying and the earnings that our company anticipates making so soon as present unsettled price conditions return to something more nearly approaching normal. We figure that with our new equipment and rearrangement in Rome, with very nice earnings coming out of our Cope Division in Collegeville, Pa. and a much improved outlook in California, that our company should hit earnings of $3,000,000 per annum without any difficulty.

I trust that you and Peter are having an interesting, delightful time and trust I will be able to get a glimpse of you sometime late in October.

Very warm regards.

Cordially, ——, ——.

HTD:AS
Air Mail

[fol. 5360] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 166

Internal Correspondence

October 14, 1957.

From: R. V. Davies,
Pittsburgh Office.
To: Mr. F. L. Magee,
Pittsburgh Office.

I am attaching a memorandum dated October 14 by Mr. Coffin captioned "Acquisition of Insulating and Covering Facilities", as well as considerable covering data. You may not want to wade through all of this but it is interesting that all of the four companies referred to seem to do quite well financially.

There are rumors, unsubstantiated, that Reynolds is shopping around for a company of this type. I believe that we should take some action as promptly as possible,

but at least as far as Phil and I know none of us have personal contacts with any of these firms such as was the case with Rome.

It also seems to me that it would be bad if word circulated that Alcoa was shopping around and I wonder, therefore, if we could not do some shopping through a third party who would not reveal the name of his principal unless and until a real interest was evidenced. I believe there are firms who make a business of doing this kind of work although I do not know who they are. Certainly our financial contacts should have some knowledge as to how this is done or recommendations to make.

I would like to discuss this with you at your convenience.

R. V. Davies.

Present stock price.

RVD

Whenever you say—leaving for NY now. Hope return Thurs.

F.L.M. 10/15

P.S.

How about Kerite?

[fol. 5361] In United States District Court

Plaintiff's Exhibit 167

Internal Correspondence

Oct. 15, 1957.

From: F. L. Magee,
Pittsburgh Office.
To: Mr. R. V. Davies,
Pittsburgh Office.

Re: Rome Cable Corporation

Ross Fraser was visiting his son (perhaps it was a daughter) in Pittsburgh over last weekend and called me on the phone to express to me the same thoughts that he did to you and Lee; namely, that he hoped the breakdown in our negotiations would not result in any change in the hereto-

fore prior good relationships. He said he had talked to you a day or two before on the phone and consequently he wanted to chat with me also.

I told him we were naturally disappointed and found it a little hard to understand why our proposition was not a perfectly good one from their standpoint, considering the basic and intrinsic values incorporated in our system. He replied quite carefully with a measured comment that he and some others did realize the future potentialities of Alcoa and its underlying common stock, but inferred that Mr. Dyett was not sold on the proposition and indicated that he was concerned about the income angle. I pointed out that the convertible proposal took care of this, but he simply reiterated, in more or less veiled terms, that it was the Dyetts who really were the hold-outs. Unfortunately, he gave no indication or suggestion as to re-opening or continuing the negotiations.

F. L. Magee.

FLM:RAH
Cc—Mr. L. E. Hickman.

[fol. 5362] In United States District Court

Plaintiff's Exhibit 168

Internal Correspondence

Oct. 3, 1958.

From: F. L. Magee,
Pittsburgh Office.
To: Mr. R. V. Davies,
Pittsburgh Office.

Re: Ebasco Services, Inc.

The discouraging angle of your letter of September 23rd points to the strong possibility that we are nearing the end of our rope on the acquisition program. If the Okonite proposition does not work out, it seems to me we are in the position of where we might want to make one more pass at Triangle and possibly the smaller company in Trenton (name slips my mind at the moment), neither of which, as I

understand the situation, has any great promise of success.

Meantime, don't you think that it is highly important that Phil Coffin, along with our Operating and Engineering group, put some real concentrated effort on the development of an alternate program on which we should proceed promptly, if we fail in these instances? I am sure you will agree that no time should be lost getting into our own program, if we fail in the acquisition program.

There is some merit in developing our own program, because even if we have additional negotiations, we will be in a much better position to evaluate whatever offer we might want to make outside, if we have a better understanding as to just what is called for in our own program in the way of facilities, capital expenditures and potential costs. I am, of course, referring to a rounded out program well beyond the neoprene stage, and a program which Mr. Coffin and his associates would recommend to keep us in the No. 1 spot in the aluminum conductor field and, if necessary, a sufficient factor in the copper field to help us maintain the No. 1 position in the aluminum field.

[fol. 5363] I know that we have made the neoprene study, but I am not sure that management has really had a visualization of the whole program ahead of us as our electrical conductor people would visualize. I point out that with this whole picture before us, our offer for a good company might be substantially influenced.

Regardless of the foregoing program, I return to my original point; namely, that the company should really know what we are headed into if we are going on our own and, to my knowledge, this picture has never been developed, as I understand Mr. Coffin's position with regard to our comparatively short range needs to meet the competitive situation.

F. L. Magee.

FLM:RAH
Cc—Mr. P. T. Coffin, Mr. H. C. Erskine.

[fol. 5364] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 169

October 16, 1958.

File Routed To:
F. L. Magee,
Pittsburgh Office.

Re: Ebasco Services, Inc.

Yesterday, upon reading that Kennecott had taken over Okonite, I talked with Phil Coffin. He confirmed my understanding that his next choice to Okonite would be Triangle —his final choice Crescent, and failing in either one of these instances, then we should move as fast as we could under our own steam, as suggested in my letter of October 3rd to Ralph Davies.

I phoned the above information to Mr. Davies, who planned to talk with Mr. I. W. Wilson and if he has no feelings to the contrary, put Ebasco in motion with Triangle as promptly as possible.

F. L. Magee.

FLM:RAH

[fol. 5365] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 170

This Copy for: Mr. H. C. Erskine—Pittsburgh Office

November 21, 1958.

T. L. Gilbert—Massena Wks.
R. W. Knapp—Pgh. Office.
Mr. E. D. Mairs,
Pittsburgh Office.

Re: Preliminary Report Covered & Insulated Wire & Cable

Since our meeting with Mr. H. C. Erskine on November 12, the following progress has been made.

It has been established that Step I, for immediate consideration, should include the following:

Step I—Immediate consideration—

A. Neoprene Line & Auxiliaries—R/A M-2520 Capacity 3,000,000# Al. wt./yr.	$475,000
B. Buncher for Development—Revision to Auth. M-31998 —Additional Funds	1,500
C. Twister and Rewind Line (Guesstimate) Capacity 4,000,000# Al. wt./yr.	110,000*
D. Metal Strip Wrapping Equipment (Guesstimate)	15,000
Total of Estimates	$601,500

* Item A includes sufficient funds for building to include all of Step I.

Should item C be desired before item A, an additional amount estimated at $40,000 would be required to provide suitable building facilities for this equipment. Then item "A" could be reduced by $40,000.

Parts C & D will be included in requests for authorization as soon as engineering and economics are completed. [fol. 5366] As far as the next steps are concerned, they become somewhat intangible and their order cannot be established at this time. However, the following programs should be considered in the final report which should be completed early in January, 1959.

1. Facilities to produce power cable and building wire at Massena.
2. Additional polyethylene and neoprene production facilities for covered conductor at—
   (a) Massena or
   (b) Vancouver or
   (c) Other location
3. Facilities to produce at Massena:
   (a) Armored cables
   (b) Flexible cords and cables
   (c) Radio hook-up wire
   (d) Telephone wires and cables
4. Investigate need for specialized technical personnel.

T. L. Gilbert, R. W. Knapp.

TLG:RWK/es

cc: Mr. N. B. Lane—Massena Works, Mr. H. C. Erskine—Pittsburgh Office, Mr. P. T. Coffin—Pittsburgh Office.

[fol. 5367] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 171

December 2, 1958.

From: T. L. Gilbert.

To: Mr. N. B. Lane.

Re: Covered Conductor—Overall Program

Following are pertinent points developed during my recent Pittsburgh trip:

1. *Neoprene Line*—Joe Healy was working up the profit picture at both a. scheduled prices and b. current depressed prices. Generally speaking, the equipment would decrease our margin loss on neoprene products from $326,000 to $76,000 per year. We have recommended going ahead with project if Alcoa expects to remain in the Covered Conductor Business.

2. *Twister and Rewind Lines*—L. T. Guess has furnished a sales forecast which indicates the need for additional twisting capacity by next fall, or possibly sooner. Additional rewinding capacity would also be required to handle the greater number (same proportion) of expected tank test rejects. Massena was instructed to proceed with necessary R/A for these lines. It should be available for forwarding to Pittsburgh by December 5. Done.

3. *P. T. Coffin's Overall Insulated Conductor Forecast*—Over $500 million per year is present volume of all insulated wire and cable produced domestically, with copper being a 98% factor. Much of this can be replaced economically with aluminum.

The present Kennecot-Kaiser-Okonite-U. S. Rubber combine presents Alcoa with a very formidable opponent. However, fact that Kennecot owns 16% or more of Kaiser should soon have a stabilizing effect on Kaiser's pricing policies.

Insulated Conductor business was historically a profitable one until Kaiser upset the cart. It should return to this attractive profit level soon. Right now we are in an unparrelled price slump.

Mr. Coffin feels that Alcoa must become competitive in

the overall insulated field, including production of copper wires and cables!

[fol. 5368] 4. *P. T. Coffin's Immediate Concerns*—Since we have limited equipment for insulating, we are in a vulnerable spot. Two years ago we lost several good customers due to inability to deliver when required. These customers are still lost to us. Competitors talk Alcoa down as having insufficient facilities to meet demands. We must not let business get away due to lack of facilities. It is very necessary that we meet our delivery schedules, which means that all material scheduled in a month must be shipped out that month, even if we have to make more use of Rome Cable facilities.

Warehouse stocks have been insufficient for recent high level of business with result that business has been lost. Warehouse authorizations to be increased to reflect present and expected future levels. This will be done by Pittsburgh and Massena Planning. Massena should be able to use the forthcoming expected "seasonal lull" to build up the necessary stocks.

5. *Insulated Conductor Survey*—Following Task Force appointed to make survey: Messrs. E. D. Mairs, Chairman, R. W. Knapp, L. T. Guess, J. L. Healy, Ray Andrews, Massena Engineering and T. L. Gilbert.

To make full report in early January on following:

a. Determine product mix and volume to be manufactured.
b. Chronological program for entrance into various insulated categories.
c. Types and amount of equipment required.
d. Location of operations, including survey of existing company buildings.
e. Specialized technical help required.
f. Total investment required and schedule of expenditure.

With this overall picture in mind, my schedule for the time up to about December 12 is:

1. Hold meeting to brief all Massena people concerned on the overall problem. (done)

[fol. 5369] 2. Have Engineering prepare R/A for second

twister and rewind lines. (Expect to have complete by December 5)

3. Push L. T. Guess for triplex forecast so that R/A story can be prepared. (Received November 26)

4. Work up insulated conductor product mix and volume. (Local Purchasing obtaining necessary competitor's price schedule and product data. Should receive today. Also, Guess to furnish me with a special report prepared by Alcoa's electrical consultants in New York.)

5. Preliminary investigations on equipment for power cables and building wire. (Press of above R/A has prevented getting into this.)

6. Join with L. T. Guess in scouting for likely future technical help in the group of insulated conductor people at the annual Wire and Cable Symposium at Asbury Park this week.

7. Tentative trip to Pittsburgh next week to check progress and get needed information.

Although early January Leaves only a short time, it is questionable how accurate a survey will result.

T. L. Gilbert.

TLG:jom

[fol. 5370] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 172

December 22, 1958.

T. L. Gilbert
Massena Works
Mr. E. D. Mairs
Pittsburgh Office

Re: Interim Report—Covered and Insulated Wire and Cable

Since the preliminary report of November 21, the following progress has been made:

1. R/A submitted for twister and rewind lines @ $135,000.

2. Wire and Cable Symposium in Asbury Park, New Jersey, attended by Messrs. Guess and Gilbert, and acquaintances formed with a number of technical people in

insulated wire and cable field for possible future reference.

3. Discussion held with Monsanto Chemical Company at Springfield, Mass. concerning their recent internal market research report on "The Insulated Wire and Cable Industry". Copy of this report is now in our possession on a loan basis. This report has been of major importance in enabling us to proceed with our own analysis.

4. Tentative sales goals set and tentative order of entry into production of various categories determined. See Table I attached.

5. Dollar volume of sales in two major categories (building wire and power cable) that comprise 1/3 of total has been converted to total conductor covering and insulating tonnages. Analysis of communications wire and cable, which also comprise 1/3 of the total field, awaits the imminent acquisition of necessary price sheets.

6. Pittsburgh Electrical Engineering Department is being solicited to work up the degree of usage of various types of cable construction, along with unit weights of component materials in each type.

7. Need for following types of equipment for both aluminum and copper is forseen:

[fol. 5371] Banbury mixer
Plastic extruders (large and small)
Continuous vulcanizing extruders (small and medium)
Cablers
Bunchers
Rewind and repair lines
Wire serving heads
Taping equipment
Braiding equipment
Twister (small)
Armoring equipment
Wire drawing equipment (intermediate and fine)
Tinning equipment
Electrical test equipment (high and low voltages)
Applicators for asbestos insulation
Molding equipment for flexible cord plugs
Paint

Steps planned for immediate future follow. It is hoped that the final report will be submitted in January, but from

the following listing it will be noted that there is still a major part of the work to be accomplished. Help has been offered and is being used to gain time.

1. Complete tonnage analysis of market. Anaconda Price Books coming—TLG.
1a. Specific items for mfg.
2. Determine cost of necessary equipment types.
3. Establish crew sizes per production unit.
4. Determine amounts of various insulation and covering components required in various cable categories, along with material costs.
5. Assemble complete list of equipment required.
6. Make layout of equipment and determine floor space needed.
[fol. 5372] 7. Plan location of operations and building costs.
8. Estimate technical wire and cable personnel required.
9. Estimate MPC's.
10. Determine profits to be expected, based on current competitive prices.
11. Submit final report.

T. L. Gilbert.

TLG:jom
Attachment

CC: Messrs. N. B. Lane—Massena, H. C. Erskine—Pittsburgh, P. T. Coffin—Pittsburgh, J. L. Healy—Pittsburgh.
File

[fol. 5373]

Table I

Market Analysis—Insulated Wire and Cable

Categories	1954 Sales $ MM	1954 Sales %	1957 Sales* $ MM	1957 Sales* %	Projected 1967 Sales $ MM	Projected 1967 Sales %	Goal % of Market for Alcoa	Order of Entry In Field	Remarks
Communications	267	23	470	31	1000+	40	5	4	Tie in with communication outfit necessary. Western Union suggested. Best growth potential. Hi degree of technical know-how required.
Power	(483)	(42)	(590)	(39)	(1200)	(47.5)			
Power & Control Cable	174	15	230	15	460	18	5	3	Over half is 600V or under. With CV line and present line could make volume items. Great variety of construction.
Building Wire	195	17	270	18	540	21	5	2	Small sizes very competitive. Type TW can now be produced.
Line Wire & Serv. Drop	88	8	80	5	110	4	15	(1)	Already in the business.
Marine	26	2	—	1	?	4.5	5	8	Small field, and specialized.
Utilization	(325)	(28)	(340)	(23)	(310)	12.5			
Magnet Wire	175	15	180	12	(Excl. per FTC)		No.	No	Not included in survey.
Automotive & Aircraft	63	5.5	70	5	150	6	5	5	Missiles to become large factor here. Going more to high temp. coverings (200°F—400°F)
Flexible Cond.	58	5	56	4	100	4	5	6	Over 50 specific types. Very competitive in small sizes.
Appliance & Fixture	29	2.5	33	2	60	2.5	5	7	
Unclassified	82	7	110	7	(No information)				
Total	1157	100	1510	100	2510	—			

* 1957 sales were 10% lower than 1956 on volume basis and 20% lower on $ basis, due to decreased business activity and highly competitive market situation.

[fol. 5374] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 173

December 26, 1958.

T. L. Gilbert
Massena Works
Mr. L. T. Guess
Pittsburgh Office

Cc: Mr. F. A. Gunther, Pittsburgh, Mr. E. D. Mairs, Pittsburgh, Mr. G. Bright, Massena, Mr. E. E. Hickey, Massena, Mr. G. E. Martin, Massena, Mr. D. Harkins, Massena, File.

Re: Insulated Wire & Cable Survey

We in Massena are attempting to arrive at specific wire and cable constructions to be used in figuring type and amounts of equipment necessary and in estimating MFCs. It seems necessary that these types be passed on to you so that the work that Messrs. Gunther and Callahan and you do in determining construction component weights and relative popularity be done using the same bases. If you think that we have chosen some "foul ball" constructions, let me know. Also, if there are some popular items that we have omitted, we can readily add them at this time. The constructions were gleaned from catalogs from G.E., General Cable, and Anaconda.

Attached is a tabulation of the items that we have chosen in the general Power category, which includes Building Wires and Power Cables. Since we already have the necessary equipment for Line Wire and Service Drop Cables, there is no information included on these. The Monsanto classes of Communication and Utilization Wires and Cables are being worked up, and similar data will be sent to you when available. Copper wires and cables only are considered, since aluminum is only a small fraction of these cable types.

[fol. 5375] I expect to bring the results of our work to Pittsburgh for consolidation with your data on January 6.

T. L. Gilbert.

TLG/mli
Attachment

[fol. 5376] Table I—Power Cables

Tentative Insulated Wire & Cables Chosen for Survey

(Categorized by NEMA Report Groupings)

I Building Wires & Cables

A. Rubber Insulated

1. #2–7 strand RH-RW with 4/64 rubber insulation and a double braid jacket.
2. #2–7 strand RH-RW with 4/64 rubber insulation and a 3/64 Neoprene jacket.
3. #2–7 strand RHW with 4/64 heat and moisture resistant rubber insulation and a 3/64 Neoprene jacket.
4. #2–7 strand RR with 4/64 code rubber insulation and 3/64 rubber jacket.

B. Non-rubber Insulated

1. #2–7 strand TW with 4/64 PVC.
2. Non-Metallic sheathed cable composed of 2–#10 7-strand conductors each with 2/64 PVC insulation and paper tape and 1–#12 solid ground. A filler is run opposite the ground wire, and the composite is jacketed with a saturated and painted double cotton braid.
3. 60°C Fixture wires—#16–26 strand (.010″ individual wires) with 2/64 PVC insulation.
4. 90°C Fixture wires—#16–26 strand (.010″ individual wires) with 2/64 service rigid PVC.

II Power and Control Cables—Rubber and Plastic

A. Control Wires

1. 90°C Switchboard Wire—#12 solid with .020″ PVC insulation plus .020″ asbestos plus .016″ flame resistant cotton braid.
2. #12–7-strand single conductor TW control wire with 3/64 PVC insulation.
3. #12–7 strand multiple conductor (10 conductors per cable) control cable with .020″ PE insulation and .010″ PVC jacketing on individual conduc-

tors, and with glass-reinforced tape and 4/64 PVC jacket on composite cable.

[fol. 5377] 4. #12–19-strand multiple conductor (10 conductors per cable) control cable with 3/64 RH rubber insulation on individual conductors and with cotton tape and 5/64 Neoprene jacket on composite cable.

B. Power Cables

1. #2–7-strand, 600 v. *type RR* with 4/64 rubber insulation and 3/64 Neoprene jacket.
2. #2–7-strand, 600 v. *type RHW* for conduit and and aerial use with 4/64 rubber insulation and 2/64 Neoprene jacket.
3. #2–7-strand, 600 v. type RHW for direct burial (USE) with 4/64 rubber insulation and 3/64 Neoprene jacket.
4. #2–19-strand, *5 KV* for conduit, with 10/64 rubber insulation over a semi-conducting tape and 4/64 Neoprene jacket.
5. #2–19-strand, *5 KV* non-shielded direct burial cable with 10/64 RW rubber insulation over semi-conducting tape and a 3/64 Neoprene jacket.
6. 4/0–19-strand, *5 KV* shielded direct burial cable with a semi-conducting tape, 10/64 rubber insulation, a second semi-conducting tape, a shielding tape, a rubber filled tape, and a 5/64 Neoprene jacket.
7. 4/0–19-strand, *5 KV* cable for either grounded or ungrounded service, with semi-conducting tape, 10/64 PE insulation, second semi-conducting tape and 5/64 PVC jacket.
8. 4/0–19-strand, *7500 volt* cable for grounded neutral service, with semi-conducting tape, 12/64 rubber insulation, shielding tape, rubber filled tape, and 5/64 Neoprene jacket.
9. 4/0–19-strand, *7500 volt* cable for ungrounded neutral service, with semi-conducting tape, 16/64 rubber insulation, shielding tape, rubber filled tape, and 6/64 Neoprene jacket.
10. 4/0–19-strand, *15 KV* cable for grounded neutral service, with semi-conducting tape, 19/64 rubber

insulation, shielding tape, rubber filled tape, and 6/64 Neoprene jacket.

11. 4/0–19-strand, *15 KV* cable for ungrounded neutral service, with semi-conducting tape, 27/64 rubber insulation, shielding tape, rubber filled tape, and 7/64 Neoprene jacket.

[fols. 5378-5379] 12. #3 AWG, 300 v. SE cable with two #3–7-strand phase wires insulated 4/64 type rubber, taped with cellophane, and covered with cotton braid. Two phase wires served with fine wire neutral conductor, covered with moisture sealing tape and glass-cotton heat and moisture resistant braid, then painted.

13. #2 AWG, *300 volt USE* cable with three #2–7-strand phase wires each insulated with 4/64 RHW rubber and taped. Fillers are added and the composite is taped and then jacketed with 7/64 Neoprene.

14. 5 KV Series Lighting—#6 solid with 10/64 PVC insulation.

15. 5 KV Series Lighting—#6 solid with 6/64 PE insulation and 3/64 PVC jacketing.

16. 5 KV Series Lighting—#6 solid with 110 mil. PE insulation.

17. 5 KV Series Lighting—#6 solid with 6/64 Butyl rubber insulation and 3/64 Neoprene jacket.

[fol. 5380] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 175

Mr. H. C. Erskine, Pittsburgh

January 2, 1959.

From: T. L. Gilbert,
Massena Works.

To: Mr. E. D. Mairs,
Pittsburgh Office.

Re: Insulated Wire and Cable Survey

This letter will show progress made thus far on the survey, plus the items we hope to get underway during our next week's visit to Pittsburgh.

A. *Progress So Far*

1. *List of Products to be Manufactured*

Over 60 types have been listed. This information has been forwarded to Pittsburgh personnel for comment and so that relative popularity of each and weights of their components can be worked up.

2. *Types and Costs of Equipment*

These are now firmed up to varying degrees. We expect to get remaining necessary information from suppliers whom Mr. Andrews is arranging to have on hand for discussions.

3. *Direct Materials Needed for Cables*

We have a practically complete list, with purchase prices on most of them.

4. *Machine Production Rates*

Okay on those with which we are familiar. Will get information on others from next week's discussions.

5. *Crew Sizes*

Depends greatly on amount of equipment and layout. To be figured later.

6. *Operational Sequence for Each Cable Type*

Listed except for a few exceptions such as on telephone cables.

7. *Relative Volumes of Main Categories*

Based on NEMA 1955 report, dollar sales volume has been converted to tonnages in five or six main categories of cables.

[fol. 5381] 8. *Old Smelting Building Facility Layout*

A 20 foot-to-the-inch sketch of existing buildings is being drawn up for later layout use.

B. *Work to be Done on Next Week's Visit*

1. Talk to machinery suppliers to get balance of price, speeds, floor area and size ranges needed.
2. Get component weights on typical cables.
3. Convert the relative sales popularity of different cables into tonnages.
4. Get work started on transportation costs to markets.
5. Work with Mr. Healy on MFC development.
6. Develop rough ideas for equipment layout.
7. Determine policy on purchase of equipment for ini-

tial use on copper and later use on aluminum (particularly wire drawing).

8. Pick selling prices from published competitive price schedules for use in determining profit margin.

9. Determine method of merchandising insofar as it might affect discounts.

10. Arrange to get test specifications for such categories as Telephone Cables.

The survey has begun to shape up so that a final report date of late January appears attainable.

T. L. Gilbert.

TLG:jom

CC: Messrs. H. C. Erskine, Pittsburgh, P. T. Coffin—L. T. Guess, Pittsburgh, J. L. Healy, Pittsburgh, R. W. Andrews, Jr., Pittsburgh, J. A. MacLeod, Pittsburgh, N. B. Lane, Massena.

File

Messrs. E. E. Hickey, G. R. Bright, G. E. Martin, D. C. Harkins, NNOO.

[fol. 5382] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 178

January 12, 1959.

Philip T. Coffin,
Pittsburgh Office.

Mr. F. J. Close,
Pittsburgh Office.

Re: Insulated Conductors

We need the services of the Commercial Research Department to help us make an overall study in regard to Alcoa's broad participation in the insulated wire and cable field. This study is being made at the request of Mr. Magee. A task force, with Mr. E. D. Mairs as Chairman, is investigating manufacturing facilities, geographic aspects, etc. In order to complete a study of manufacturing facilities, further knowledge of the market is necessary.

This study, giving some general recommendations, must be completed by the end of February. The Commercial Research group can be most helpful in determining:

(1) Market by classifications for building wire, power cables, utilization wire, flexible cords, appliance and fixture wire, and communications, with special reference to size breakdown.

(2) Geographic center of market for insulated conductors.

(3) Areas where penetration of aluminum into this market new held by copper appears most favorable.

(4) Geographic location of plants by competitors.

A simple review of published information should be satisfactory for this study. (The Commercial Research group is more familiar with sources of this information than members of Mr. Mair's task force.) A more detailed study may be required later.

Philip T. Coffin.

PTC:ags

CC: Mr. E. M. Strauss—Pittsburgh, Mr. E. D. Mairs—Pittsburgh.

[fol. 5383] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 179

The Market for Insulated Copper Conductor

Commercial Research Division

January 17, 1959

T. Allen Johnston.

[fol. 5384] Introduction

This study was made to determine several market aspects of the insulated copper wire and cable market.

Due to a limited amount of time, only published data was examined. Field interviews were conducted with personnel of McGraw-Hill Publishing Co. and the Bureau of the Census, Department of Commerce. No information that could be considered of definite value to this study was obtained from these field interviews.

Data to be obtained were as follows:

1. Market by conductor type and size;
2. Market center for insulated conductors;
3. Conductor types and sizes offering best opportunities for aluminum;
4. Location of competitors' plants.

This report covers only the data obtained by the Commercial Research Division in the limited time available.

[fol. 5385] Market by Conductor Type and Size

The only published data on conductor types was found in the 1954 Census of Manufactures, and page 36B-11 of the Electrical Appliances and Lamps; Insulated Wire and Cable, and Engine Electrical Equipment Bulletin is shown in Exhibit I.

Total sales (manufacturer's selling price) in 1954 were $1,135 million dollars. The largest single conductor group was communications wire and cable with a dollar value of $248 million or almost 25% of total dollar sales.

Exhibit I shows total sales of both insulated wire and cable manufacturers who represent about 30% of the total and the wire drawers who produce the balance of 70 per cent. If a company buys pig, ingot, wire bar, or redraw rod and draws its wire to final size before covering, it is classified by Census as Wire Drawing rather than insulated cable manufacturing. Only those companies purchasing wire drawn to size and then covering are classified as Insulated Wire and Cable manufacturers.

Tonnage of copper consumed for insulated wire and cable by both the Wire Drawing and Insulated Wire and Cable industries in 1954 is estimated to be one billion pounds.

Tonnage of metals consumed by individual wire and cable types shown in Exhibit I is not available as Census did not collect such tonnage data and it will not collect such

[fol. 5386] ELECTRICAL APPLIANCES AND LAMPS; INSULATED WIRE AND CABLE; AND ENGINE ELECTRICAL EQUIPMENT

Product code	Product	Total value of shipments including inter-unit transfers	
		1954	1953
3431—	Insulated wire and cable, including appliance wire and cord and flexible cord sets, total	1,131,844	$[illegible]
3431	Communication wire and cable	249,373	186,478
3431111	Coaxial cable: Lead sheathed	3,[illegible]	29,722
3431115	Flexible	[illegible]	1,[illegible]
3431121	Lead and lead-sheathed wire	12,[illegible]	[illegible]
3431131	Drop and bridle wire	19,[illegible]	21,[illegible]
3431141	Distribution and jumper wire	10,[illegible]	1,[illegible]
3431151	Inside and dort telephone wire	6,427	6,123
3431161	Paper-insulated, lead-covered (except coaxial)	82,643	68,231
3431171	Rubber-covered cable	13,[illegible]	32,729
3431199	Other communication wire and cable	[illegible]	[illegible]
3431	Other insulated wire and cable	778,322	[illegible]
3431211	Signal wire and cable	12,432	7,334
	Magnet wire:		
	Enameled, including synthetic resin enamels (including combinations of enamels with other coverings)		
3431221	Enameled only	124,[illegible]	90,[illegible]
3431223	Enameled and covered	34,[illegible]	21,[illegible]
	Not enameled:		
3431229	Cotton covered	10,[illegible]	[illegible]
3431227	Other	20,[illegible]	22,[illegible]
	Nonfibrous and slow burning wire:		
3431231	Braided (including slow burning)	42,[illegible]	
3431233	Rubber covered	4,[illegible]	78,[illegible]
3431235	Thermoplastic covered	[illegible]	
3431237	Polychloroprene (neoprene) covered	16,[illegible]	
	Building wire and cable, except varnished cambric insulated:		
3431241	Fibrous covered and/or jacketed (including lead-covered)	45,[illegible]	66,[illegible]
3431243	Nonmetallic covered cable or conductor	19,[illegible]	23,[illegible]
3431245	Nonmetallic sheathed cable or conductor	36,[illegible]	30,[illegible]
	Service cable (including self-supporting type but excluding service entrance cable):		
3431261	Rubber insulated	23,[illegible]	
3431263	Thermoplastic insulated	28,[illegible]	23,[illegible]
3431266	Service entrance cable	21,[illegible]	
3431267	Synthetic (no braid)	[illegible]	17,[illegible]
3431269	Other building wire and cable (excluding varnished cambric insulated)	10,[illegible]	1,[illegible]
	Power wire and cable:		
	Under 601 volts:		
3431291	Portable power cables	19,[illegible]	14,[illegible]
3431293	Varnished cambric insulated (including varnished cambric building wire)	4,[illegible]	11,[illegible]
3431293	Synthetic	3,[illegible]	6,[illegible]
3431294	Rubber insulated (including building wire)	44,[illegible]	18,[illegible]
3431295	Asbestos and asbestos-varnished cambric	6,[illegible]	3,[illegible]
3431296	Other power wire and cable, under 601 volts	9,[illegible]	3,[illegible]
	601 volts and higher:		
3431298	Portable power cables	3,[illegible]	3,[illegible]
3431263	Varnished cambric insulated	9,[illegible]	14,[illegible]
3431263	Paper insulated	40,[illegible]	32,[illegible]
3431265	Rubber insulated	20,[illegible]	12,[illegible]
3431267	Other power wire and cable, 601 volts and higher	3,[illegible]	1,[illegible]
	Automotive and aircraft type wire and cable:		
3431271	Secondary ignition wire and cable (except harness sets)	2,[illegible]	
3431273	Aircraft wire, other than ignition	[illegible]	[illegible]
3431275	Insulated battery, starting, and other primary wire and cable (except cable sets)	3,927	
3431279	Other automotive and aircraft type wire and cable (excluding cable sets and nonmetallic battery cable)	14,[illegible]	
3431289	Marine wire and cable (U.S. Navy and Merchant Marine)	23,[illegible]	4,[illegible]
3431293	Other insulated wire and cable	63,[illegible]	24,[illegible]
3431293	Insulated wire and cable, not specified by kind	3,[illegible]	[illegible]
3499	Appliance wire and cord and flexible cord sets	[illegible]	78,[illegible]
3499[illegible]	Flexible cord sets	40,[illegible]	29,[illegible]
	Appliance wire and cord:		
3499[illegible]	Fixture wire (including heat resistant)	10,[illegible]	8,[illegible]
	Flexible cord (including heater cord):		
3499[illegible]	Rubber insulated	22,[illegible]	19,[illegible]
3499[illegible]	Thermoplastic insulated	10,[illegible]	4,[illegible]
3499[illegible]	Other appliance wire and cord	22,[illegible]	[illegible]
3499[illegible]	Appliance wire and cord and flexible cord sets, not specified by kind	2,[illegible]	[illegible]

See footnotes at end of table.

E. N. WAGNER
CLERK U. S. DIV. CT.

[fol. 5387] tonnage data in the 1958 Census of Manufactures now underway.

There is no published data available on covered conductor sales or production by size.

Market Centers for Insulated Conductors

Based on Alcoa's 1957 shipments of covered aluminum conductors the market center was located at Elsberry, Missouri.

Using 1954 Census of Manufactures data of consumption by manufacturing establishments, the center for insulated copper was Central Illinois. Due to Census restrictions on disclosure of data, this center is less exact than that for Alcoa shipments but it is of interest to note the relative proximity of these centers.

No utility consumption of insulated copper wire is included in the Census of Manufactures, and a reasonable assumption would be that the insulated copper market center be slightly to the east of the above center.

Insulated Conductor Types Offering Best Potentials for Conversion to Aluminum

Conductor types offering the best potentials for aluminum are those where the metal cost is the greatest proportion of total conductor cost.

Fine sizes of aluminum wire will be less advantageous than equivalent conductor sizes of copper wire. This will probably eliminate branch circuit wire at the present alu- [fol. 5388] minum-copper price relationship.

The conductor types offering the best potentials initially are:

Power & Feeder Cable #8 and larger
Aircraft Cable
Aerial Cable
Welding Cable

Other conductor types and sizes may well have merit as aluminum conductors, but a detailed study would be necessary.

Location of Insulated Copper Conductor Plants

Exhibit II and accompanying tables show the location of the ten leading manufacturers of insulated copper conductors. The ten leading competitors were obtained from a market research report of Monsanto Chemical Co.

Okonite Co. is shown as a separate company and not combined with Kennecott which previous to the Okonite acquisition was not in the first ten insulated copper conductor manufacturers.

[fol. 5389] Locations by State of Insulated Wire and Cable Plants of Ten Leading Insulated Copper Wire and Cable Manufacturers 1958

State	Number of Plants
New Hampshire	
General Cable	1
Simplex Wire & Cable Corp.[1]	1
Massachusetts	
General Cable Corp. (Cornish Wire Co., Inc.)[2]	1
General Electric Co.	1
Simplex Wire & Cable Corp.	1
Connecticut	
General Electric Co.	1
Rhode Island	
General Cable Corp.	1
New York	
General Cable Corp.	1
Phelps Dodge Copper Prod.	1
Rome Cable Corp.	1
Western Electric	1
New Jersey	
General Cable Corp.	3
Okonite Co.[4]	3
Phelps Dodge Copper Prod.[3]	1
Triangle Conduit & Cable Corp.	1
Western Electric Corp.	1
Maryland	
General Cable Corp.	1
Western Electric Corp.	1
North Carolina	
Essex Wire Corp.	1
Georgia	
Anaconda Wire & Cable Corp.	1
Florida	
General Cable Corp.	1
Tennessee	
General Cable Corp.	1

[fol. 5390]

Alabama	
Essex Wire Corp.	1
Ohio	
Essex Wire Corp.[5]	1

State	Number of Plants
Indiana	
Anaconda Wire & Cable Corp.	1
Phelps Dodge Copper Prods.	1
Michigan	
Essex Wire Corp.	1
Illinois	
Anaconda Wire & Cable Corp.	1
Essex Wire Corp.	1
General Cable Corp.[4]	1
Western Electric Corp.	1
Missouri	
General Cable Corp.	1
Nebraska	
Western Electric Corp.	1
Texas	
General Cable Corp.	1
Montana	
Anaconda Wire & Cable Corp.[5]	1
California	
Anaconda Wire & Cable Corp.	1
Essex Wire Corp.	1
General Cable Corp.	2
General Electric Co.	1

Notes:
[1] Submarine Cable, only.
[2] Cornish Wire, Inc. acquired by General Cable Corp. in January 1959.
[3] Weatherproof (Textile Covered, only).
[4] Telephone Cable, only.
[5] Okonite Co. acquired by Kennecott Copper Corp. in late 1958.
[6] Miscellaneous Conductors.
Source: Monsanto Chemical Co. BDSA—U.S. Dept. of Commerce.

[fol. 5391] Location of Plants of Ten Leading Insulated Copper Wire and Cable Manufacturers 1958

Anaconda Wire & Cable Co.
- Black Eagle, Montana [1]
- Marion, Indiana
- Orange, California
- Sycamore, Illinois
- Watkinsville, Georgia

Essex Wire Corp.
- Mt. Airy, N. C.
- Sycamore, Illinois
- Tiffin, Ohio [2]
- North Birmingham, Alabama
- Detroit, Michigan
- Anaheim, California

General Cable Corp.
- Bayonne, N. J.
- Emeryville, California
- Los Angeles, California
- Perth Amboy, N. J.
- Rome, N. Y.
- St. Louis, Mo.
- Monticello, Illinois [2]
- Tampa, Fla.
- New Brunswick, N. J.
- Providence, R. I.

State	Number of Plants
Memphis, Tenn.	
Baltimore, Maryland	
Concord, N. H.	
Boham, Texas	
Williamstown, Mass. (Cornish Wire Co., Inc.)[6]	
General Electric Co.	
Bridgeport, Conn.	
Lowell, Mass.	
Okland, California	
Okonite Co.[5]	
Passaic, N. J.	
Paterson, N. J.	
New Brunswick, N. J.	
Phelps Dodge Copper Products Corp.	
Bayway, N. J.[4]	
Yonkers, N. Y.	
Ft. Wayne, Ind.	

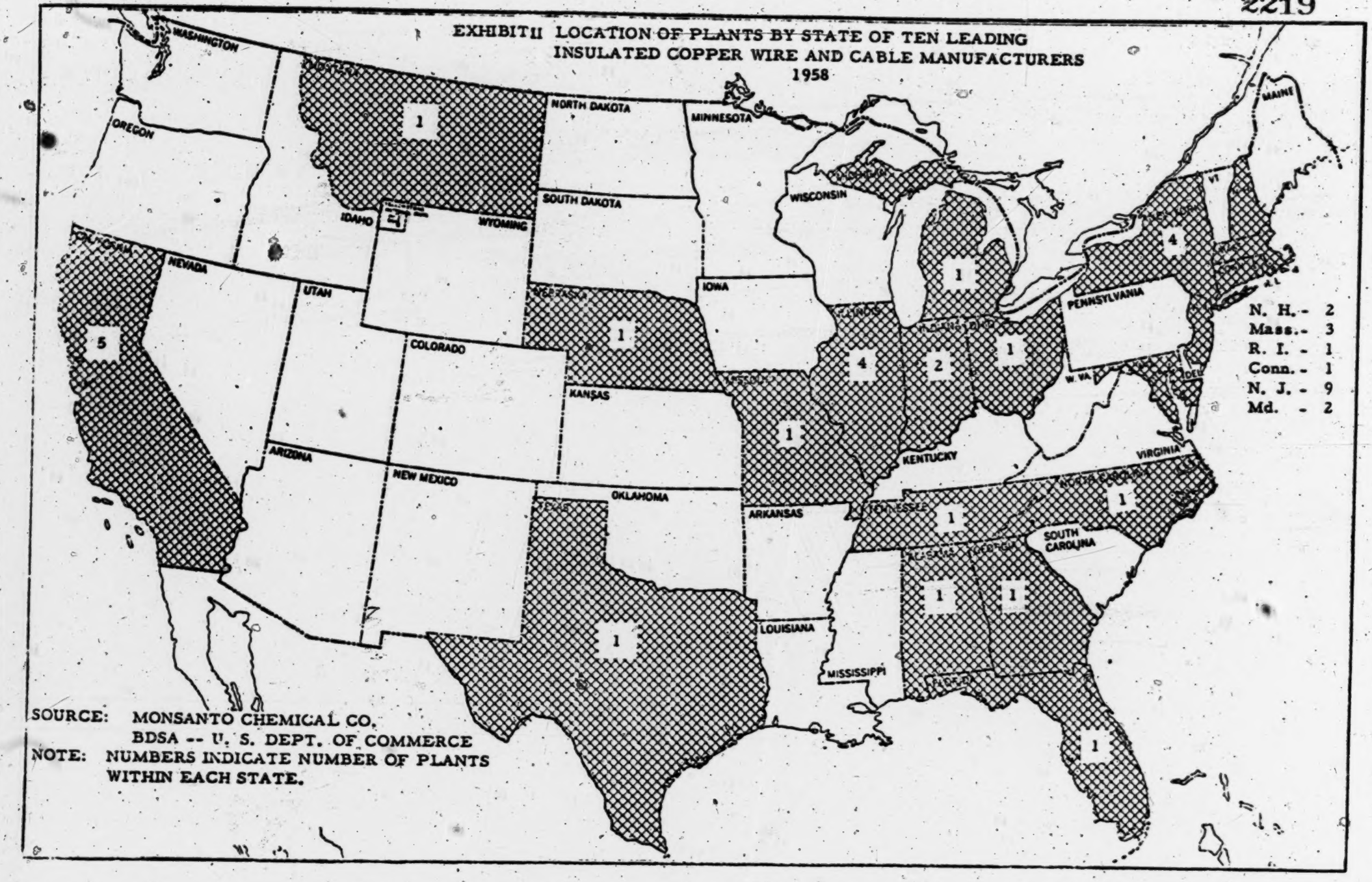
[fol. 5392]

Rome Cable Corp.	
Rome, N. Y.	
Simplex Wire & Cable Corp.	
Cambridge, Mass.	
Newington, N. H.[4]	
Triangle Conduit & Cable Corp.	
New Brunswick, N. J.	
Western Electric Corp.	
Baltimore, Md.	
Kearny, N. J.	
Chicago, Ill.	
Buffalo, N. Y.	
Omaha, Nebraska	

Notes:

[1] Miscellaneous Conductors, only.
[2] Telephone Cable, only.
[3] Weatherproof (Textile Covered), only.
[4] Submarine Cable, only.
[5] Okonite Co. acquired by Kennecott Copper Corp. late in 1958.
[6] Cornish Wire Co., Inc. acquired by General Cable Co. in January 1959.
Source: Monsanto Chemical Co. BDSA—U.S. Dept. of Commerce.

EXHIBIT II LOCATION OF PLANTS BY STATE OF TEN LEADING INSULATED COPPER WIRE AND CABLE MANUFACTURERS 1958



SOURCE: MONSANTO CHEMICAL CO.
BDSA -- U. S. DEPT. OF COMMERCE

NOTE: NUMBERS INDICATE NUMBER OF PLANTS WITHIN EACH STATE.

[fol. 5395] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 180

Alcoa

First in Aluminum
Aluminum Company of America

1501 Alcoa Bldg., Pittsburgh 19, Pa.

News Release

For Further Information: Gordon C. Meek, ATlantic 1-4545, Ext. 465

For Immediate Release, Thursday, Jan. 22, 1959

Pittsburgh, Pa., Jan. 22, 1959—Rome Cable Corporation and Aluminum Company of America today announced plans to affiliate.

Frank L. Magee, president of Alcoa, and A. D. Ross Fraser, president of Rome Cable, announced that agreement has been reached on a plan by which Alcoa will acquire all the properties of Rome Cable for 355,226 shares of Alcoa common stock. This will permit distribution to Rome shareholders of three shares of Alcoa common stock on each five shares of Rome common stock. The agreement is contingent upon approval of Rome shareholders, who will meet on March 25. If approved, it will take effect immediately.

Alcoa and Rome plan to combine their electrical conductor, conduit, and accessory activities in a new company to be called Rome Cable Company. The present members of Rome's management will continue in their present capacities in the newly formed company. Mr. H. T. Dyett will retire, as chairman of the board of Rome Cable, when and if the agreement is consummated, rather than at the annual meeting in June, as previously planned; but he will continue to serve on the board of directors of the new company. Alcoa plans to continue the fundamental policies established by the Rome management, and no major changes in personnel or operating procedures are anticipated.

[fol. 5396] Rome Cable Corporation shares currently are listed on the New York Stock Exchange. The company has

approximately 2,500 shareholders. Rome Cable's net sales for the year ending March 31, 1958, amounted to $40,615,000. Annual sales have averaged $47-million over the past five years. The company has approximately 1,500 employees. It operates manufacturing plants at Rome, N. Y.; Torrance, Calif.; and Collegeville, Pa., as well as sales offices in principal cities of the United States.

Rome is best known for its broad line of quality insulated wire and cable products—chiefly made of copper—and for its steel conduit and other wiring systems. Its products are sold to electric utilities, electrical manufacturers, other wire fabricators, industrial users, wholesalers, mines and oil companies. A number of specialty products are made for the military services, especially for use in the missile program.

Rome Cable was founded 23 years ago and has grown rapidly during that time. It is well known in the electrical industry for the emphasis it has placed on research and development activities. During 1958, the company opened a new research center at Rome, N. Y., in order to stimulate further progress in the development of new products and new and improved manufacturing processes and practices. Nearly 40 per cent of the company's sales during the year ending March 31, 1958, came from items that Rome did not manufacture prior to 1950.

[fol. 5397] For more than 60 years, Alcoa has pioneered in the development of aluminum as an electrical conductor. It produces aluminum wire and cable, bus conductors, conductor accessories, conduit, and windings of aluminum sheet and foil for electric transformers and condensers. One of the company's research laboratories is devoted exclusively to the development of new products and processes for the electrical conductor industry.

"Our proposed affiliation with Alcoa," Mr. Fraser said, "is very much in the best interest of Rome's employees, shareowners, and customers. It will make possible more complete service to customers by taking advantage of the combined production and marketing of Alcoa's line of aluminum conductor products, as well as bare and insulated wire and cable products produced by Rome. The coordinated research and development activities of Rome and

Alcoa will provide improved services to the electrical industry."

"The plan that will be submitted to Rome's shareholders," Mr. Magee said, "will make possible greatly improved service to the rapidly growing electrical industry. For many years Alcoa has specialized in the production and sale of bare aluminum conductors, with emphasis on the popular aluminum cable steel reinforced (A.C.S.R.) for electric transmission and distribution lines. More recently, Alcoa has been offering a limited line of insulated aluminum conductors. Rome Cable's complete facilities for the production and sale of many types of insulated wire and cable, as well as bare copper conductors, will fully complement Alcoa's facilities and enable the new organization to meet the increasingly complex requirements of the electrical industry."

[fol. 5398] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 181

Alcoa
First in Aluminum
Aluminum Company of America
1501 Alcoa Bldg., Pittsburgh 19, Pa.

News Release

For Release at 7:30 P.M., EDST, Monday, June 15, 1959,
Or Anytime Thereafter

Rome, N.Y., June 15, 1959—The new combination of Rome Cable Corporation and Aluminum Company of America has greatly enhanced opportunities for both concerns to share in the growth of the rapidly expanding U.S. electrical industry.

This bright outlook for the two companies and their personnel was foreseen tonight by Alcoa President Frank L. Magee, in response to a welcome extended to Alcoa by the officers and directors of Rome Cable.

Mr. Magee said both firms should realize future benefits from forthcoming joint effort by their respective research

organizations, increased facilities for production, and broadened sales and distribution networks.

Coupled with these advantages, said Mr. Magee, will be improved opportunities for market exploitation because the product lines of both Rome and Alcoa will, for the first time, be rounded out to provide a full complement of electrical conductor and accessories in aluminum, copper, and steel.

Mr. Magee spoke at the Rome Country Club before an audience which included officials of Rome Cable and Alcoa, and area civic and business leaders.

[fol. 5399] Alcoa officers who flew to Rome today with Mr. Magee were: I. W. Wilson, company board chairman; M. M. Anderson, Leon E. Hickman, and Lawrence Litchfield, Jr., executive vice presidents; Ralph V. Davies, Harold C. Erskine, and Edward B. Wilber, vice presidents; and Alfred M. Hunt, company secretary and director. The group was accompanied by Philip T. Coffin, Alcoa's manager of electrical industry sales, and John L. Fleming, general manager of public relations.

A tour of Rome Cable's Research Laboratory and a meeting of the concern's board of directors preceded luncheon at the country club with a group of Rome Cable management people. A. D. Ross Fraser, president of the new Alcoa subsidiary, welcomed the visitors.

The Alcoa group devoted the afternoon to a tour of the Rome Cable plant and to a press conference attended by area newspaper, television, and radio station representatives, before returning to the country club for dinner.

Mr. Magee told the gathering that Alcoa regarded Rome Cable's experience, talent, and long demonstrated teamwork as more important that the purchase of the firm's plants and equipment.

"The people of Rome Cable are now Alcoa people," he said, adding that Rome's organization will remain intact and that Rome employees now will share in Alcoa employee benefits and job opportunities throughout the parent organization.

[fol. 5400] Alcoa's president lauded the community regard Rome Cable's people had developed toward their

company and themselves during their long tenure, and termed this another corporate asset which Aloca prized and would seek to preserve and nourish.

[fol. 5401] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 183

cc: E. C. West

To: Mr. J. R. Woods
From: C. J. McMurry
Date: April 2, 1959

Subject: Tennessee Valley Authority, Chattanooga, Tennessee

Dear Jack:

As you will recall, last January we had correspondence about getting on the approved list of TVA for aluminum conductor transmission cable. It was set up that at the first opportunity, probably this fall, they would visit our plant for an inspection.

In view of the fact that we are now a division of Alcoa, it would seem that I should kill this request with TVA on these grounds. Have you any comment otherwise?

CJM:wg

Sincerely, M.

[fol. 5402] In United States District Court

Plaintiff's Exhibit 184

cc: E. C. West

C. J. McMurry—Atlanta
J. R. Woods—Rome
April 7, 1959
Tennessee Valley Authority

Dear Mac:

With reference to your memo of April 2nd, it would seem certain that we will ride in on Alcoa's approval, so I agree that there is not much to be gained by pursuing the matter further. If, by any chance, a question does come up we will have to reconsider.

Very truly yours, ——, ——.

JRW:reh

[fol. 5403] In United States District Court

Plaintiff's Exhibit 185

Alcoa Private Wire

23 PI CT 4-14-60
H. H. Rodee.

Re TVA. Mr. Harry Hicks asking whether we are making ACSR at Rome and if so whether a TVA inspection team of from 5 to 8 engineers could obtain clearance to inspect the facilities at Rome Cable sometime this year, possibly this summer. Will we give approval.

Lindsey M. Hall, Chattanooga.

[fol. 5404] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 186

Telegram

This Copy for T.V.A

To: Lindsey M. Hall, Chattanooga. 4/14/60.
W. W. Knapp, Rome (By Mail).

Retel TVA we are not making and do not contemplate making ACSR at Rome. Therefore assume TVA engineers will have no interest in inspecting Rome facilities.

HHR:BHA H. H. Rodee.

[fol. 5405] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 187

A. D. R. Fraser
C. H. Ellis
G. W. Commerford
L. D. Fitler
F. P. Baumler
T. D. Bylin

Aluminum Capacities July 10, 1959.
Based on factor of 4 7/.0772 Ech. 19

Stranding:

1,000,000 ft. (39,000#) per week, could be available starting in 2 weeks.

Properzi—Casting:

Present operation 10 hours per day 6 days a week—1 machine—approximately 100,000# per week.

Could have an additional 100,000# per week in approximately 3 weeks by adding another shift.

Drawing:

Operating at 88% capacity—will operate at 100% week of July 27, 1959. Will have available 15,000# per week additional.

Insulating—Polyethylene: Singles:

One machine—#5 plastic approximately 840,000′ per week—3 shifts available in about 1 week to juggle men back to machines.

Edmonds—#885:

Twisting self supporting capacity 750,000 ft. per week. Filled to capacity through week of July 27, 1959 on 3 shift basis.

Note: Increase to 3 shifts due to approximately 50% of Pittsburgh Requirements for July.

Edmonds #870:

A smaller machine—operating 1 shift has capacity of approximately 40,000′ per shift or 400,000 feet per 5 day week —would be available in 2 weeks after break-in of necessary help.

T. D. Bylin.

TDB k

[fol. 5406] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 189

February 8, 1956

ACCOUNTING DEPARTMENT
COST DIVISION
PITTSBURGH OFFICE

MR. P. T. COFFIN

PITTSBURGH OFFICE

RE: CABLE PRICES

In accordance with your recent request, we have shown below the prices necessary to return 20% margin on capital for a representative group of cable sizes. Also shown are current schedule prices:

Size and Stranding			Price Necessary To Return 20% Margin On Capital	Current Schedule Price	Increase or (Decrease)
#1/0	6/1	A.C.S.R.	$.324	$.313	$.011
#4	7/1	A.C.S.R.	.328	.320	.008
795,000	26/7	A.C.S.R.	.319	.315	.004
900,000	54/7	A.C.S.R.	.339	.328	.011
336,400	19	All Alum.	.396	.390	.006
795,000	37	All Alum.	.366	.375	(.009)

J. L. HEALY

JLH:hcw

[fol. 5407] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 191

February 20, 1956.

Accounting Department,
Cost Division,
Pittsburgh Office.
Mr. D. Wilmot
Pittsburgh Office

Electrical conductor file

Re: Electrical Conductor Cable and Redraw Rod Prices

In line with our conversation this morning, attached is a table supplementing the information included on the tables prepared last week, of which you have a copy.

Based on current costs, an average price increase of $.015 per aluminum pound is needed on cable in order to return 20% on capital employed. This is notwithstanding that in 1948, cable shipments were returning slightly better that 20% on capital, and price increases since 1948 have apparently been adequate to cover increased costs of metal, steel wire and labor. The reasons for this are as follows:

1. In 1948 we had only one plant—Massena—and the invested capital and overhead expense was accordingly much lower.

2. With only one plant in operation, we were operating at that time at close to 100% of capacity as compared to today's operations of only slightly better than 50%.

3. Our change in basis of allocating G.A. & S.E., effective the first of 1955, results in approximately $.008 per pound increased assessment of G.A. & S.E. against this product.

It seems to me that the significant point in this is that our present need for price increases in cable is occasioned by changes in our own facilities and operating practices. Since our competitors have not necessarily had parallel circumstances, we should be aware of the fact that

[fol. 5408] any price increase at this time, although needed by Alcoa, may increase the margin available to a competitor to a point beyond that which has ever been available to him since 1948.

This, of course, can be eliminated, insofar as non-integrated competitors are concerned, by making a corresponding price increase in redraw rod. The attached table indicates that a price increase of $.014 would be needed to offset a $.015 price increase in cable. With a price increase of $.014, redraw rod would return 40% on capital employed. Prior to 1954, redraw rod has always returned a margin equivalent to 30% return or better. A possible pattern of price increases which would return approximately what is needed, without unduly opening the spread between redraw rod and cable, might be as follows:

	Total Price Increase	Increased Net Margin	% Return on Capital (Allowing for 10% Labor Increase)
E. C. Pig	$.005	$.005	....
Redraw Rod	.014	.009	30%
Cable	.018	.013	18%

The above pattern would obtain approximately the price increase needed to recover a 10% labor increase and obtain 20% return on capital for cable, although a small portion of the increased margin would be reflected in pig margins. The increase in spread to a competitor using redraw rod would be only $.002 per pound after consideration of his scrap loss factor.

T. H. Kerry.

THK:SPC

Attachment

[fol. 5409]

			% Return Resulting From Price Increase if E. C. Pig Price Increased $.005 Per Pound	
	At Current Costs	Allowing For a 10% Labor Increase	At Current Costs	Allowing For a 10% Labor Increase
Cable Price Increase Needed to Return 20% on Capital Employed at 70% Utilization	$.015	$.018	18%	19%
Redraw Rod Price Increase Needed to Return 30% on Capital*	.007	.009	23	26
Redraw Rod Price Increase Needed to Retain Spread Assuming Cable Price Increases Shown Above	.014	.017	33	37

Redraw Rod Margin and % Return After Each Price Change	Former Basis for Allocation of G.A.&S.E. Margin/Lb.	% Return	Present Basis for Allocation of G.A.&S.E. Margin/Lb.	% Return
Price Change Effective				
10–11–48	$.029	54%		
1–27–50	.024	50		
10– 4–50	.021	43		
8– 4–52	.021	33		
1–23–53	.024	40		
8– 9–54	.021	29		
1–13–55	.021	29	$.011	16%
8–11–55	.024	34	.014	20

* Redraw Rod is currently returning 20% (assuming increased efficiency at Massena). Based on prior years performance, this product should return at least 30%.

[fol. 5410]

Increase in Base Cable Price from 10–11–48 to 8–11–55		$.107/Al. lb.
Increase in Cost to Competitor of Redraw Used in Cable	$.073(1)	
Estimated Increase in Cost of Steel Core Wire	.020	
Estimated Increase in Labor Based on Alcoa's Costs	.012	
Estimated Increase in Transportation Costs	.000	.105
Estimated Increase in Cable Prices in Excess of Competitors' Cost Increases		$.002/Al. lb.

(1) Based on $.070 per pound increase in redraw sales price, 90% recovery in cable production and $.047 per pound increase in scrap prices.

Segregated loose scrap today	$.185
Segregated loose scrap 10–11–48	.138
	$.047

[fol. 5411]

			% Return Resulting From Price Increase if E. C. Pig Price Increased $.005 Per Pound	
	At Current Costs	Allowing For a 10% Labor Increase	At Current Costs	Allowing For a 10% Labor Increase
Cable Price Increase Needed to Return 20% on Capital Employed at 70% Utilization	$.015	$.018	18%	19%
Redraw Rod Price Increase Needed to Return 30% on Capital*	.007	.009	23	26
Redraw Rod Price Increase Needed to Retain Spread Assuming Cable Price Increases Shown Above	.014	.017	33	37

Redraw Rod Margin and % Return After Each Price Change	Former Basis for Allocation of G.A.&S.E.		Present Basis for Allocation of G.A.&S.E.	
	Margin/Lb.	% Return	Margin/Lb.	% Return
Price Change Effective				
10-11-48	$.029	54%		
1-27-50	.024	50		
10- 4-50	.021	43		
8- 4-52	.021	33		
1-23-53	.024	40		
8- 9-54	.021	29		
1-13-55	.021	29	$.011	16%
8-11-55	.024	34	.014	20

* Redraw Rod is currently returning 20% (assuming increased efficiency at Massena). Based on prior years performance, this product should return at east 30%.

[fol. 5412] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 192

This Copy To: Mr. P. T. Coffin

August 26, 1957.

W. B. Howard
Pittsburgh Office
Mr. R. B. McKee
Pittsburgh Office

Received May 1, 1959. Genl. Files.

Re: Central Cable Company

In accordance with your request we have prepared the following chart and tabulations covering shipments to the captioned company, and comparisons between the prices of aluminum pig, re-draw rod and aluminum conductors:

I. Shipments for 1951-57 (January-June).
II. Estimated Spread Between E.C. Grade Re-Draw Rod, ACSR Scheduled and Competitive Prices (Composite Conductor).
III. Estimated Spread Between E.C. Grade Re-Draw Rod, ACSR Scheduled and Competitive Prices (Aluminum Content Only).
IV. Comparative Prices Aluminum Pig, E.C. Grade Re-Draw Rod, and ACSR 1948-1957.

In discussing the problem with Mr. Coffin, he suggested that the average price of #4, #1/0, #4/0 and 397,500 C.M. sizes of conductors be used for the basis of comparison. He also kindly estimated, from our own revenue figures, competitive prices which have been in effect to a greater or lesser degree since 1952. In view of the fact that Alcoa has neither control of steel core wire prices nor our competitors stranding costs, it was decided to consider the aluminum content of ACSR separately from the complete composite conductor. The tabulation and the chart, therefore, include aluminum content as well as ACSR figures.

Conclusion: Table III indicates that the aluminum content of ACSR in 1948 was approximately 33½¢ per pound. The spread between it and re-draw at that time was 11½¢. By and large, the same ratio of spread has existed since [fol. 5413] that time and today with the aluminum content in the scheduled price of ACSR at 54½¢ per pound, the spread has increased to 20¢. This comparison clearly indicates that the conductor scheduled prices have been increased properly with the price of re-draw rod.

In considering the competitive situation, it is apparent that the worst price cutting occurred in 1955 and the current year. Certainly Alcoa was not the instigator and our own margin reports indicate that prices at which we were forced to take certain pieces of business were not at all satisfactory.

W. B. Howard.

WBH:af
Attachments

[fol. 5414]

Central Cable Company
Jersey Shore, Pa.

	1957 (Jan.-June)		1956		1955	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
Pig			200,000	48,000.	220,000	49,500.
Rod and Bar	558,175	185,872.	2,538,703	803,702.	1,514,788	423,444.
Toll Rod and Bar			200,401	16,032.	220,199	13,620.
Cable						
Cable Acces., Aluminum	2,037	1,405.	4,673	3,413.	2,467	1,667.
Cable Acces., Non Aluminum						
Shipping Containers						
Total	560,212#	$187,277.	2,734,376#	$871,147.	1,737,255#	$488,231.

	1954		1953		1952	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
Pig						
Rod and Bar	1,411,930	375,214.	1,166,834	305,387.	565,289	137,485.
Toll Rod and Bar						
Cable	17,203	8,193.	534,538	224,215.	179,392	70,236.
Cable Acces., Aluminum	3,169	1,739.	343	145.		
Cable Acces., Non Aluminum	5,905	555.	222	28.		
Shipping Containers	80(Cr)	1,761.(Cr)	7	382.	69	1,242.
Total	1,432,302#	$383,940.	1,701.715#	530,157.	744,681#	$208,963.

	1951	
	Pounds	Dollars
Pig		
Rod and Bar	144,321	34,637.
Toll Rod and Bar		
Cable	192,298	70,010.
Cable Acces., Aluminum		
Cable Acces., Non Aluminum		
Shipping Containers	127(Cr)	1,777.(Cr)
Total	333,619#	$102,870.

August 22, 1957

[fol. 5415]

Estimated Spread Between E.C. Grade Re-Draw Rod

ACSR Scheduled and Competitive Prices
(Composite Conductor)

Year (Average)	E.C. Re-Draw	ACSR (Scheduled Prices)	Spread	ACSR (Competitive Situation)	Spread
1948	21.75	22.62	.87		
1949	22.50	23.22	.72		
1950	23.00	25.05	2.05		
1951	24.00	25.63	1.63		
1952	25.20	27.44	2.24	26.76	1.56
1953	26.20	28.74	2.54	28.57	2.37
1954	27.00	29.12	2.12	27.34	.34
1955	28.75	31.48	2.73	27.76	(.99)
1956	31.93	34.90	2.97	32.45	.52
1957	34.60	37.13	2.53	32.72	(1.88)

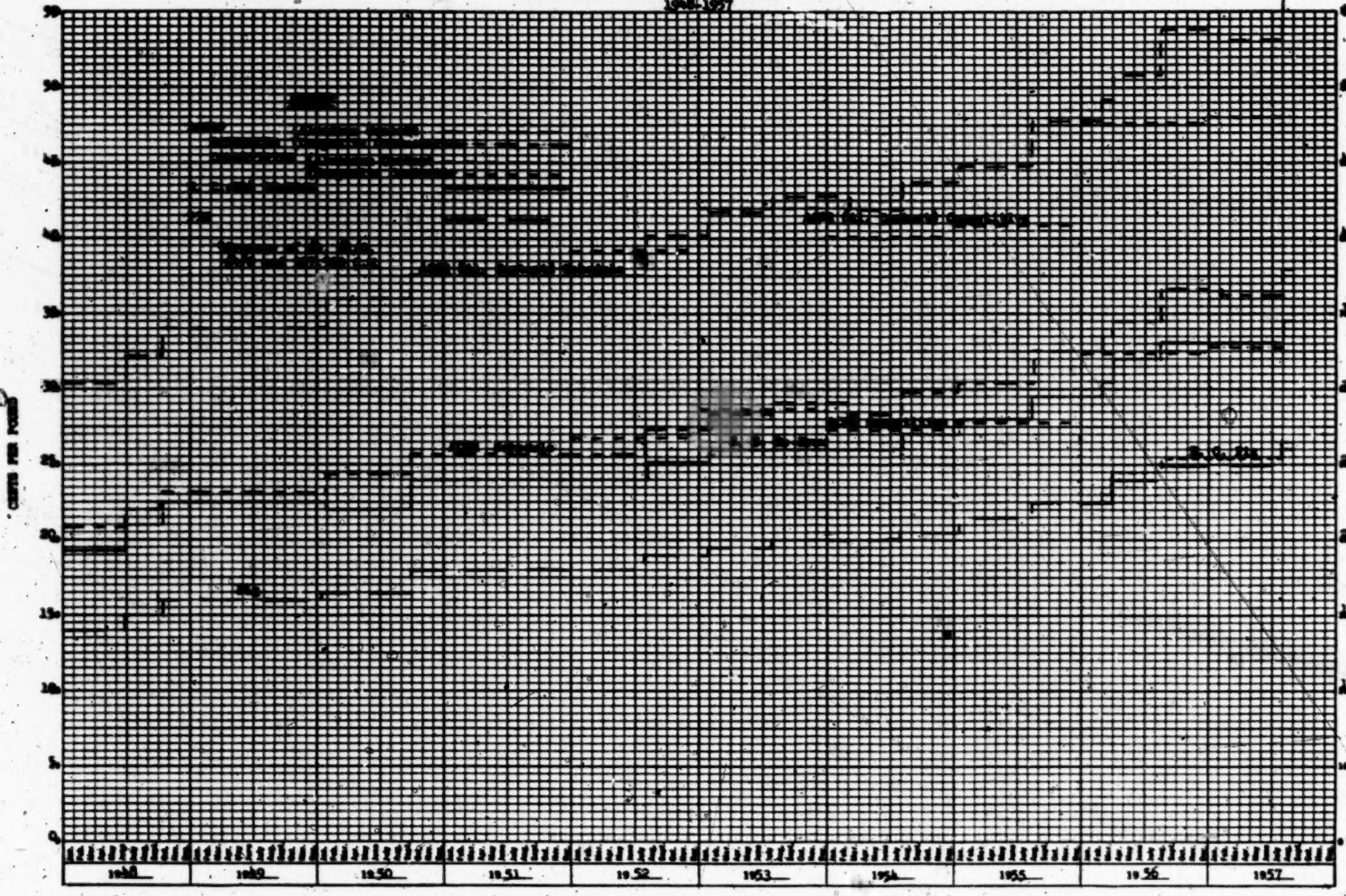
[fol. 5416]

Estimated Spread Between E.C. Grade Re-Draw Rod

ACSR Scheduled and Competitive Prices
(Aluminum Content Only)

Year (Average)	E.C. Re-Draw	ACSR (Scheduled Prices)	Spread	ACSR (Competitive Situation)	Spread
1948	21.75	33.24	11.49		
1949	22.50	34.13	11.63		
1950	23.00	36.83	13.83		
1951	24.00	37.68	13.68		
1952	25.20	40.34	15.14	39.33	14.13
1953	26.20	42.24	16.04	42.00	15.80
1954	27.00	42.79	15.79	40.18	13.18
1955	28.75	46.27	17.52	40.80	12.05
1956	31.93	51.30	19.37	47.70	15.77
1957	34.60	54.57	19.97	48.10	13.50

COMPARATIVE PRICES
ALUMINUM P20 B.C. GRADE NO-HEAT TOD ACRE
1948-1957



August 22, 1957

[fol. 5418] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 193

This Copy for: Mr. D. Wilmot

September 24, 1957

L. P. Favorite
Pittsburgh Office
Mr. R. C. Erickson
Pittsburgh Office

Re: Central Cable Corporation

This will refer to your letter of September 19, with reference to shipments of E.C. Redraw Rod and E.C. Pig. I am listing below our shipments of E.C. Pig to cable manufacturers for the year 1956 and the first eight months of 1957, also our estimated total requirements of these customers, Alcoa's participation and our best guess as to the percentages supplied by competitors.

(Thousands of Pounds)

Dist.	Customer	Alcoa Shipments Year 1956	Alcoa Shipments 8 Mo. 1957	Total Requirements 1957 Estimate by Sales Office Total	Alcoa Share	Per cent Participation
Al.	Rome Cable	3,175	1,115	3,600	2,000	(Alcoa —60% (Alcan —20% (Kaiser —20%
At.	Southwire Co.	2,066	240	15,000	500	(Alcoa — 3% (Alcan —40% (Kaiser —25% (Reynolds —25% (Anaconda — 7%
At.	Southern Electrical Company	2,976	2,579	13,400	6,600	(Alcoa —50% (Alcan —45% (Kaiser — 5%
Ch.	Essex Wire Corp.	1,051	252	*6,000	300	(Alcoa — 5% (Alcan —58% (Kaiser —17% (Reynolds —20%
NY	General Cable	4,792	4,349	7,500	6,000	(Alcoa —80% (Alcan —10% (Kaiser —10%
	Totals	14,060	8,535	45,500	15,400	

* From 1957 Sales Aid.

[fol. 5419] In my letter of September 5, addressed to Mr. R. B. McKee, I listed our shipments of E.C. Redraw Rod to our customers who produce cable. During 1956, the in-

dustry shipped 187,356,000 pounds (net aluminum weight) of ACSR and bare cable. During the same period, Alcoa shipped 55,607,000 pounds leaving a balance of 131,749,000 pounds shipped by competitors. Using this latter figure, the 18,849,000 pounds of E.C. Redraw Rod mentioned in my letter of September 5, as being shipped to this group of competitors, would show that our percentage of E.C. Redraw Rod shipped to customers amounted to 14.35%. On the same basis, we would estimate that Kaiser shipped about 7% or 9,000,000 pounds and Reynolds about 2½% or 2,600,000 pounds. This, of course, is not the true picture as to how much metal Alcoa furnished to the industry, because we should add the amount of E.C. Pig that was shipped to customers who make cable. During 1956, the total amount of E.C. Pig and E.C. Redraw Rod shipped to these customers totaled 32,909,000 pounds. So on this basis, and using the figure 131,749,000 pounds as the total tonnage of cable shipped by this group of customers, we supplied 25%.

Considering the fact that we shipped 55,607,000 pounds of cable which added to the E.C. Rod and E.C. Pig would total 88,516,000 pounds and considering the fact that a total of 187,356,000 pounds was shipped by the entire industry, we then supplied 47% of the total metal. I want to caution you that this is a figure you should not use, because we know that some of the E.C. Redraw Rod and E.C. Pig we ship to customers goes into the manufacture of E.C. Bare and Covered Wire, which is not a part of the cable situation. [fol. 5420] Using the Bureau of Census figures of shipments for 1956, which cover E.C. Wire, Covered Wire and Cable, the industry shipped 250,000,000 pounds. Using the figure of 88,516,000 pounds as the total amount of metal supplied by Alcoa, we then arrive at a total percentage participation of 35%. If we use the Bureau of Census figure of total shipments of 250,000,000 pounds and subtract our shipments of cable 55,607,000 pounds, we arrive at a figure of 194,400,000 pounds of products produced by our competitors using E.C. Pig or Redraw Rod. Using this figure, as compared to the E.C. Pig and E.C. Redraw Rod shipped to this group of customers, we arrive at a participation of only 17%.

There are many ways that these figures can be used to arrive at certain percentages, but I believe that the examples

which I have listed above will serve your purpose. It is rather difficult to arrive at any definite set of figures which can be checked with the Bureau of Census figures published in Washington. These figures include E.C. Wire, Covered Wire and Cable, but I believe that facts, as listed above, are more or less in line with the data that you requested. If I can be of any further assistance, please let me know.

L. P. Favorite.

LPF:jk

CC: Mr. R. V. Davies, Mr. L. E. Hickman, Mr. R. B. McKee, Mr. D. Wilmot, Mr. L. C. Fisher, Philadelphia.

A	Total and Shipt.	187.3
B	Alcoa	55.6
C	All others	131.7
D	Alcoa Shipt. to Feb.	32.9
E	%—D of C	25
F	Total and Bare & Covered	250
		55
		195

$$\frac{329}{195} = 17\%$$

[fol. 5421] In United States District Court

Plaintiff's Exhibit 194

October 11, 1957.

Accounting Department
Cost Division
Pittsburgh Office
Mr. P. T. Coffin
Pittsburgh Office

Re: Spread in Schedule Base Price Between E. C. Redraw Rod and Bare Cable

Attached hereto are two tables containing data regarding E. C. redraw rod and bare cable schedule prices which may be of interest.

J. L. Healy.

JLH:hcw
Attachments
CC: Mr. D. B. Miller, Pittsburgh

[fol. 5422]

Table I

Estimated Competitors Margin on Cable

Manufactur Assuming Purchase of Redraw Rod, Sale of Scrap at Market Price, Sale of Cable at Alcoa Schedule Price and Assuming Alcoa's Costs

(Per Composite Pound)

	#1/0 6/1 ACSR	#4 7/1 ACSR	795,000 CM 26/7 ACSR	900,000 CM 54/7 ACSR	336,400 CM 19 All Alum.	795,000 CM 37 All Alum.
Alcoa Price Schedule Dated 8-1-57	$.3663	$.3731	$.3679	$.3840	$.4510	$.4252
Cost						
Redraw Rod Cost @ $.346	.261	.223	.263	.281	.384	.384
Scrap Credit @ $.18	.013 cr	.013 cr	.013 cr	.014 cr	.019 cr	.019 cr
Wire Drawing	.004	.008	.003	.005	.007	.005
Stranding	.009	.021	.005	.009	.015	.007
Steel	.059	.078	.060	.051	.....	.....
Packing and Shipping	.013	.013	.013	.013	.013	.013
Transportation	.019	.019	.019	.019	.019	.019
*Plant Administrative Expense and Unabsorbed Burden	.012	.016	.011	.013	.017	.013
*Total Cost Excluding G.A. & S.E.	.364	.365	.361	.377	.436	.422
*Competitors Margin Before Allowance for C.A. & S.E.	.0023	.0081	.0069	.0070	.0150	.0032
Alcoa Price Schedule Dated 10-7-57	.3363	.3431	.3379	.3540	.4110	.3852
Total Cost Excluding G.A. & S.E.	.364	.365	.361	.377	.436	.422
Competitors Margin Before Allowance for G.A. & S.E.	.0277 (loss)	.0219 (loss)	.0231 (loss)	.0230 (loss)	.0250 (loss)	.0368 (loss)

* Note: Alcoa's plant administrative expense includes substantial expenditures for metallurgical and industrial engineering and other technical services, a relatively small portion of which would be incurred by the non-integrated competitor. Likewise, Alcoa's unabsorbed burden includes certain elements of cost which the non-integrated producer would not incur. We have no way of knowing what a competitor's general administrative and selling expense would be and therefore have not attempted to estimate this item. However, the competitor undoubtedly does not sustain the extensive programs Alcoa does for advertising, research, etc. and therefore his general administrative and selling expenses would reasonably be expected to be much lower than Alcoa's. Considering these factors and after making due allowance for the competitor's general administrative and selling expense (Table I does not include provision for the competitor's G.A. & S.E.) it is quite probable that Alcoa's schedule prices, based on price schedules dated 8-1-57, for E.C. redraw rod and cable permit the non-integrated producer to make a profit.

[fol. 5423]

TABLE II
CHANGES IN BASE PRICE OF E.C. REDRAW ROD AND
SELECTED CABLE SIZES FROM JULY 22, 1946 TO DATE AND
COMPARISON OF SPREAD BETWEEN THESE PRODUCTS DURING SAME PERIOD

	Date of Price Change (2)																				
	7-22-46	12-10-47	7-25-47	6-23-48	10-11-48	1-27-50	5-22-50	10-4-50	3-1-52	1-23-53	7-27-53	3-3-54	8-9-54	1-13-55	8-11-55	2-24-56	3-28-56	6-10-56	2-1-57	6-1-57	10-7-57
Base Price Per Aluminum Pound																					
E.C.-H12 and H14 Redraw Rod	.185	.190	.194	.210	.225	.220		.240	.252	.242			.270	.280	.295	.305	.320	.333	.333	.340	.340
Cable																					
1/0 6/1 A.C.S.R.	.290(1)	.295(1)	.310(1)	.329(1)	.346(1)	.345		.369	.387	.400	.411	.402	.420	.430	.451	.475	.490	.520	.525	.539	.495
4 7/1 A.C.S.R.	.327(1)	.332(1)	.373(1)	.394(1)	.414(1)	.414		.439	.461	.475	.493	.484	.503	.517	.551	.571	.582	.618	.611	.642	.571
795,000 26/7 A.C.S.R.	.288(1)	.293(1)	.315(1)	.334(1)	.351(1)	.350		.374	.393	.405	.410	.401	.415	.429	.459	.474	.489	.516	.513	.535	.493
900,000 54/7 A.C.S.R.	.231(1)	.294(1)	.397(1)	.325(1)	.342(1)	.340		.365	.383	.395	.400	.392	.410	.419	.448	.463	.478	.505	.502	.524	.483
336,400 19 All Alum.	.265(1)	.265(1)	.271(1)	.291(1)	.300(1)	.303		.316	.332	.345	.345	.342	.357	.367	.390	.405	.420	.442	.441	.451	.411
795,000 37 All Alum.	.251(1)	.242(1)	.247(1)	.266(1)	.251(1)	.277		.301	.317	.329	.330	.327	.342	.352	.375	.390	.405	.420	.425	.425	.385
Arithmetic Average	.205(1)	.201(1)	.304(1)	.325(1)	.340(1)	.338		.361	.379	.392	.398	.391	.409	.419	.447	.462	.477	.505	.501	.520	.473
Spread in Base Price																					
Redraw Rod to Cable (3)	.100	.101	.110	.113	.115	.118	.118	.121	.127	.130	.135	.129	.139	.139	.152	.157	.157	.172	.168	.174	.130

(1) Prior to 1-27-50 there was no transportation allowance on cable, therefore, $.0135 per composite pound has been added to the price schedule indicated to adjust for the present full transportation allowance basis.

(2) These are the exact dates of the cable price changes. In some cases the pig and redraw price changes vary from these dates by a few days.

(3) The spread between redraw and cable is based on the difference between the redraw price and the arithmetic average of the cable prices shown above.

[fol. 5424] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 195

January 25, 1955.

Robert P. Miller
York Office
Mr. D. B. Miller
Pittsburgh Office.

Re: Central Cable Corporation, Jersey Shore, Pa.

In a telephone conversation with Mr. M. C. Harris, Vice President of the captioned today, he stated that he had reason to believe that large users of redraw rod were getting special prices by placing orders for six months requirements. He feels that since they are a good customer they should also have some consideration. I frankly feel that he is misinformed.

To my knowledge, there is no competitive situation at Central Cable regarding prices. They will not have anything to do with Reynolds' redraw and, at last report, the drawing qualities of Kaiser's rod was inferior to ours. I am sure that if either of these two competitors were offering a cheaper rod they would give him some, if not all, of their business. I thought you might be interested in knowing about this, however, and if you have any comments, I would appreciate receiving them.

Robert P. Miller.

RPM MLB

cc: Mr. P. T. Coffin, Pgh., Mr. G. R. Gent, Pgh., Mr. L. C. Fisher, Phila.

[fol. 5425] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 196

January 27, 1955.

Robert P. Miller
York Office
Mr. D. B. Miller
Pittsburgh Office

Re: Central Cable Corporation, Jersey Shore, Pa.

This supplements my letter to you of January 25th regarding the captioned's request for a lower price on his redraw rod requirements.

Attached hereto you will find a letter received today from the captioned, formally requesting a price on their redraw rod requirements for the first half of 1955. We, of course, will make no reply to this letter, nor discuss the situation with the customer until hearing from you. I assume that this same letter was sent to both Reynolds and Kaiser, but I repeat that the customer claims he prefers our product because he does not have faith in the Reynolds method of fabrication nor does the Kaiser rod draw as readily as ours does.

Robert P. Miller.

RPM MLB

cc: Mr. P. T. Coffin, Pgh., Mr. L. C. Fisher, Phila.
Attach.

[fol. 5426] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 197

Copy for Mr. A. R. Gneiser, York

February 23, 1955.

L. C. Fisher
Philadelphia Office
Mr. David B. Miller
Pittsburgh Office

Re: Central Cable Corporation

With reference to Bob Miller's letter of January 25 and your letter of February 4 to Al Gneiser, Messrs. J. G. Detwiler and M. C. Harris called upon Mr. Coffin Tuesday, February 21, ostensibly to talk about our agency agreement on conductor accessories. The subject of redraw rod was brought up during the conversation and in your absence Mr. Coffin did a masterly job of explaining the Company's views regarding the sale of this product to cable stranders.

Mr. Detwiler was informed quite firmly that our margin on redraw rod is too low to permit consideration of any reduction in selling price. Mr. Detwiler was not happy, as you can imagine. He indicated that his purchase probably will be considerably reduced during the first six months of 1955 due to the fact that his competitors have accepted a great deal of cable business at prices below his permissible selling prices. He reiterated his intention to purchase Alcoa rod, however. This is due to the fact that the utilities express a preference for cable fabricated from Alcoa raw material plus the fact that his own experience with directly cast rod has been unsatisfactory. He purchased 50,000 lbs. of rod from Southwire only to find that its drawing characteristics are poor, apparently caused by inclusions.

[fol. 5427] Mr. Harris and I had a brief conversation earlier regarding rod prices, during which I gave him essentially the same information about our rod prices. He insisted that Central Cable has been offered lower prices by our competitors and demanded to know whether we will meet such prices. He tried to infer that Kaiser was quoting $.01 off our price, but did not say this directly. I told him

that redraw rod is not as profitable as many other products and under present circumstances there appears to be no advantage to reducing prices. I do not believe that Kaiser has offered a lower price but will ask Bob Miller and Al Gneiser to keep in close touch with these people in case such an offer develops, at which time we will discuss the subject further with you.

Central Cable are ordering the stranded items they do not produce from Southwire at present which has eliminated us from a substantial amount of cable business. Southwire apparently is allowing them more discount than our 5%.

At the close of our various conversations Bob Miller and I told Messrs. Harris and Detwiler separately that we are very much interested in their rod business and we will do everything in our power to provide the best possible quality and service. Furthermore, we will get in touch with them immediately if there is any change in redraw rod prices. They were assured that their price will be as low as prices offered to anyone else in their particular line of business. [fol. 5428] Mr. Detwiler certainly will be casting around to find some means of saving money on redraw rod and we will continue to keep in close touch with him so that you can be informed at all times.

L. C. Fisher.

LCF/ac

cc—Mr. P. T. Coffin, Pittsburgh, Mr. A. R. Gneiser, York.

[fol. 5429] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 198

CC: H. T. Dyett
A. D. R. Fraser
G. E. Rolston
G. A. Weiss

August 5, 1955.

Mr. R. Murray Willard
District Sales Manager
Aluminum Company of America
90 State Street
Albany 7, New York

Dear Jess:

In your letter of August 2nd you state that it is necessary to increase the prices on the products which we purchase from you. The advance without protection which you are forced to make is understandable, and we can see the need for the revision as you cannot be expected to absorb the wage increases as well as the greater cost of materials and services. Although we are in complete agreement with your policy in charging us more for our aluminum pig, we cannot understand your pricing policies in regard to cable as stated in your price sheets dated June 27, 1955. The policy to which I refer is as follows:

> "The prices stated herein for materials covered hereby shall be firm for a period of 240 days from date of Alcoa's acknowledgment of order, after which they shall be adjusted to and the materials shall be invoiced at Alcoa's prices in effect at time of shipment except that any increases in prices shall not exceed those stated herein by more than 5% within one year from date of Alcoa's acknowledgment of order or by more than an additional 5% within each succeeding year."

As you know, Alcoa is our only source at present for aluminum pig. Consequently, effective immediately we are forced to pay a higher price for the aluminum we purchase, but at the same time in meeting competition the product we sell has a practical ceiling for 240 days based on price of

aluminum in effect prior to August. This makes us feel a little like Cinderella. Unfortunately we have no Prince Charming. What's the answer?

Although we are most unhappy in this middle position, we should enjoy having you come to Rome for that golf game—provided you will play for pennies rather than the dimes we no longer can afford.

Very truly yours, Rome Cable Corporation, ——, ——, Executive Vice President.

JHD:AF

[fol. 5430] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 199

February 6, 1957.

Accounting Department
Cost Division
Pittsburgh Office
Mr. D. B. Miller
Pittsburgh Office

Wire Rod Bar File 1121

Re: Electrical Conductor Cable and Redraw Rod Prices

Please refer to our conversation of this morning regarding the spread between E.C. redraw and cable prices.

On February 28, 1956 the price of E.C. pig was increased $.005 per pound, E.C. redraw rod was increased $.010 per pound and cable was increased $.015 per aluminum pound. As a result of these increases, the spread between E.C. redraw rod and cable was increased $.005 per pound.

On August 10, 1956 cable prices were increased $.006 per aluminum pound over the metal, labor and steel cost increases which occurred at that time. This $.006 per pound was intended to cover increased costs and reduced revenue resulting from an increase of 2½% in distributors discount and the elimination of quantity extras. It appears probable that this amount was considerably more than needed, with the result that the spread between redraw rod and cable may have been widened on August 10th.

The proposed reduction in published cable prices to the 3-29-56 price plus 5% will result in an average decrease of $.004 per aluminum pound. Thus, we can absorb this reduction without decreasing the price of redraw and still have a greater spread between redraw and cable (by $.001 per pound or more) than existed before 2-28-56.

If you would like additional data, please advise.

J. L. Healy.

JLH:hcw

CC: Mr. P. T. Coffin, Pittsburgh.

[fol. 5431] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 200

September 19, 1957.

Mr. Leon E. Hickman
R. C. Erickson
Pittsburgh Office
Mr. L. P. Favorite
Pittsburgh Office

Re: Central Cable Corporation

Mr. L. E. Hickman has requested that I analyze Mr. R. B. McKee's memorandum of August 29, 1957, and your memorandum of September 5, 1957, regarding the above-captioned subject.

If consideration is given to establishing a commodity price on E. C. redraw rod and establishing firm prices therefor on a basis similar to that currently charged for cable, the effect thereof on the customers for E. C. pig must also be studied. Accordingly, it is requested that you advise me as to the sales of E. C. pig during the same periods, namely, 1956 and the first seven months of 1957, limiting such statistics, if you desire, to the total number of customers and the total amount of pig sold and identifying only the major customers with the respective purchases of each. In addition, if you can advise of the extent to which customers purchase standard pig and perform the

alloying operations themselves, such information will be most helpful in analyzing this problem. Likewise, if you could give me some idea of the percentage of the market held by Alcoa in the sale of E. C. redraw rod and the sale of E. C. pig, and also of the percentages of the market held by each of the other two major producers, such information will be most helpful.

R. C. Erickson.

RCE:pmb

cc: Mr. L. E. Hickman, Mr. R. B. McKee, Mr. R. V. Davies, Mr. D. Wilmot, Mr. L. C. Fisher, Philadelphia.

[fol. 5432] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 201

Internal Correspondence

October 15, 1959

From: Alfred R. Gneiser
York Office
To: Mr. D. B. Miller
Pittsburgh Office.

Re: Central Cable Corporation Jersey Shore, Penna.

When I was in Pittsburgh I told you and others about Mr. Jack Detwiler's offer to purchase 25,000,000 Lbs. of E.C. Redraw from us over the next five years if we could guarantee today's price of $.287 per pound. In return he promised to write a contract with us in which the amount to be taken out would be absolutely firm. When I indicated that we could not write a long term contract without an escalation clause Mr. Detwiler said he might be interested in a one-year deal at today's price. We believe these offers were also going to be made to other suppliers if such had not already been done.

Central Cable claim they are interested only in 62% conductivity and so would not use Properzi stock. We seem to feel they are now getting some of their requirements from Kaiser and the balance from abroad. The

imported coils are one piece spool wound of about 3,000 Lb. weight and Central Cable like them because they eliminate welding and take up much less warehouse space.

We here would be inclined to gamble a bit to get this outfit back in the fold,—they haven't favored us with any business for almost two years—but if a one year firm contract is not in the cards it is felt that we might be able to interest Central Cable in a five year contract tied to the existing price of E.C. Pig. Mr. Detwiler, in effect, buys [fol. 5433] his copper rod on a somewhat similar basis and could well be inclined to look favorably on a like schedule for aluminum.

The build-up of our price today on this Redraw is as follows:

E.C. Pig	Plus Toll Fab.	= E.C. Redraw Price
$.252	$.035	$.287 per Lb.

Subsequent prices would be made up of the then prevailing Pig price plus toll plus maybe a definite maximum escalation on this fabricating differential not to exceed a certain percentage in any one year.

25,000,000 Lbs. is a lot of aluminum and we would like to book it. Central, of course, want some sort of protection in exchange for a firm commitment in this large amount. It is our hope that the above price formula could be made interesting to you. We would like to approach Mr. Detwiler with a proposition if you will fill in the escalation details.

May we suggest a very thorough investigation of the matter. Perhaps some kind of an overall program might be formulated to permit of writing a mutually agreeable contract with other independent wire fabricators as well as Central Cable.

Alfred R. Gneiser.

ARG MH

cc—Mr. R. B. McKee, Pittsburgh, Mr. L. P. Favorite, Pittsburgh, Mr. H. T. Wilder, Pittsburgh, Mr. S. J. Simmons, Pittsburgh, Mr. W. T. Mitman, Pittsburgh, Mr. G. H. Weiss, Pittsburgh, Philadelphia Office.

[fol. 5434] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 202

October 20, 1959.

David B. Miller
Pittsburgh Office
Mr. A. R. Gneiser
York Office

Re: Central Cable Corporation Jersey Shore Pennsylvania

Your letter dated October 15th under the above caption has been given very careful consideration, and I regret to report that our answer is still the same as that which we gave you when you discussed the matter on a recent visit to Pittsburgh.

As anxious as we are to secure all the business which we can possibly book, there are too many ramifications to this situation to permit us to offer anything other than a supply contract on the basis of price current on date of shipment.

David B. Miller.

DBM BS

CC: Messrs. R. B. McKee, Pittsburgh, L. P. Favorite, Pittsburgh, H. T. Wilder, Pittsburgh, S. J. Simmons, Pittsburgh, W. T. Mitman, Pittsburgh, G. H. Weiss, Pittsburgh.

[fol. 5435] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 203

Copy for Mr. E. W. Beggs
Internal Correspondence

February 7, 1957.

From: G. V. Craighead
Buffalo Office
To: Mr. P. T. Coffin
Pittsburgh Office

Re: Westinghouse Electric Corporation, Buffalo, New York

On January 31 Messrs. Baker, Beggs, and myself met with certain Westinghouse people to discuss further their interest in toll fabricating aluminum magnet wire for Alcoa. Those in attendance from Westinghouse were:

Mr. C. W. Parezo, Director of Purchases
Mr. W. G. Miller, Manager, Wire Department
Mr. W. E. Burden, Non-ferrous Buyer

We briefly reviewed what we had already brought out in previous meetings about the unrealistic pricing of aluminum magnet wire by those in the coated copper end of this business. We further pointed out that we had several large customers who had already come to us and who had shown interest in re-designing their product for aluminum and using several million pounds of aluminum magnet wire annually if a reasonable savings over copper could be shown. Our contention was that actual economies did exist in the use of aluminum over copper and that these should be realistically translated into prices of the aluminum product.

Mr. W. G. Miller reacted quite favorably and in the very short time he had to prepare figures, he conservatively estimated that today they have at least 75,000 lbs. aluminum [fol. 5436] capacity per month available for covering the below sizes:

Quantity	Wire Size Diameter
50,000 lbs.	.28-.045
15,000 lbs.	.010-.0254
10,000 lbs.	.144 and larger

The customer's towers are presently set up to use Bondar which is a Westinghouse coating similar to Formvar. It was pointed out, however, that their towers could be changed over to Formvar, if necessary, with very little capital outlay. Mr. Miller further mentioned that additional tower capacity could be made available using their present equipment. It would also be possible, he felt, to install new towers in order to take care of the business. Mr. Burden's questioning was mostly concerned with what level we would attempt to price aluminum magnet wire and whether it would be related to the copper market. We did everything possible to discourage any such pricing of aluminum on the basis of copper. All of us feel that Westinghouse will give us prices on the above sizes, based on their actual costs and including a profit with no unknown factors.

We asked that Westinghouse give us some toll figures on the basis of Alcoa furnishing them with:

1. Redraw rod.
2. Final size wire, 20-25 gage
3. Intermediate wire size, perhaps .189

With Westinghouse's present, although limited, facilities for drawing aluminum wire we are particularly interested in figures on (2) above. The next move is up to Westinghouse who plan to come through with some pricing information very shortly. Should you wish, we could set up a meeting either in Buffalo or Pittsburgh with certain of their top people to discuss this.

[fol. 5437] In the way of sidelights, their Mr. Miller is extremely interested and is the type of person who will make a program like this work. He is the one who has been wielding the big stick at Lima and the fact that Lima has experienced excess breakage during automatic winding doesn't discourage him in the least.

In the interim, Alcoa will have to be thinking about whether Bondar would be acceptable in lieu of Formvar. Mr. E. W. Beggs plans to get technical information on Bondar and, very shortly, will relay it to you.

Another thing we will have to think about is the type of package Alcoa might like for the finished product, i.e. spools, returnable or nonreturnable, or possibly the pail

pack. Then there is the matter of other insulation such as glass or, perhaps, cotton.

I think we are off to a good start at Westinghouse; certainly they are an extremely cooperative lot. Our contacts there are good and we stand ready to move this along just as fast as we are permitted.

G. V. Craighead

gvc:el

cc: Mr. R. S. Baker, Syracuse, Mr. E. W. Beggs, Buffalo, Mr. R. R. Cope, New Kensington.

[fol. 5438] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 210

February 20, 1958

Philip T. Coffin
Pittsburgh Office
Mr. R. R. Cope
New Kensington

Re: REA Magnet Wire Company

I am not sure that I discussed with you the background of Paragraph 4 of Mr. Davies' letter to Bob Whearley. Only the slightest reference was made to the matter when you and I were in Fort Wayne, but it could be quite important.

If we wish to cover the entire field in magnet wire, as I think we should, it will, of course, be necessary for us to be in a position to furnish material such as previously described in numbered paragraph 4. Rea does not have the equipment to make this, but Rome does; and if during my absence you have occasion to discuss the point, as you probably will, I think you should make it quite clear to Rea Magnet that because of our long standing tie-up with Rome we would probably owe first allegiance to them with respect to these particular types of magnet windings. If Rea's reaction is what I think it will be, they will shrug their shoulders and say that they had no intention of getting

into that field now. If, on the other hand, they take the position that they would like to install the necessary equipment and round out their line, then we will be confronted with making a choice between Rea and Rome; and presumably we would have to fall back on Mr. R. V. Davies for both an opinion and probably help.

PTC:ags Philip T. Coffin

[fol. 5439] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 221

Internal Correspondence

October 1, 1958.

From: R. R. Cope
Pittsburgh Office
To: District Sales Office Managers

Re: Alcoa Aluminum Magnet Wire

In presentations to the sales offices concerning strip and foil windings, we have indicated that there is a potential market for insulated aluminum magnet wire, particularly in the appliance motor field. We also indicated that magnet wire producers have never established realistic prices so aluminum could be competitive with copper. This was true even when copper was as high as 50 cents a pound.

Alcoa has entered into an agreement with Rea Magnet Wire Company, Inc., Fort Wayne, Indiana, to manufacture aluminum magnet wire as an Alcoa product and to sell it as an agent of Alcoa. Rea is a leading independent producer of magnet wire and has pioneered several innovations which are today commonplace in the magnet wire industry.

Realistic prices have been established by Alcoa for the first time, giving cost savings over copper magnet wire of from 6 to 14 per cent for equivalent conductivity.

The Alcoa product will utilize three different types of insulation for the most part, and be available in either single or heavy coatings. Formvar, Nyform and Isonel

(polyester) are the three types of insulation. Formvar and Nyform are Class A insulations. Isonel (polyester) is a Class B and F insulation, capable of operation at 155°C. (The attached material provides this information in more detail.) The size range will be from 12 through 24 gauge. The attached price sheet will prevail. All the types of insulation are priced the same.

" The product will be available on spools or in pails or drums as shown in the attached price list, and will carry the Alcoa label.

[fol. 5440] This new product will give us an opportunity to recommend either round insulated magnet wire or strip as a means of fabricating a particular electrical device.

We ask that you make a real attempt in your contacts with electrical manufacturers to generate interest in this new product, sending any inquiries to Mr. Joseph C. Coyne, Fort Wayne Sales Office, by *teletype* since Rea tells us that the success of the sale of magnet wire is, to a large degree, dependent upon fast action. Under our agreement with Rea, you may actually accept orders for aluminum magnet wire if circumstances indicate the advisability of such action. Normally we should try to place the business through Rea.

We have a decided jump on our competitors in having a quality product, priced to reflect the actual savings available with aluminum. Timing is important. Please make every effort to contact likely prospects. You may be contacted by some of the Rea sales people on problems such as joining; I am sure you will cooperate with them. Attached also is a list of the Rea sales organization.

R. R. Cope.

RRC:BJH

cc: Mr. D. Wilmot, Mr. I. W. Wilson, Mr. F. L. Magee, Mr. R. V. Davies, Mr. R. B. McKee, Mr. F. J. Close, Mr. W. S. McChesney, Mr. J. D. Harper, Mr. G. R. Stout, Vancouver, Mr. N. B. Lane, Massena, Mr. K. R. Van Horn, ARL, Mr. A. B. Wilber, New Kensington, Mr. H. H. Caldwell, New Kensington, Mr. S. R. Chapman, New Kensington, Assistant District Managers, Branch Office Managers, Resident Managers, Industry Managers, Product Managers, Assistant Product Managers, Chief Administrators, Foil Salesmen, Electrical Conductor Salesmen.

[fol. 5441] Comparison of Bare Copper and Al. Magnet Wire

Awg Size	Nom. Bare Dia.	Lbs./1000 Feet		Feet/Lb.		Ohms/1000 Feet		Ohms/Lb.	
		Cu.	Al.	Cu.	Al.	Cu.	Al.	Cu.	Al.
10	.1019	31.43	9.556	31.82	104.6	.9988	1.616	.0318	.1691
11	.0907	24.9	7.57	40.2	132	1.261	2.04	.0506	.269
12	.0808	19.8	6.01	50.6	166	1.589	2.57	.0804	.428
13	.0720	15.7	4.77	63.7	210	2.001	3.24	.127	.679
14	.0641	12.4	3.78	80.4	264	2.524	4.08	.203	1.08
15	.0571	9.87	3.00	10	333	3.181	5.15	.322	1.72
16	.0508	7.81	2.38	128	421	4.019	6.50	.514	2.74
17	.0453	6.21	1.89	161	529	5.054	8.18	.814	4.33
18	.0403	4.92	1.49	203	669	6.386	10.3	1.30	6.91
19	.0359	3.90	1.19	256	843	8.047	13.0	2.06	11.0
20	.0320	3.10	.942	323	1060	10.1	16.4	3.27	17.4
21	.0285	2.46	.748	407	1340	12.8	20.7	5.19	27.6
22	.0253	1.94	.589	516	1700	16.2	26.2	8.36	44.5
23	.0226	1.55	.470	647	2130	20.3	32.9	13.1	69.9
24	.0201	1.22	.372	818	2690	25.7	41.5	21.0	112
25	.0179	.970	.295	1030	3390	32.4	52.4	33.4	178
26	.0159	.765	.233	1310	4300	41.0	66.4	53.6	285

[fol. 5442] REA Sales Districts

September 11, 1958

Indiana-Michigan-Kentucky District

R. H. McCampbell,
3610 E. Pontiac Street,
Fort Wayne, Indiana,
Anthony 5202.

Ohio-Western Pennsylvania District

Ivan J. Barclay,
3610 E. Pontiac Street,
Fort Wayne, Indiana,
Anthony 5202.

Chicago District

Robert J. Slater,
Larry Whearley,
4808 N. LaVergne Avenue
Chicago 30, Illinois,
AVenue 3-2608 or 3-2609.

New England District

John V. Muddle,
74 Union Street,

Ashland, Massachusetts,
Telephone: Framingham, Mass.
TRinity 3-7091.

California District

George R. Croft,
2837 W. Pico Boulevard
Los Angeles 6, California,
Republic 1-8211.

Southeastern District

G. Lloyd Schoen,
Electrical Insulation Suppliers, Inc.,
500 Means Street, N. W.
Atlanta, Georgia,
Jackson 5-2707.

Minnesota District

O. J. Lenmark,
610 Plymouth Building,
Minneapolis 2, Minnesota,
FEderal 3-3388.

St. Louis District

Leonard R. Oser,
301 Siteman Building,
111 S. Bemiston Avenue,
St. Louis, Missouri,
Volumteer 1-6455.

Kansas District

Charles H. Funk,
220 South Robin Road,
Wichita, Kansas,
WHitehall 3-0237.

Oklahoma-Arkansas District

John H. Cole Company,
(Motor Repair Shops),
1825 West Main Street,
Oklahoma City 2, Oklahoma,
CEntral 2-3171.

Eastern District

R. E. (Dick) Clayton,
F. X. O'Connell,
Highway 22 & County Line Road,
Somerville, New Jersey,
Mailing Address: P. O. Box 529,
Telephones:
Somerville—RAndolph 2-2300,
New York—WHitehall 3-4737.

Wisconsin District

E. C. Winkenwerder,
4808 N. LaVergne Avenue,
Chicago 30, Illinois,
PEnsacola 6-1332.

Texas District

Seco Electric Supply Company,
Mr. Ike Wynn,
Grand and Trunk Avenues,
Dallas, Texas,
HAmilton 8-2116.

[fol. 5443] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 223

Internal Correspondence

July 30, 1959.

From: L. E. Hickman
Philip T. Coffin, Pittsburgh Office
To: Mr. R. V. Davies, Pittsburgh Office

Confidential

Legal

Re: Aluminum Magnet Wire

I am decidedly bullish over the future of aluminum magnet wire, particularly in the wire sizes in the general range of No. 10 through No. 30. Beyond No. 30, the tensile

strength of aluminum is such that probably wire drawing and handling difficulties would put too high a price tag on aluminum magnet wire for most ordinary uses. My reasons for the optimistic outlook with respect to alumnium magnet wire are based chiefly on one premise and that is my belief that the relative supply and demand pictures for aluminum and copper are so different. Putting it another way, I think that within the next several years copper will get up on a plateau and stay there whereas aluminum appears to be going along at a very stable price level.

There are literally thousands of everyday uses for copper magnet wire such as bell ringing transformers, solenoids and relays of every description, electric toys, electric appliances, fractional horse power motors for work shops, etc., where aluminum magnet wire could be used in many instances for very slight reductions in prices over present day copper prices and in some cases for a considerable reduction in price, all depending upon whether or not space factor is important or the relative price of the winding constituent is large in the article under consideration.

General Electric Company, for example, in its captive manufacture of aluminum magnet wire has been using the product for some seven or eight years in a number of electrical appliances and in refrigerator motors. So far as we [fol. 5444] know, they have had no trouble. G. E. has also been using aluminum magnet wire more recently in dry type distribution and lighting transformers, and some of us are puzzled why some of the General Electric competitors have not followed suit. We know that Westinghouse, in their Buffalo Works, are on the verge of going into an aluminum magnet wire program, but the price of copper has not quite reached the point of swinging the balance.

Another very large outlet for aluminum magnet wire is in the coils of television sets where space factor, particularly for the saddle coils, is not important. Light weight, on the other hand, and price are very important. Up to a short time ago, we thought that probably automobile horns were another excellent outlet for aluminum magnet wire, but Mr. Cope tells me that it appears more and more that while the future for aluminum is excellent in this direction, it will probably be in the form of strip windings rather than magnet wire. I mention this because I think I told you not long

ago that I thought automobile horns were one of the big outlets.

Rea Magnet Wire is making excellent headway in interesting manufacturers in the use of aluminum magnet wire for electronic applications and for missiles and in aircraft where light weight and operating at high temperatures are important. You are probably aware of the fact that copper, when used at elevated temperatures, oxidizes and flakes off and gives all kinds of trouble. That is one of the reasons that Westinghouse recently gave so much publicity to a process that they had purportedly developed for the coating of aluminum on the outside of copper wire. The applications of aluminum magnet wire in this field are quite diversified, and at the present time, at least, the price of satisfactory wire for these applications is of particular importance.

I think that the exploitation of aluminum magnet wire by Alcoa and others will inevitably spur on some of the other [fol. 5445] captive manufacturers such as Western Electric, for example, to also go to aluminum magnet wire, and probably some residual business would come our way as a result, and almost certainly we could get a good share of the aluminum redraw rod.

Rome Cable Corporation enjoys a nice volume of business in square and rectangular magnet wire but does not go down to the smaller so called round sizes in either copper or aluminum. I think that our pushing the aluminum magnet wire application would be a natural and valuable activity to supplement the Rome activities. Generally speaking, the same trade that the Rome salesmen call on for Rome's present magnet wire products would be the same as that for the finer wire sizes of magnet wire to which I refer.

A final reason for my being optimistic about the future of aluminum magnet wire is again a matter of purely personal judgment. It is my belief that those who get in on the ground floor on the exploitation of aluminum magnet wire will be those who reap the biggest reward, and while I do not picture by any means that aluminum will replace copper even in the majority of magnet wire applications, there will be many situations where package deals involving big and small wire, or both copper and aluminum, can

or will be made to advantage. Mr. Cope has advised me from time to time that he thinks that something like 10% of the copper magnet wire market could well be taken over by aluminum. I don't disagree with Mr. Cope except to the extent that I am somewhat more optimistic. I can foresee the possibility of perhaps invading the copper market to the extent of several times that Mr. Cope thinks. A survey by Commercial Research, as I recall it, indicated current consumption of copper in the magnet wire field approximating 500,000,000 pounds per year. Certainly after applying a 50% factor for aluminum-electrical applications, 25,000,000 pounds a year or better in a highly fabricated [fol. 5446] product such as aluminum magnet wire would appear to be a market well worth a pretty good sized gamble.

Philip T. Coffin.

PTC:ags

[fol. 5447] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 224

Internal Correspondence

January 8, 1960.

From: F. L. Magee
Pittsburgh Office
To: Mr. L. E. Hickman
Pittsburgh Office

Re: REA Magnet Wire Company, Inc.

Referring to the attached proposed letter, I wonder if it would not be desirable in expressing our thinking as regards the future operations of Rea, to stress the fact that one of the important advantages of our new relationship is that of fostering leadership in the development and utilization of aluminum magnet wire by virtue of Alcoa's background in aluminum research and development and Rea's background in the magnet wire field.

I ran into Paul Gross of our New York Sales Office the other day and he made the remark that the Rome salesmen

whom he had met are all fine fellows, but in the course of working with them, he has found that they are completely copper-minded, and have little recognition of the fact that we would like to develop the use of aluminum in the electrical conductor field. As a matter of fact, he remarked that the general impression seems to be that we purchased Rome only in order to acquire their copper wire business, whereas we all know that while we want all the copper business we can get, at the same time we are certainly anxious to convert copper wire to aluminum wherever aluminum has a natural advantage. We know that the top people in Rome recognize this situation and it is not at all unexpected to find the rank and file do not yet have a recognition of our aluminum program. Obviously, this is one of the good reasons for coordinating the sales force and par- [fol. 5448] ticularly to have some of our men tied in with the Rome sales activities.

FLM:RAH

F. L. Magee.

[fol. 5449] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 225

Internal Correspondence

January 18, 1960.

From: Leon E. Hickman
Pittsburgh Office
To: Mr. J. L. Fleming
Pittsburgh Office

Alcoa has this day purchased the assets of Rea Magnet Wire Company, Inc. The Rea Company has plants at Fort Wayne and Lafayette, Indiana. The company specializes in the manufacture of smaller sizes of magnet wire, a product used in coil windings, transformers, motors and other electrical and electronic equiment. It is hoped that Rea, in affiliation with Alcoa, will bring aluminum wire into a number of these markets.

I attach a copy of a statement made to the Rea Company concerning Alcoa's proposed policies in the operation of the company.

Leon E. Hickman

LEH:lhm

Distribution: Officers, Pittsburgh General Office, Product Sales Managers, District Sales Managers, Branch Sales Managers, Works Managers, Public Relations Managers, Subsidiary Company Heads, Sales General.

Received January 19 1960. John Fleming

[fol. 5450] Aluminum Company of America

1501 Alcoa Building
Pittsburgh 19, Pa.

January 15, 1960.

Mr. Samuel A. Rea,
Chairman of the Board,
Rea Magnet Wire Company, Inc.,
Fort Wayne, Indiana

Dear Sam:

If the stockholders of Rea Magnet Wire Company, Inc., approve the sale of your company to Alcoa, the most challenging opportunity confronting us both is how to utilize your people to the best advantage. Plants and technology are only significant in the hands of the right people. When we were last together, we spent more time on this subject than any other. We in Alcoa have continued to give it a top priority in our thinking because, above all else, we want to maintain the high esprit de corps of the Rea organization and to open to every man and woman in your company improved opportunities under the new program. You are free to tell your people that our thinking is running along the following lines:

(1) *All manufacturing and selling activities of Rea Magnet Wire Company, Inc., now conducted in Fort Wayne*

and Lafayette, Indiana, will be continued in those locations. We already operate aluminum fabricating plants in Lafayette and Richmond and in July, 1960 will open the finest aluminum smelter in the world at Warrick, Indiana. Our experience in Indiana has been outstanding and, with your plants combined with ours, Indiana becomes a major manufacturing center for Alcoa.

(2) *A new corporation, likewise to be known as Rea Magnet Wire Company, Inc., will be formed to take over the properties of the present Rea Company.* Its Board of Directors will consist of a small number of Rea and Alcoa officers selected with an eye to a functional coordination of activities. You and the other officers of Rea will be expected to manage the new company, as you have the old, with only such changes in titles and functions as you have recommended to us or as time and changing circumstances ultimately indicate to be in our common interest. Likewise, the rest of your organization will be carried over intact into the new company.

[fol. 5451] (3) *Wages and benefits.* We agree with you that you should continue your present policies with respect to salaries and wage rates of hourly employees and that you should continue your existing employee benefit plans, including profit sharing. However, should the new company ever be required to negotiate with a union on such matters, the new company can make no commitment as to the continuation of these benefits under those conditions.

(4) *We expect the new company to assume leadership in the development and utilization of aluminum magnet wire.* While we have no intention of minimizing your operations in copper magnet wire, we do anticipate that your experience in the magnet wire field and our know-how in the properties of aluminum can be combined through aggressive research into leadership in the development and utilization of aluminum magnet wire in those applications where aluminum is equal or superior to copper.

(5) *Research,* Both Rea and Alcoa are research-minded. We expect the new company to continue its research activities, indeed to expand them, but also to make full use of the research staff and facilities of Alcoa by coordinating programs.

(6) *We expect the new company to continue the present*

sales organization and policies of Rea, subject only to such modifications as experience may show to be in the common interest. It is hoped that the Alcoa and Rea selling organizations can support each other and coordinate activities to their mutual benefit.

(7) *Purchasing.* We anticipate that the purchasing activities of the new company, particularly in copper, will be handled through its own organization, but in coordination with Alcoa purchases in the same or related fields.

(8) *The new company will operate functionally as a Division of Alcoa.* It will have full responsibility for the manufacture and sale of the products presently manufactured by the Rea Company and such others as may be appropriate to its activities. As a Division of Alcoa, Rea will [fol. 5452] draw upon Alcoa for such help as Rea may desire and Alcoa may have available, whether it be in the field of research, manufacturing or engineering know-how, selling experience, customer contacts, or staff services of any of the numerous kinds made available in Alcoa. It is our intention to give the new Rea organization autonomy and authority commensurate with its responsibilities and to depend upon the good judgment of the Rea organization to make full use of the strength available through affiliation with Alcoa.

(9) *Modifications in the light of experience.* I am sure you realize that, while we speak in complete candor and good faith, these policies must always be subject to modification or change as experience may dictate. A rigid commitment on any of these points would be no more in your interest than in ours. For example, tax considerations may ultimately make it advisable to liquidate the new company into Alcoa and thereafter operate it simply as one of the Divisions of the parent company. Some of your people are quite likely to find additional opportunities for advancement in the Alcoa organization. No decision can be reached now as to where it would be advisable to manufacture new products or supplement the production of existing items.

There is an element of faith in this, as in all worthwhile matters. If we did not share that faith, we would not have offered your company this affiliation with Alcoa, nor would

your Board have recommended its acceptance to your stockholders. We are counting on your people, strengthened by the support that Alcoa can give them, to develop the magnet wire business of Rea, both in copper and aluminum, well beyond its present potential. We can go far together if we maintain a mutual confidence and a willingness to adapt our program to changing circumstances. Subject only to those inevitable contingencies, this letter expresses our full thinking to date.

And I may say that we welcome you and every man and woman in the Rea organization into the Alcoa family with genuine enthusiasm and a confidence that we shall do well in partnership.

With cordial regards, I am

Sincerely, Leon E. Hickman, Executive Vice President.

LEH:lhm

[fol. 5453] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 227

General Files

Received February 9, 1960, General Files

Jan. 28, 1960.

Mr. Philip Sporn,
President, American Electric Power Service Corporation
30 Church Street,
New York 8, New York

Dear Phil:

Our interest in the Rome Cable Corporation and now in the Rea Magnet Wire Company was stimulated by our long-time confidence in the future of aluminum in the electrical industry. Thanks to progressive industrialists like you and companies like American Electric Power Service, aluminum continues to make progress in the many fields which involve the use of electric current. In addition, there are, as you

know, many other possibilities for aluminum to be used by the electrical manufacturing and electrical utility industries.

As an old friend of ours, you might be interested to know that these are the first two outside acquisitions ever made by Alcoa. Our decision was made in the belief that we could progress faster by acquiring these two aggressive and highly reputable companies, as well as the fact that we have had friendly relations with these companies for a long time and were attracted by their keen interest in the potentialities of aluminum in their respective fields.

We have been especially attracted by the fine organization which is behind the Rea Magnet Wire Company, from Sam Rea right through to the last workman. We fully intend that they shall continue to operate autonomously, and we have every reason to believe that they can not only expand their operations in the aluminum wire field, but that they will continue to grow in their present field of endeavor.

We in Alcoa always thought it was a pretty sad day when we had to give up any thought of acquiring the Newark, Ohio plant, which is now occupied by one of our good competitors. While the Rea Magnet Wire Company is a comparatively small operation, it is a real pleasure to again [fol. 5454] have one of our operations on the system of A.E.P.

You were most thoughtful to write me such a nice letter about our Rea acquisition. While we will miss you on April 11th, you will have our best wishes for a pleasant trip to Europe and I can assure you we will be more than pleased to get to know Bud Hill and Red Doyle when we have our Fort Wayne-Rea get acquainted day.

With best regards, I am

Sincerely yours, Frank L. Magee, President.

FLM:RAH

[fol. 5455] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 228

Fine Wire

Commercial Research Division
September 16, 1955

[fol. 5456] Index

	Page
Summary of Findings	1
Recommendations	7
Introduction	9
I. Markets	12
II. Products	31
III. Prices and Price Policies	49
IV. Competition	56
V. Merchandising	59
VI. Distribution	61
VII. Alcoa Production and Technical Facilities	62
VIII. Future Possibilities	63
Appendix	65

[fol. 5457] **Summary of Findings**

1. This report describes and evaluates the market for fine wire ranging in diameter from 0.010" to 0.020" and in a few cases as low as 0.005". The insect screening market was omitted. Applications using or showing a potential for the following metals were considered:

Aluminum
Copper and copper base alloys
Stainless steel

2. The total present market, 1954, was equivalent in volume to 81,087,000 lbs. of aluminum. In actual pounds, it was divided by type of metal as follows:

	Pounds	% of Total Metal Volume
Aluminum	1,147,000	1.4
Copper and copper base	254,466,000	95.1
Stainless steel	8,520,000	3.5
Total	264,133,000	100.0

The same total divided by major type of end use results in the following:

	Pounds	% of Total Metal Volume
Electrical products use	246,101,000	92.8
Non-electrical products use	18,032,000	7.2
Total	264,133,000	100.0

3. Aluminum fine wire used in 1954 represented 1.4% of the total volume. The principal markets are listed below:

	Pounds
Shipboard cable armor	400,000
Aircraft cable	350,000
Automotive air filters	120,000
Industrial wire cloth	102,000
Tea bag staples	100,000
Others	75,000
Total	1,147,000

[fol. 5458] 4. The Alcoa share of the present aluminum market was 39.6% and represented sales of redraw rod and fine wire as follows:

	Pounds
Redraw	242,000
Fine Wire	212,560
Total	454,560

5. Copper and copper base alloy fine wire dominated the 1954 market—95.1% of the metal volume, equivalent to 77,115,000 lbs. of aluminum. The principal copper markets are listed below:

	Pounds
Telephone systems	80,757,000
Flexible cords	45,000,000
Automotive wiring	41,958,000
Magnet wire	24,911,000
Power cable	16,500,000
Paper mill mesh	9,000,000
Others	36,340,000
Total	254,466,000

6. Stainless steel fine wire accounted for 3.5% of the 1954 market by volume, actually 8,520,000 pounds.

7. The total future market by 1960 is estimated to be equivalent in annual volume to 92,310,000 lbs. of aluminum, 13.8% greater than 1954. In actual pounds, it will be divided by type of metal as follows:

	Pounds	% of Total Metal Volume	% Increase Over 1954
Aluminum	20,390,000	22.1	1680.0
Copper and copper base	227,690,000	74.8	−10.5
Stainless steel	8,770,000	3.1	2.9
Total	256,850,000	100.0	

This total, divided by major type of product use, results in the following:

[fol. 5459]

	Pounds	% of Total Metal Volume
Electrical products use	236,890,000	92.0
Non-electrical products use	19,960,000	8.0
Total	256,850,000	100.0

8. Aluminum fine wire should represent 22.1% of the 1960 volume. With the exception of aircraft cable, the principal markets of the future will be new ones as listed below:

	Pounds
Automotive wiring	7,280,000
Flexible cords	6,060,000
Aircraft cable	1,250,000
Paper mill mesh	1,100,000
Power cable	930,000
Others	3,770,000
Total	20,390,000

9. It is significant that over 90.0% of the sales by primary aluminum producers to the 1960 fine wire markets will be in the form of redraw rod and wire. The bulk of the fine wire will be drawn in captive plants for internal consumption.

10. Alcoa's share of the 1960 aluminum fine wire market should be about 60.0%, divided as follows:

Product	Pounds	% Increase Over 1954
Fine Wire	1,243,000	487.0
Redraw	11,085,000	4480.0
Total	12,328,000	

11. The copper and copper base alloy share of the market by metal volume will drop to 74.8% in 1960, equivalent to 69,000,000 lbs. of aluminum. Their principal markets are listed on the following page:

[fol. 5460]

	Pounds
Telephone systems	70,390,000
Flexible cords	38,800,000
Magnet wire	32,500,000
Automotive wiring	30,775,000
Power cable	16,000,000
Paper mill mesh	8,800,000
Others	30,425,000
Total	227,690,000

12. The consumption of stainless steel wire will show little change by 1960, up 2.9% to 8,770,000 pounds.

13. Fine wire buying centers located in the northeastern section of the country purchased about 90.0% of the volume used in 1954. The pattern should be the same in 1960.

14. The degree to which the following product requirements are met will have a direct effect on the future sales of aluminum fine wire:

a. Develop and promote an economical tinning process.
b. Develop economical joining processes.
c. Increase drawing speed.
d. Increase strength-conductivity relationship.
e. Improve fatigue properties.
f. Increase elongation without sacrificing yield strength.
g. Improve consistency of mechanical properties.
h. Provide an oiled wire.
i. Provide facilities for special spooling requirements.

15. The present price of EC grade aluminum fine wire is competitive with copper on a conductivity basis in diameters from 0.010" to 0.020". However, even with the lowest prices developed by Alcoa's Accounting Department based on optimum production, EC is not competitive with copper when other costs of manufacturing insulated wire are considered.

[fol. 5461] 16. The present price of 5056 alloy aluminum fine wire is competitive on a volume basis with the other metals considered in this study.

17. Since World War II, the basic ingot price of aluminum has increased 62.7% while copper soared 258.0% There are no indications that this trend will be reversed during the forecast period. Naturally, any future increase in the spread between basic aluminum and copper prices will improve the chances for the substitution of aluminum.

18. The basic price policies of the fine wire industry are similar; wire is priced by the pound with extras for small quantities. Variations occur in base price quantities; copper has a lower and broader base (200 to 29,999 lbs.) than aluminum (2000 lbs.).

19. Companies drawing fine wire may be classified as follows:

a. Integrated producers; from smelting to fine wire for sale.
b. Independent; purchase redraw from others and produce fine wire for sale.

c. Captive; draw fine wire for internal use, may be either integrated or independent companies.

20. There are only 6 integrated producers of aluminum and copper fine wire but hundreds of independent and captive plants.

21. The fine wire industry has been a follower rather than a promoter. Relatively little money is spent for promotion, advertising or product development.

22. The most effective merchandising method for the sale of aluminum fine wire is direct customer contacts by salesmen and sales development engineers.

23. The normal method of distributing fine wire and redraw rod is by direct mill shipment.

24. Copper producers maintain stocks of wire bars to meet the rapid delivery requirements that prevail in the electrical products market. There is some stocking of fine wire.

[fol. 5462] 25. It may be necessary for Alcoa to increase its stock of EC redraw rod at Massena, but it is not likely that the volume by 1960 will warrant stocking fine wire.

26. Most of Alcoa's fine wire machines are modern. The present idle capacity of 6,000,000 lbs. would be more than necessary to fill the estimated 1960 demand of 1,225,000 pounds.

[fol. 5463] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 230

Long-Term Forecast of the Demand for Aluminum
First Report November 20, 1957

Confidential

George Van Buren Day
Commercial Research Division

[fol. 5464] Index

	Page
Index	2
Summary of Findings	3
Introduction	4
Report Methods	5
Section I—Total Shipments	6
Total Aluminum Demand (1946-1975) Graph and Statistics (Table 1)	7
Alcoa Total Shipments (1946-1975) Graph and Statistics (Table 2)	9
Section II—Shipments By Markets	11
Total Aluminum Shipments by Major Markets (Table 3)	12
Industry Shipments and Alcoa Shipments—for 1955, 1960, 1965 and 1975, By Major End Uses, By Aluminum Product (Table 4)	13
Section III—Alcoa Participation	20
Alcoa Direct Shipment Participation By Market (Table 5)	21
Alcoa Participation, By Aluminum Product (Table 6, 7)	23
Appendix	29
Aluminum Product Trends (Table 8)	30
Key Applications (Table 9, 10)	32
Key Business Indicators (Table 11)	35

[fol. 5465] Summary of Findings

The period from now to 1975 promises to be a relatively prosperous one, barring the effects of war not assumed in this forecast. Recessions may be more frequent than in the past but they should be minor and of short duration. The Gross National Product should move ahead at an annual rate of at least 3% compounded annually influenced by a strong growth in population and an annual increase in productivity of 2.65 per cent.

Total net shipments of aluminum in the United States amounted to 4.0 billion pounds in 1955. A 43% increase to 5.7 billion pounds by 1960, and a 108% increase (over 1955) to 8.3 billion pounds by 1965 is forecast. Continuation of this growth pattern envisions a 15.0 billion pound market for aluminum in 1975, 3.75 times the current demand. Because of cyclical variations, aluminum shipments in any one year may not be exactly as forecast; they should follow the past ten-year pattern of varying plus or minus 10% from the forecast trend.

Aluminum shipments should increase in five-year periods as follows:

1955–1960	9.0%	compounded	annually
1960–1965	7.75%	"	"
1965–1970	7.0%	"	"
1970–1975	5.75%	"	"

Aluminum's maturity in several markets substantiates a lessening of its growth curve, but the potentialities of aluminum use in many other markets cannot yet be fully estimated.

In the next 10 years, Electrical, Packaging, Building Product and Motor Transportation uses will increase their consumption of aluminum at a faster rate than other industries. Some military and aircraft usage will actually decline. About 70% of the growth by 1965 will be accounted for by 30 major applications, led by these six whose combined increase will account for 40% of the industry's increase:

Doors and Windows
Passenger Cars
Primary Electrical Power Cable
Air Conditioning

Motor Trucks
Highway Freight Trailers

All major aluminum products will grow in volume. Those exceeding the industry growth rate of plus 108% in the next 10 years are:

Welded Tube
Foil
Electrical Wire & Cable
Permanent Mold Castings
Extrusions
Drawn Tube

Sheet and Die Castings should match industry growth.

Alcoa's share of aluminum volume (exclusive of its shipments of finished products such as rivets, nails, closures, etc.) amounted to 1.54 billion pounds in 1955, or 38.5% of the total. As a result of strong competitive pressures, its shipments may not grow as fast as total industry shipments. A decline in Alcoa participation is therefore forecast over the next 20 years. By 1960, its share should amount to 34.3% (1.96 billion pounds); by 1965, 32.1% (2.66 billion pounds). In the second decade, it is forecast Alcoa's participation will not be allowed to slip below 30%, for a 4.5 billion pound shipment in 1975.

[fol. 5466] Introduction

At the request of the Sales Vice Presidents, the Commercial Research Division undertook the task of bringing up to date the so-called "Davies Report" of February 4, 1952. Specifically, the objectives were:

1. To make medium and long-term forecasts of the total U.S. demand for aluminum as determined by an analysis of each market's demand;
2. To determine from forecasts the demand for major aluminum products during the period in question;
3. To estimate Alcoa participation.

The year 1955 was chosen as the base year. The years 1960, 1965 and 1975 were chosen for the five, ten and twenty-year forecast periods.

In order to forecast the future demand for aluminum, it is fundamentally necessary to forecast economic trends, and in turn, the future production and sale of products that will use aluminum. Once the economic climate is established for the future, predictions can be made for automobile production, new housing starts, appliance sales, electric power production, etc. The economic basis for this report is the Commercial Research Division's composite of the soundest opinions, predictions and forecasts made by many economists and business organizations. The key indicators chosen are listed in Table 11 (page 35).

This report is based on the "market build-up" method of forecasting. An economic forecast thus provides a basis for measuring aluminum usage in future years if no wider application of aluminum were made. But an allowance must also be made for aluminum's growth possibilities. A thorough analysis of sales and technological developments in each of some 200 applications provided a good measurement of growing usage and the aluminum products involved.

As one source of information, the Sales Development Division's "Crystal-Gazing" report of late 1956 was used. In it, each section listed many possible applications of aluminum with reasonable "promise" of success and gave a measure of the tonnage that might be developed as "new business" for 1961. All Commercial Research Division market studies to date were reviewed. Out of detailed personal interviews with personnel in these divisions, and with some product managers, came a realistic growth pattern for each of the major applications of aluminum.

A forecast to be of benefit must be constantly reviewed and revised. It is important also that each review or revision be conducted within the same framework. A considerable part of this study's task involved the development of a suitable forecasting method and a procedure for identifying shipments of aluminum products to each of the major end uses.

It is planned to review annually total shipments of aluminum by the industry and by Alcoa. Biannually, a review of this entire report is contemplated.

[fol. 5467] Report Methods

1. "Direct" Participation

A true measure of Alcoa's participation in any market can only be obtained by comparing its "direct" shipments with industry *net* shipments. "Direct" shipments are herein defined as shipments of Alcoa primary products direct to customers who immediately use the product in fabrication or assembly. Excluded are any Alcoa shipments of primary products to customers who first "convert" these products into other primary wrought or cast products before their fabrication or assembly into the end use application. Thus, shipments of Alcoa extrusions to a window manufacturer are counted in "direct" participation; shipments of extrusion billets to a window manufacturer that has a captive press are not counted.

The manner in which industry statistics are gathered does not allow for a direct comparison of Alcoa's *gross* shipments with industry *gross* shipments. Furthermore, shipments of some products for further conversion cannot be market identified.

A clearer understanding of Alcoa's performance in the various markets is obtained if Alcoa is considered to have two major market groups: (1) The End Use Market, and (2) The so-called "Conversion" Market. Its participation in the first can be measured only on a market "direct" participation basis. Its share in the second, and its over-all participation, can only be measured on a product basis.

2. Measurement of Future Alcoa Participation

Alcoa's market participation is based on its share of the use of each aluminum product in each application. Its future participation reflects a growing competitive productive capacity. It appears reasonable to assume that for several major products Alcoa's participation will be severely restrained by the available production capacity and sales efforts of its competitors.

3. Market Classification

Figures in the report are classified by *ten* Major Markets. Some tables are expanded into 40 different categories with-

in those markets. This classification system is essentially the same as adopted by the Aluminum Association and is based on the Bureau of Census' classification of metal consuming industries.

Two Aluminum Association markets have been excluded: the "Conversion" market, for reasons explained in paragraph 1 above, and Distributors and Jobbers, which are not end use markets in themselves. The latter volume was prorated among markets on two bases: (1) obvious end use products, such as irrigation pipe, cable or pigment were placed in their proper markets; (2) all other metal was apportioned among markets according to the pattern of market shipments reported by members to the Aluminum Association, with some minor adjustments.

The volumes shown in each market can be taken to mean "use" or consumption by the market, with the understanding that they are actually "shipments to the user." (Scrap generated in the manufacture of end use products is thus not deducted.)

[fol. 5468] Section I—Total Shipments

Industry Shipments

Complex pressures existed in the last ten years which acted to decrease, as well as increase, the demand for aluminum. Were similar conditions to exist, the strong statistical growth trend should continue well into the future. The Mathematics Service Section of Alcoa's Metallurgical Division analyzed aluminum shipments from the year 1901 and projected the growth curve ten years hence. Its results substantiate this trend of aluminum based on past history.

The "market build-up" method projections are therefore substantiated statistically. As noted on the first graph following, several other independent studies also generally agree with the demand figures shown in this report.

Although a healthy growth is predicted based on past trends, it is also a fact that aluminum's maturity in several markets will act to restrain this trend. At the same time, it is too early to measure the full potentialities of aluminum

use in many other markets. Aluminum shipments should increase in five-year periods as follows:

1955–1960	9.0% compounded annually
1960–1965	7.75% " "
1965–1970	7.0% " "
1970–1975	5.75% " "

Past history indicates that shipments may vary plus or minus 10% from the forecast trend in any one year.

Alcoa Shipments

As previously stated, Alcoa's participation in each market can only be measured by comparing its "direct" shipments with industry *net* shipments. Excluded are any Alcoa shipments of primary mill products to customers who first "convert" these products into other primary products before use.

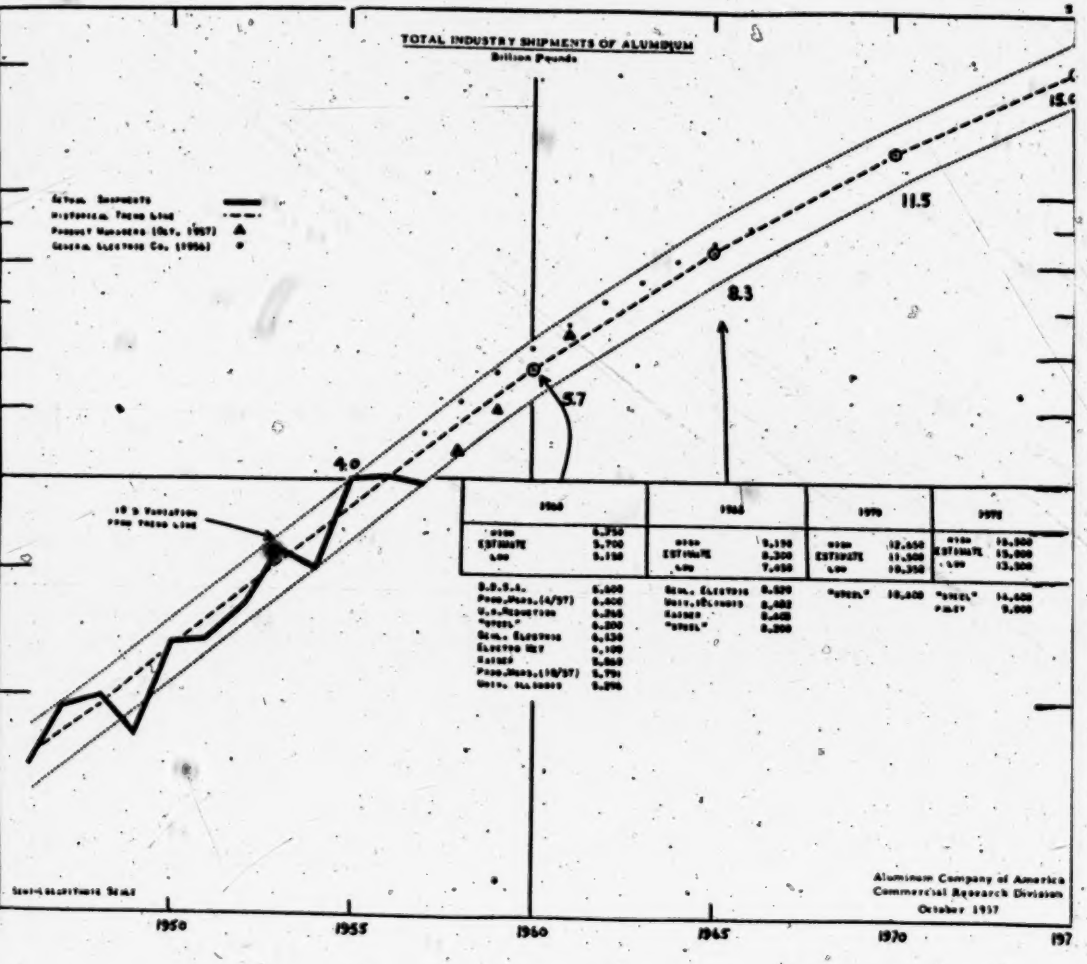
As shown in Table 2, Alcoa's *total* participation is made up of (1) its shipments "direct" to customers for immediate use in fabricated products and (2) its so-called "conversion" shipments.

Alcoa's total share of aluminum volume (exclusive of its shipments of stockpile pig and finished products, such as rivets, nails, closures, etc.) amounted to 1.54 billion pounds in 1955, or 38.5% of the total. Its "direct" participation amounted to 27.6%. Its share of metal supplied by all other producers and fabricators amounted to 15.0%. By 1960, its total share could decline to 34.3% (1.96 billion pounds); by 1965, 32.1% (2.66 billion pounds)—as a result of strong competitive pressures. By 1975, it is forecast that Alcoa's participation will not be allowed to slip below 30.0%, for a 4.5 billion pound shipment in that year.

Alcoa's total shipments to customers thus will show increases over its 1955 shipments as follows:

Year	Alcoa Increase Over 1955	Industry Increase Over 1955
1960	+ 27%	+ 43%
1965	+ 73%	+108%
1975	+192%	+275%

[fol. 5469]


TOTAL INDUSTRY SHIPMENTS OF ALUMINUM
Billion Pounds
11.5
8.3
5.7
4.0
1950
1955
1960
1965
1970
Aluminum Company of America
Commercial Research Division
October 1957

[fol. 5470]

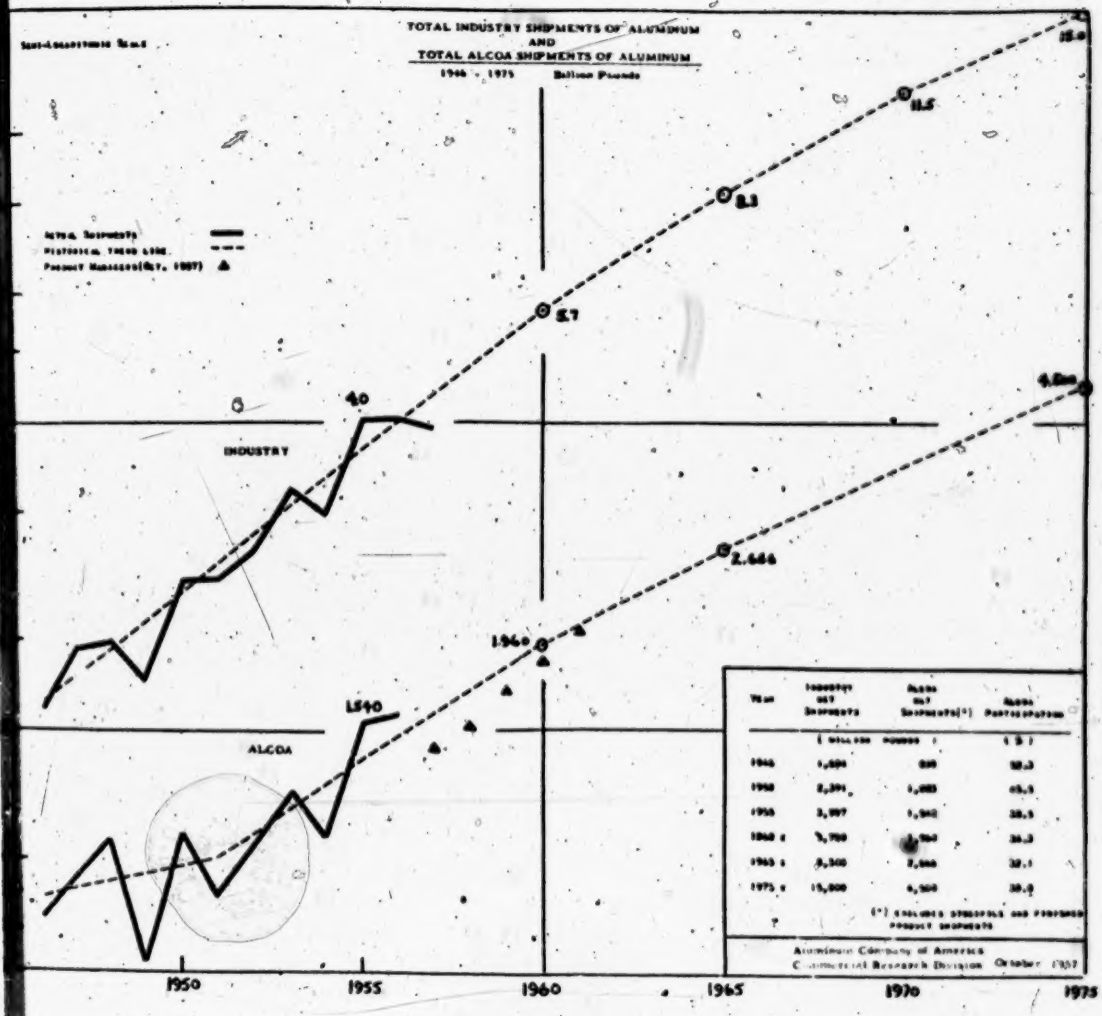
2290 Table 7

CONFIDENTIAL

TOTAL ALUMINUM DEMAND
1946 - 1975
Million Pounds

Year	Total Net Shipments (1)	Fitted Trend Line	Variation from Trend 10%	Variation from Trend -10%
1946	1,604	1,650	1,815	1,485
1947	1,946	1,775	1,952	1,598
1948	1,994	1,940	2,134	1,746
1949	1,766	2,120	2,332	1,908
1950	2,391	2,330	2,563	2,097
1951	2,421	2,550	2,805	2,295
1952	2,662	2,800	3,080	2,520
1953	3,211	3,050	3,355	2,745
1954	3,007	3,350	3,685	3,015
1955	3,997	3,650	4,015	3,285
1956	4,014	4,000	4,400	3,600
1957		4,400	4,840	3,960
1958		4,800	5,280	4,320
1959		5,250	5,775	4,725
1960	5,717	5,700	6,270	5,130
1965	8,307	8,300	9,150	7,450
1970	11,500	11,500	12,650	10,350
1975	14,969	15,000	16,500	13,500

Notes:
(1) Shipments 1946 - 1949: Department of Commerce.
Shipments 1950 - 1956: B.D.S.A., Department of Commerce.
Shipments 1960 - 1975: Estimated
(2) 10% variation based on shipments 1946 - 1956 being within plus or minus 10% of trend line.



Year	Industry Net Shipments	Alcoa Net Shipments(*)	Alcoa Participation
	(Billion Pounds)		(%)
1946	4,000	000	38.3
1950	8,391	1,000	00.0
1955	3,997	1,542	38.5
1960 e	5,700	2,000	36.3
1965 e	9,500	3,666	38.1
1975 e	15,000	6,500	38.0

(*) Excludes Ingot and Finished Product Shipments

Aluminum Company of America
Commercial Research Division October 1957

[fol. 5472]

Table 2 10.
CONFIDENTIAL

ALCOA PARTICIPATION IN THE ALUMINUM INDUSTRY
1946 - 1975
(million pounds)

Year	Total Net Shipments[1]	Fitted Trend Line	Variation from Trend[2] +10%	Variation from Trend[2] -10%	Alcoa "Direct" Shipments[3]	Alcoa "Direct" Participation %	Alcoa "Conversion" Shipments[4]	Alcoa Total Shipments[5]	Total Alcoa Participation %
1946	1,604	1,650	1,815	1,485				839	52.3
1947	1,946	1,775	1,952	1,598	(not	available)		747	48.5
1948	1,994	1,940	2,134	1,746				1,071	53.8
1949	1,766	2,120	2,332	1,908				718	40.7
1950	2,391	2,330	2,563	2,097				1,083	45.5
1951	2,421	2,550	2,805	2,295	(not	available)		898	37.0
1952	2,662	2,800	3,080	2,520				1,047	39.3
1953	3,211	3,050	3,355	2,745				1,240	38.6
1954	3,007	3,350	3,685	3,015				1,065	35.4
1955	3,997	3,650	4,015	3,285	1,105	27.6	435	1,540	38.5
1956	4,014	4,000	4,400	3,600	n.a.	n.a.	n.a.	1,563	39.0
1957		4,400	4,840	3,960					
1958		4,800	5,280	4,320					
1959		5,250	5,775	4,725					
1960	5,717	5,700	6,270	5,130	1,416	24.8	545	1,961	34.3
1965	8,307	8,300	9,150	7,450	1,960	23.6	706	2,666	32.1
1970	11,500	11,500	12,650	10,350					
1975	14,969	15,000	16,500	13,500	3,376	22.5	1,127	4,503	30.0

Notes:

(1) Shipments 1946-1949 -- Department of Commerce.
Shipments 1950-1956 -- B. D. S. A. Department of Commerce
Shipments 1960-1975 -- Estimated.

(2) 10% variation based on shipments 1946-1956 being within plus or minus 10% of trend line.

(3) Direct shipments of Alcoa mill products to all customers, but excluding metal for conversion into mill products before use (i.e., foil stock, redraw rod)

(4) Shipments of ingot, billets, redraw rod, sheet and foil stock, etc., to customers for conversion into mill products before use.

(5) Stockpile shipments and finished product shipments (i.e., collapsible tubes, rivets, nails, etc.) are excluded.

[fol. 5473] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 231

July 11, 1960.

Richard W. Davis
Commercial Research Division
Pittsburgh Office
Mr. William W. Knapp
Rome Cable Division
Rome, New York

Confidential

Re: Product Managers' Five-Year Forecast
Ref: Cable & E.C. Wire—Cable Accessories

Confirming our telephone conversation of July 1, the following represents your forecast of shipments for the next five years:

Cable & E.C. Wire Shipments
(Million Lbs.)

	Bare			Covered		
	Industry	Alcoa	% Alcoa	Industry	Alcoa	% Alcoa
1959	196	61.9	31.5	61	7.5	12.3
1960	195	61.6	31.5	60	7.3	12.3
1961	210	66.0	31.5	63	8.2	13.0
1962	225	71.2	31.6	65	8.6	13.2
1963	245	77.6	31.7	70	9.8	14.0
1964	255	81.1	31.8	75	10.5	14.0
1965	270	88.0	32.5	80	12.0	15.0

[fol. 5474]

Combination Bare & Covered

	Industry	Alcoa	% Alcoa
1959	257	69.4	27.0
1960	255	68.9	27.0
1961	273	74.2	27.2
1962	290	79.8	27.5
1963	315	87.4	27.7
1964	330	91.6	27.8
1965	350	100.0	28.6

The following forecast for Alcoa Cable Accessories was developed by Mr. F. R. Dallye and Mr. R. D. Cook:

Alcoa Cable Accessories
(Million Lbs.)

1959	2.1
1960	2.2
1961	2.3
1962	2.4
1963	2.5
1964	2.6
1965	2.7

Richard W. Davis

RWD:mbb

cc: Mr. R. L. Williamson—Rome, N. Y., Mr. F. R. Dallye—Pittsburgh, Mr. R. D. Cook—Pittsburgh.

[fol. 5475] In United States District Court

Plaintiff's Exhibit 232

Insulated Aluminum Power Cables

Aluminum has long been used, and long been completely accepted, as an electrical conductor. All that is needed to verify this is a glance upward at the aluminum transmission lines that criss-cross our skylines. Yet, with all its acceptance and application for overhead conductors and bus, aluminum has not received recognition as a conductor material for insulated power cables except by the aluminum industry itself.

The reasons for this are not hard to find. One of the strongest, however illogical it may be, is resistance to change—in the form of new materials and different procedures—which use of insulated aluminum conductors would present. Equally compelling reasons at one time—and at that time completely logical—were supply and cost: with the exception of brief periods in the late 40's and early 50's, it has only been recently that a sound case could be made for the use of aluminum either on the basis of material availability or installed economy.

Supply

The first chink in the armor of copper's exclusive enjoyment of the insulated cable field came during two brief but severe shortages of copper, immediately following World [fol. 5476] War II and during the Korean War. A considerable amount of insulated aluminum cable was manufactured and installed in 1947, and again in 1952, representing the first real use of aluminum in the field.

Though these were short-range situations, which changed within a few months, they provide a basis of engineering, installation, and operating experience.

Some mistakes were made. One was the use of the same temper of wire—hard-drawn—as is ordinarily used for overhead conductors. This difficulty was overcome by Aluminum Company of America's development of partially annealed tempers, EC-H24 and EC-H26, which have handling characteristics similar to partially annealed copper.

Another difficulty was that fittings which had been found satisfactory for copper were assumed to be equally satisfactory for aluminum. When it was recognized that this was not true, Alcoa opened its laboratories to a number of manufacturers of electrical fittings interested in developing suitable fittings for aluminum. This was accomplished in a relatively short time.

Because of the knowledge gained and the problems solved in these early installations, insulated aluminum has now become the standard for all Alcoa plants. Many of these plants have continuous operations that cannot tolerate shutdown.

[fol. 5477] Of great future significance in looking at long-range availability is the practical fact that the world's supply of aluminum is vastly greater than that of copper. As use of all metals increases, copper will be more and more exclusively confined to the many uses for which it is uniquely suited. Already proven is aluminum's capability to do the job as a power cable. Simply on the basis of future material supply alone, therefore, universal application of the aluminum power cable seems inevitable.

Cost

Insulated aluminum cables are here to stay because present economics and projections of future cost relationships of aluminum and copper favor aluminum. The amount of savings from use of aluminum usually depend upon whether conductor selection is determined by equal resistance or equal temperature rise.

When equal resistance is the factor, an aluminum conductor* must be 1.59 times the cross-sectional area of a given copper conductor, to have the same d.c. resistance. For A.W.G. sizes this means that a No. 6 aluminum wire has the same d.c. resistance as a No. 8 copper wire. How- [fol. 5478] ever, even with this increase in cross-section, use of aluminum results in the conductor having less than half the weight of a comparable copper conductor. This is illustrated by saying that one pound of copper will produce a No. 8 wire twenty feet long, and one pound of aluminum will produce a No. 6 wire 41 feet long, while both will have the same d.c. resistance per foot.

If conductor selection is based upon allowable temperature rise, (current carrying capacity tables), an aluminum conductor need have only about 36 per cent more cross-sectional area than a comparable copper conductor. The weight of aluminum in this circumstance is only 41 per cent the weight of the copper conductor to do the same job. Tests show that, depending upon size, aluminum conductors have 78 to 84 per cent the capacity of the same size copper conductor having the same insulation. The following is a tabulation from the AIEE publication, Electric Power Distribution for Industrial Plants, October, 1956:

Aluminum Current-Carrying Capacities—60 Cycles

Conversion factors for determining current ratings of aluminum conductors from values given for same size copper in IPCEA current-carrying capacity tables.

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* "Conductor" as used in this article refers to the metal wire portion of the cable.

[fol. 5479] Standard Concentric Stranding

For Cables in Air, or in Non-Metallic Conduit		For Cables with Metallic Seath or in Metallic Conduit	
(1) Size	(2) Factor	(3) Size	(4) Factor
....	....	Up to No. 1	0.78
....	....	1/0–4/0	0.79
Up to 500	0.78	250–400	0.80
600	0.79		
700–900	0.79	500–800	0.81
1000	0.80	900–1000	0.82
1250	0.80	1250	0.82
1500	0.81	1500	0.83
1750	0.82	1750	0.84
2000	0.83	2000	0.84

From a practical point of view, current-carrying capacities can be obtained from Tables 1a and 2a, National Electric Code, 1956 Edition. Comparative tests have shown that these values provide a safety margin in excess of the copper equivalents.

In choosing aluminum cables, it is hard to justify anything smaller than No. 6 aluminum. This is logical when you consider that the smaller the wire, the greater the proportion of total weight represented by insulation. The cost of metal decreases in importance as wire size decreases. Conceivably, a point could be reached where it would make little difference whether aluminum, copper, or silver conductor were used. On the other end of the scale, very significant savings can be had if aluminum is chosen for [fol. 5480] the larger wire sizes. The overall savings by use of aluminum for a large industrial plant built in 1947 was about 40 per cent on nine million feet of building wire.

The manufacture of insulated wire and cable with aluminum conductors follows essentially the same pattern and uses the same equipment as does insulated wire and cable with copper conductors. Manufacturing experience to date shows there are no special insulating problems.

The long-range outlook for the cost of insulated aluminum conductors is for a continually increasing advantage over comparable copper cables.

The basic economics of the product—supply and cost—seem, therefore, to dictate that now is the time for conductor manufacturers and users to look to aluminum.

Design

The techniques used in designing with aluminum are almost the same as those with copper. It is recommended practice to design an installation with aluminum from the start, rather than substitute aluminum for copper at a later stage. Too often the mere substitution of aluminum for copper in a layout results not only in "overdesign," but very frequently a false economic picture that denies the user the best possible application for the least expenditure. [fol. 5481] The rule-of-thumb use of aluminum two A.W.G. sizes larger than copper should be avoided, if the good characteristics of aluminum are to be fully realized. The current carrying capacities of aluminum conductors are established by the National Electric Code, Tables 1a and 2a, for the various classes of insulation. The "spread" of use for any given cable size often permits size-for-size replacement of copper by aluminum, where service is to be in the "overlap area" of the two conductors.

Insulations. Aluminum conductors are manufactured with the same variety of insulations as copper conductors. Unlike copper, aluminum does not have a deteriorating effect on rubber insulations which is particularly a problem at high temperatures. The de-rating factors for temperatures above 30°C listed in the National Electric Code are the same as those applied to copper.

Conduits. Larger ducts are not always needed with aluminum. For example, where the diameter of the conductor itself is small compared to the overall cable diameter, as in the case of high voltage cables, increased duct size is frequently unnecessary. Another typical situation is where the comparable copper cable diameter is at the beginning of a given range of conductor diameters suitable for a particular duct size; the larger aluminum cable generally falls within the range of diameters of cable that may be installed in the duct.

[fol. 5482] Comparisons for three single-conductor, 600-volt, rubber-insulated, neoprene-sheathed network cables of approximately the same current-carrying capacities and reactances, installed in underground conduit, will show this:

Copper Cable		Equivalent Aluminum Cable	
Size	Conduit	Size	Conduit
#6	1¼"	#4	1¼"
2	1¼"	1/0	2"
1/0	2"	3/0	2" *
4/0	2½"	350 MCM	3"
350 MCM	3"	500 MCM	3" *
500 MCM	3"	750 MCM	4"

* No increase in conduit size required.

Since voltage drop is often the determining factor in the selection of wire sizes, the difference in voltage drop between cables in magnetic conduit and those in non-magnetic aluminum conduit should be considered at the design stage to realize maximum savings from the use of both aluminum cable and aluminum conduit.

Installation

Aluminum cable is installed using essentially the same methods and tools as for copper cable. More care is required in making up connections, but this is generally offset, especially in the larger sizes, by easier handling of the aluminum cable—which weighs only about half as much as the equivalent copper cable. The use of lighter weight [fol. 5483] aluminum eliminates from the job some heavy rigging for handling, and much of the backbreaking labor.

Use of Joint Compound. Aluminum is a high conductivity metal and the thin oxide coating which quickly forms on it after manufacture is highly resistant to corrosion. However, this oxide is also an electrical insulator, and must be removed from the surfaces to be joined, in order to make a good electrical connection. This oxide is easily removed by abrading the surface with emery cloth or a wire brush, after first coating the surface with a grease-type joint compound which excludes air and prevents re-oxidation. It is important that connections be made in this way. If they are so done, the resulting connection will be of low resistance and trouble-free, provided, of course, that suitably designed accessories are properly installed, as outlined later.

An electrical connection to aluminum should never be made without joint compound. There are a number of good

compounds on the market, such as Alcoa No. 2 Electrical Joint Compound. The principal purpose of the compound is to protect the surfaces to be joined from oxidation. It excludes air from the surface during abrasion, and continues to protect the termination after it is completed. Some of the joint compounds on the market have metallic or abrasive powders included in the grease to aid in breaking down the oxide on mechanical compression and aid in producing a high conductivity joint. The primary purpose of the compound—to exclude oxygen—should be kept con- [fol. 5484] stantly in mind.

Connectors and Terminals. Aluminum connectors and terminals should be used with aluminum conductor wherever possible. If high operating temperatures are anticipated, and if steel or copper bolts are used in connectors, they should be made up with effective spring washers, such as the Bellville type, to provide for the greater thermal expansion of aluminum. If steel or copper bolts are used without spring washers, any heating from high loads or high ambient temperatures may cause deformation of the aluminum, resulting in a loose connection of higher resistance upon cooling.

Complete lines of good, dependable connectors and terminals for aluminum are available from the major manufacturers.

All approved types and sizes of compression terminals and sleeves made of aluminum give excellent results. Many of these have joint compound installed at the factory, to speed and simplify installation.

All types of mechanical bolted connectors are available in aluminum. Plated steel or copper bolted connectors can be used if satisfactory spring washers are included in the bolts where high operating temperatures are anticipated.

Probably the best electrical joints, especially in the larger sizes, are made up by welding. A complete line of welded [fol. 5485] lugs and terminals is available for virtually all cable sizes 1/0 and larger.

Service Record

Aluminum conductors have been used with success in all types of power service—aerial, conduit, duct, and direct-burial installations. In a five-month period in 1947, one

company shipped about one-half million feet of insulated aluminum cable, representing over 200 individual items, to 70 industrial plants and utilities throughout the United States. The bulk was in sizes 1/0 to 1,000,000 cm. The voltages ranged between 600 and 15,000 volts. A survey made after about four years of operation disclosed that no difficulties had been encountered with the cable itself.

The largest single user of insulated aluminum cable is the aluminum industry itself. After making several pilot installations over a period of years, in 1946 Alcoa adopted insulated aluminum conductors as standard for all new construction and all maintenance installations. Since that time, Alcoa has installed over 40 million feet of insulated aluminum conductors. Other major aluminum producers have also standardized on insulated aluminum conductors. It is estimated that the total insulated aluminum cable in service in the aluminum industry alone exceeds 100 million feet. This attests to the reliability of service that may be [fol. 5486] expected with aluminum cable, since so many operations in the aluminum industry depend upon uninterrupted power, maintenance of which could not be compromised by decisions unrelated to the dependability of the product.

A change-over from insulated copper to insulated aluminum conductor imposes no major problems. It merely requires that the user follow the same sound engineering practices, making the minor changes in technique that follow naturally when one metal replaces another. The changes are small; the savings are large.

[fol. 5487] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 233

Rome Cable

Division of ALCOA

Application for Consigned Stock Approval

(Note: This form to be completed by Sales Office and signed by Manager of Rome Cable Division Sales.)

Application is hereby made for approval of consignment as indicated by the following statements:

1. Distributor Kingston City Electric Supply Company, Inc.
2. Street Address 21 Grand Street
   City Kingston Zone: State: New York
3. Investment and Sales Data.

	Investment: Approx. Consignment Investment Requested	Sales: Actual Last Calendar Year	Actual This Calendar Year To Date	Estimated Next 12 Months
Copper Wire & Cable	7000	45,000	.....	45,000
Aluminum Wire & Cable	1000	4,500	.....	5 to 6,000
Aluminum Accessories	None	.....	.....	.....
Aluminum Conduit	None	.....	.....	.....
Total	8000	49,500	.....	50,000

(Note: Above actual and estimated figures should include Rome and/or Alcoa sales.)

4. Anticipated turnover 3-4 times per year.
5. Distributor now has consignment from manufacturers as follows:

Copper Wire & Cable	Aluminum Wire & Cable	Aluminum Accessories	Aluminum Conduit
None	None	None	Alcoa
.....	.....	.....	.....
.....	.....	.....	.....

(Indicate name of consignor under proper heading.)

[fol. 5488] 6. List *all* Rome Cable Division distributors in this distributor's same trading area. Indicate with (*) if distributor has Alcoa—Rome Cable consignment.

Mid Hudson Electric Supply Corp.*
Poughkeepsie, New York

7. Type of product for which consignment is anticipated (Indicate by check mark):

Copper—		
	Bare & Weatherproof	X
	Bare & Weatherproof (Carton)	X
	Building Wire	X
	SE & Self-Supporting	X
	Machine Tool Wire	.....
	Portable Cords and Cables	.....
	Mining Machine Cables	.....
	RoMarine-RoPrene—Type USE	X
Aluminum—		
	Accessories	.....
	Covered Line Wire	X
	Multiplex Service Cables	X
	Bare Aluminum & Bare ACSR	.....
	Aluminum Rigid Conduit	X

8. Remarks (Explain any circumstances you feel are pertinent to the desirability of this consignment):

At the present time we do not have a distributor in Kingston. It is felt that the addition of this outlet will result in adding about $60,000 to our volume without disturbing our present distribution set-up at Poughkeepsie

Signed , , Manager, Rome Cable Division Sales.

Date:—

[fol. 5489] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 234

Aluminum Company of America

Ralph O. Keefer
General Purchasing Agent

Pittsburgh 19, Pa.

December 12, 1951.

Mr. A. D. Ross Fraser, President,
Rome Cable Corporation,
421 Ridge Street,
Rome, New York.

Dear Mr. Fraser:

I am sorry for not having written to you sooner as a result of our telephone conversation of several weeks ago when you called me regarding the inquiry for aluminum cable for the Wenatchee and Rockdale projects. We were much slower in finally disposing of this inquiry than we usually are; however, there were many ramifications involved due to the aluminum situation in general and further because some vendors are drawing aluminum while others are not. I was, however, glad to see Rome in the final go-around for at least part of the cable that was up for purchase at the time.

One thing about the negotiation, however, that was somewhat baffling to me was the fact that you were rather competitive on the smaller sizes; i.e., 8 to 12, whereas on the larger sizes you were not too competitive. Perhaps as you gain additional experience in the insulating and handling of aluminum this situation will right itself, and you will be more competitive in the larger sizes.

With respect to the electrical conductor situation in general, we recently heard something that was somewhat disturbing. I understand that your Mr. R. A. Schatzel, who was Chairman of the symposium on polyethylene-covered wires and cable at an AIEE meeting in Cleveland, recently

made the statement that the new aluminum reduction plants could not produce conductor metal, and therefore the addition of these new plants would not relieve the electrical conductor situation. Apparently this opinion was handed down by someone in Washington who is not familiar with the facts. The facts are that any aluminum reduction plant can produce metal suitable for electrical conductor if the proper metallurgical control is maintained. It is therefore a matter of choice to some extent anyhow whether an aluminum reduction plant or a portion thereof does or does not produce metal suitable for electrical conductor.

[fol. 5490] At any rate, all of our plants, present and contemplated, can produce electrical conductor metal if we elect to so operate them.

We think, therefore, that the increased capacity that will come into production in the next few months is going to relieve the present aluminum shortage and that there is a very bright future for aluminum in the electrical conductor field. Principally the economics should motivate it, but perhaps the present and probable continued shortage of copper will be the most dominating influence.

If we can add any information or data for the benefit of Mr. Schatzel or anyone who may have misinformed him, we would be glad to be given the opportunity.

With kindest personal regards, I remain

Very truly yours, T. O. English.

TOW:bw

[fol. 5491] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 235

FULLER & SMITH & ROSS INC.
CLEVELAND
NEW YORK
CHICAGO

FILMS • TELEVISION • RADIO

Aluminum Company of America

Sound Slide Film for
Electrical Distributors

First Draft -- 7/1/54
Revised -- 7/14/54

ol. 5492]

FULLER & SMITH & ROSS INC.
CLEVELAND NEW YORK CHICAGO

FILM • TELEVISION

SCRIPT FOR

Aluminum Company of America

Sound Slide Film for Electrical Distributors

Part I -- "Working For Your Future"
REVISED

7-15-54 cm

NUMBER	ACTION	SOUND
1.	TITLE: ALCOA Presents	INTRODUCTORY MUSIC
2.	TITLE: "Working For Your Future"	CONTINUE MUSIC
3.	ART: Early laboratory scene (of aluminum production).	NARRATOR: Less than three quarters of a century ago, aluminum was so scarce as to be considered a semi-precious metal ... (BELL)
4.	ART: Early laboratory electrical set-up.	and the utilization of electricity as we know it today was just beginning ... (BELL)
5.	ART: Symbolic aluminum pot and power line ...	Electricity ... at the approximate rate of ten kilowatt-hours for every pound of metal ... is the "ingredient" that made large-scale production of aluminum possible ... (BELL)
6.	ART: Symbolic high voltage lines ... criss-crossing the country ...	Aluminum has returned the favor. Aluminum conductor carries electicity into every corner of the nation. More than 90% of the high-voltage power in North America is transmitted on aluminum ... (BELL)
7.	ART: Symbolic distribution system to city and farm homes ...	And aluminum conductors are used extensively to distribute power to urban areas and farm homes all over the nation. (BELL)

[fol. 5493]

FULLER & SMITH & ROSS INC.
CLEVELAND NEW YORK CHICAGO

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SCRIPT FOR

NUMBER	ACTION	SOUND
8.	ART: Split frame. Symbolic research man ... Symbolic production plant ... Titles: Alcoa Research & Production.	The advantages of aluminum as an electrical conductor were apparent from the start.. Between that early recognition and today's widespread use of aluminum conductors lie countless hours of research and hundreds of millions of pounds of electrical conductor production by Alcoa. (BELL)
9.	PHOTO: First Aluminum transmission line. Hartford Electric Light Co. Tariffville Hartford Co.	In 1899, Alcoa developed and sold the first aluminum transmission line in the United States, which proved the advantages of aluminum for power line construction. (BELL)
10.	PHOTO: CU piece of ACSR showing make-up ...	In 1909, William Hoopes, Electrical Engineer for Alcoa, perfected a new cable consisting of aluminum wires stranded around a core of galvanized steel ... the product known today throughout the industry as ACSR ... Aluminum Cable, Steel Reinforced. (BELL)
11.	PHOTO: Glamorized shot of ACSR BELL ...	ACSR retained the advantages of all-aluminum cable ... high conductivity, corrosion resistance, and light weight ... In addition, ACSR has the highest ratio of strength to weight of any conductor ... The result ...

[fol. 5494]

FULLER & SMITH & ROSS INC.
CLEVELAND NEW YORK CHICAGO

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SCRIPT FOR

NUMBER	ACTION	SOUND
		longer spans, fewer supports, more economical construction. (BELL)
12.	PHOTO: First ACSR line in 100 KV Range. (Southern Sierra Power Co. line) Mass Co's [illegible] Power Co. - [illegible] Brochure, [illegible]	In 1913, the first ACSR line in the 100,000 volt range was energized using Alcoa ACSR ... (BELL)
13.	PHOTO: First Aluminum distribution line. City of Pomona, Kansas	Another Alcoa first was accomplished in the early 1900's with the first aluminum distribution line using Alcoa weatherproof conductor ... (BELL)
14.	PHOTO: First ACSR line in 200 KV range (Big Creek). Southern Cal. Edison Co. - Big Creek - to Los Angeles.	And, in 1923, Alcoa ACSR was the conductor on the first 200,000 volt line when voltage was increased on this line which had been in operation since 1913 at 150,000 volts. (BELL)
15.	PHOTO: First Expanded ACSR line. SPLIT FRAME: Cutaway of expanded ACSR. Amer. Gas & Elec. Co. Spain Sta. Kanawha W. Va.	In 1953, after 20 years of research and development, Alcoa pioneered again with Expanded ACSR ... the super high voltage conductor that is Alcoa's latest and still exclusive development. (BELL)
16.	PHOTO: Sag-Tension Table for ACSR...	In addition to developing and perfecting ACSR and other conductors, Alcoa engineers created the universally recognized "Graphic

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SCRIPT FOR

NUMBER	ACTION	SOUND
		Method of Sag-Tension Calculations" which for the first time enabled engineers to determine accurately the stresses in the aluminum and steel components of the conductor under any conditions ... (BELL)
17.	PHOTO: Samples of different strandings ... ACSR	Alcoa engineers developed the several types of stranding needed for various services and in cooperation with the steel wire manufacturers, they developed standard specifications for the reinforcing steel wire for ACSR ... (BELL)
18.	PHOTO: Man installing dead end on line	The accessories and fittings necessary for the successful and economical use of ACSR were the products of Alcoa engineering and research ... (BELL)
19.	PHOTO: Armor rods installed on cable ...	For example, Alcoa invented and developed the familiar armor rods which protect transmission conductors from vibration damage, wind whipping, chafing and flash-over burns at the points of support ... (BELL)

[fol. 5496]
FULLER & SMITH & ROSS INC.
CLEVELAND NEW YORK CHICAGO

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SCRIPT FOR

NUMBER	ACTION	SOUND
20.	PHOTO: Compression fittings ... Dead ends and clamps.	Compression fittings for joints and dead ends and snubbing type dead ends and clamps were invented and developed by Alcoa ... (BELL)
21.	PHOTO: Stockbridge Damper installed on line	After acquiring the original patents for the Stockbridge Damper ... Alcoa engineers improved and made them commercially available for every size and kind of conductor. (BELL)
22.	PHOTO: Niagara Falls plant installation ... bus bar	Not all of Alcoa-s research in the electrical field has centered on wire and cable. The company pioneered in the use of aluminum bus conductors in 1896, when flat bar aluminum was used for the 33,000 ampere bus at the Niagara Works ... (BELL)
23.	PHOTO: Point Comfort Works ... Bus Bar installation ...	Since then, aluminum bus has found increasing favor in a wide variety of manufacturing, chemical, and electrical installations. Many of the problems involved in its use have been solved in Alcoa's own plants where more than 40 million pounds of aluminum bus are in operation. (BELL)

[fol. 5497]

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SCRIPT FOR

NUMBER	ACTION	SOUND
24.	Cut.	
25.	Cut.	
26.	ART: ALCOA ... First in Aluminum Conductor & Accessories	Alcoa was first on the market with aluminum conductor and accessories ... (BELL)
27.	ART: Symbolic researcher ... TITLE: ALCOA ... First in Aluminum Conductor Research	And Alcoa's leadership in electrical conductor research has contributed the major developments in aluminum electrical products for the electric light and power industry ... (BELL)
28.	Cut.	
29.	PHOTO: CU: Building nameplate... at Massena ...: or shot of new building, if completed.	The largest single company facility devoted exclusively to aluminum conductor research is the Electrical Conductor Laboratory at Massena, New York, operated by the Electrical Engineering Division of Aluminum Research Laboratories. (BELL)
30.	ART: Montage of photos of lab activities ... CU of men reading instruments, etc. ...	Here thousands of man-hours and square feet of floor space are given over to many research problems and tests that tell how to improve the performance of aluminum products in electrical service ... (BELL)

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SCRIPT FOR

NUMBER	ACTION	SOUND
31.	PHOTO: MS of outdoor span testing facilities ...	Alcoa's outdoor test facilities at Massena make it possible to reproduce field conditions on spans from 400 to 1500 feet to study the many problems of vibration and fatigue ... (BELL)
32.	PHOTO: Wind measuring equipment	Wind velocity and direction are constantly measured and recorded by sensitive devices in the instrument house ... (BELL)
33.	PHOTO: Man checking paper	Miles of such records have been examined to find the answer to the causes of conductor fatigue and what can be done to prevent it. (BELL)
34.	PHOTO: Instruments measuring cable vibration ...	Other instruments provide data on the nature of vibration, its amplitude, frequency, wave length, and the effectiveness of various devices in protecting the cable and damping the vibration. (BELL)
35.	PHOTO: MS of lab test spans ...	In the laboratory, accelerated vibration-fatigue tests on conductor and accessories are conducted under controlled conditions ... (BELL)

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SCRIPT FOR

NUMBER	ACTION	SOUND
36.	PHOTO: CU man watching cable. (This might be strobe shot to show cable vibration).	Samples must withstand five hundred million vibration cycles in laboratory tests ... as assurance that the cable will stand up during the many years of life expected of it in actual field service. (BELL)
37.	Out.	
38.	PHOTO: Man testing connectors ...	Also, the performance of numerous types of connectors for aluminum to aluminum and aluminum to copper is studied to guide the design and improvement of Alcoa accessories. (BELL)
39.	PHOTO: Test set-up of bus bar ...	Precision instruments accurately measure the electrical performance of test samples of bus bar and accessories ... (BELL)
40.	PHOTO: Test set-up for ACSR temperature measurements ...	Thermocouple wires connected to test spans of ACSR make possible accurate measurements of temperature ... (BELL)
41.	Out.	
42.	PHOTO: Lab nameplate at New Kensington or M3 of lab.	Another phase of Alcoa research for the electrical industry is carried on at the Alcoa Process Development Laboratories in New Kensington, Pennsylvania. (BELL)

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SCRIPT FOR

NUMBER	ACTION	SOUND
43.	PHOTO: Montage of several welding operations, CU:	Here Alcoa engineers and technicians are constantly at work developing and improving methods and processes for joining aluminum conductors ... (BELL)
44.	PHOTO: Soldering demonstration	In this lab, Alcoa constantly studies new methods and materials for soldering aluminum to aluminum and aluminum to other metals. (BELL)
45.	PHOTO: Welding pigtail ...	They have also developed processes and equipment for making welded joints ...
46.	PHOTO: Brazing tube ...	for brazing ...
47.	PHOTO: Cold welding ..., with samples of sheet, foil and wire.	and their latest research is in the practical use of pressure welding or "cold" welding methods for aluminum wire, sheet, and foil ... (BELL)
48.	ART: Symbolic production plant ... TITLE: Alcoa ... First in Electical Conductor Production	To make available the products of Alcoa's electrical research -- is the job of Alcoa's vast production facilities. (BELL)
49.	ART: Map with Alcoa Mining Overlay ...	Alcoa's mining operations, which produce the bauxite ore from which aluminum is refined, are located in Dutch Guiana, the United States, and in the Dominican Republic. Two other Alcoa mining locations in the

NUMBER	ACTION	SOUND
		United States produce fluorspar and limestone, required in the aluminum process. (BELL)
50.	ART: Map with ALCOA Refining overlay...	In Alabama, Arkansas and Illinois are Alcoa's processing and refining plants which extract aluminuma from the raw earths ... (BELL)
51.	ART: Map with Alcoa Smelting overlay...	Here are Alcoa's smelting plants which reduce alumina to Aluminum ... (BELL)
52.	ART: Map with Alcoa Fabricating overlay ...	And here are Alcoa's fabricating plants, which transform aluminum into useful shapes and foras ... (BELL)
53.	PHOTO: Massena and Vancouver plants.	Two Alcoa plants, at opposite ends of the continent ... Massena, New York, and Vancouver, Washington, supply electrical conductor and accessories ... (BELL)
54.	PHOTO: Sign at Massena ...	Let's make a brief tour of the Alcoa Massena plant and see how Alcoa conductor and accessories are produced ... (BELL)
55.	PHOTO: Men tapping pot in smelter ...	First stop is the smelter ... where electricity turns alumina into Aluminum ... (BELL)

2318

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SCRIPT FOR

NUMBER	ACTION	SOUND
56.	PHOTO: Men pouring pig ...	The molten metal is poured into the form of pig ... (BELL)
57.	Out.	
58.	PHOTO: Ingot entering rolling mill ...	For electrical wire and cable ... ingots of EC alloy aluminum approximately 6 by 6 inches square ... (BELL)
59.	PHOTO: 3/8 rod coming off mill.	are rolled into three-eighths-inch rod in a continuous rolling mill. (BELL)
60.	PHOTO: Rod stock going into wire machine ...	The rod is then drawn ~~precisely~~ precisely to the wire diameter required for different sizes and types of electrical conductors ... (BELL)
61.	PHOTO: Cable stranding machine ...	Modern cable stranding machines form the wire into aluminum cable or ACSR. (BELL)
62.	PHOTO. CU Physical Lab sign ...	Throughout the production process, the Physical Testing Laboratory maintains a continuous check for quality and uniformity. (BELL)
63.	PHOTO: Quantometer test ...	A sample of each "pour" from the smelter is tested by the quantometer to be sure that ~~it~~ it meets metallurgical specifications ... (BELL)

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SCRIPT FOR

NUMBER	ACTION	SOUND
64.	PHOTO: Man making conductivity test ... samples of rod and wire.	The 3/8-inch rod and the wire are tested on a statistical quality control program for weight, conductivity ... (BELL)
65.	PHOTO: Man making tensile strength test ...	... tensile strength and elongation ... (BELL)
66.	PHOTO: Man making test on steel wire ...	Samples of the steel wire used as a core for ACSR are continuously tested for specified properties ... (BELL)
67.	PHOTO: Making test on tension machine of finished cable ...	Here also are made the stress-strain tests on finished cable which are the basis for all sag and tension calculations. (BELL)
68.	PHOTO: Reel of cable in field... lineman working with it ...	These continuous tests throughout production assure that every foot of Alcoa electrical conductor delivered meets rigid standards for metallurgical, mechanical and electrical uniformity ... (BELL)
69.	PHOTO: Group of accessories ...	At Massena, Alcoa also produces a complete line of conductor accessories ... "dead ends", compression joints, parallel groove clamps, armor rods, Stockbridge Dampers and many others ... (BELL)

SCRIPT FOR

NUMBER	ACTION	SOUND
70.	PHOTO: Pattern shop ...	In the pattern shop, skilled craftsmen translate accessory designs into precision forms for production patterns. (BELL)
71.	PHOTO: Foundry ... molding	In the foundry, sand molds are carefully made and ... (BELL)
72.	PHOTO: Foundry ... casting ...	the accessory parts are cast ... (BELL)
73.	PHOTO: Machine shop ... assembling 280 series clamp...	The completed castings are finished and assembled ... (BELL)
74.	PHOTO: CU Drilling hole in clevis for dead end...	Precise holes are drilled in the steel clevis ends of compression dead ends to assure that these fittings develop at least 95% of the rated strength of the conductor. (BELL)
75.	PHOTO: CU soldering copper bushing in pg clamp.	Copper bushings are soldered into the parallel groove clamps for aluminum to copper connections a procedure with a long and generally excellent history. (BELL)
76.	PHOTO: Group of accessories packed for shipping ...	and the finished products are carefully packed for shipment ... (BELL)

[Col. 5505]

FULLER & SMITH & ROSS INC.
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SCRIPT FOR

NUMBER	ACTION	SOUND
77.	PHOTO: Montage of testing and inspection operations on accessories ...	Here again, continuous inspection and tests maintain a rigid quality control to assure that each accessory will give the service it was designed for ... (BELL)
78.	TITLE: ALCOA Research and Production ... 1. Supply Quality Products 2. Improve Performance 3. Seek New Applications	Alcoa's Research and Production for the electrical industry proceeds toward three major objectives ... First, to supply high quality products and materials for the use of the industry; second, to discover ways to improve the performance of aluminum electrical products; third, to seek new applications for aluminum in the electrical field ... (BELL)
79.	ART: Symbolic researcher ... Symbolic plant ... TITLE: ALCOA Research & Production ... working for your future ...	Many of the problems that have faced Alcoa and the electrical industry have been solved ... many still remain and new ones have appeared ... Toward the solution of these problems and others yet to come ... ALCOA Research and Production will continue to contribute from its great fund of knowledge, experience and resources ... working for your future. (BELL)
80.	END TITLE ...	MUSIC UP AND HOLD TO END ...

[fol. 5306]

FULLER & SMITH & ROSS INC.
CLEVELAND · NEW YORK · CHICAGO

FILM · TELEVISION

SCRIPT

FOR

Aluminum Company of America

Sound Slide Film for Electrical Distributors

Part II - "Profit by Experience"
Revised

NUMBER	ACTION	SOUND
1.	TITLE: Alcoa Presents ...	INTRODUCTORY MUSIC
2.	MAIN TITLE: "Profit by Experience"	CONTINUS MUSIC ...
3.	Chart showing expanding Market for Aluminum Conductor and Accessories ..	On the basis of all the facts and figures available, the market for Aluminum Conductor and accessories is growing by leaps and bounds ... (BELL)
4.	PHOTO: Transmission Line ...	Aluminum is already used to transmit more than 90% of the high voltage power in North America. (BELL)
5.	PHOTO: Distribution Line in Urban area.	And, aluminum conductors continue to grow in preference for primary and secondary distribution and service drop ... (BELL)
6.	Out	
7.	Out.	
8.	PHOTO OR ART: Salesman with catalog or brief case ... looking at group of signs ... Utility, REA, Mfg., Co., etc...	For you, as a salesman of aluminum conductor and accessories, this means growing opportunity for extra sales and profits ... (BELL)
9.	PHOTO or ART: Same Salesman ... looking at group of signs ... Many little salesmen going in.	But, competition is growing, too. As the sellers market becomes a buyers market ... more manufacturers enter the field, and ar

[fol. 5507]

FULLER & SMITH & ROSS INC.
CLEVELAND NEW YORK CHICAGO

FILM • TELEVISION

SCRIPT FOR

NUMBER	ACTION	SOUND
9.	continued	sales efforts are stepped up ... (BELL)
10.	PHOTO or ART: Salesman looking seriously at camera ...	You have to sell more aggressively and, most important of all, you have to have the products and manufacturing support that helps you get your share of this business at a profit ... (BELL)
11.	ART: ALCOA offers you .. 1. Complete Line 2. Dependable Quality 3. Continuous Advertising	Alcoa gives you these 3 advantages ... a complete line of aluminum electrical conductor and accessories of dependable quality, backed by continuous advertising support. Let's see how these Alcoa advantages help you sell ... (BELL)
12.	PHOTO: Alcoa Electrical Catalog... TITLE: 1. Complete Line	First, Alcoa manufactures and stands behind a complete line of both aluminum electrical conductors and accessories ... including (BELL)
13.	PHOTO: CU: Samples of aluminum and ACSR cable ...	ACSR and all-aluminum wire and cable in a complete range of sizes and types ... (BELL)
14.	PHOTO: CU: Samples of Covered wire and triplex ...	Covered wire and service drop ... (BELL)

[fol. 5308]

FULLER & SMITH & ROSS INC.
CLEVELAND NEW YORK CHICAGO

FILM • TELEVISION

SCRIPT for

NUMBER	ACTION	SOUND
15.	PHOTO: Group of accessory items...	Accessories for all conductors ... (BELL)
16.	PHOTO: Group of bus conductors...	Aluminum bus bar ... (BELL)
17.	PHOTO: Group of conduit	And corrosion-resistant Alcoa Aluminum Rigid conduit ... (BELL)
18.	PHOTO: Order pad on desk ... TITLE: Sell Complete Job ...	This means that when you sell Alcoa you have a better opportunity to sell the complete job ... (BELL)
19.	PHOTO: Repeat 16 ... ADD TITLE: Extra Sales & Profits	To make extra sales and increase your profits ... (BELL)
20.	PHOTO: Shot of completed line ... ADD TITLE: One responsibility	And there is one responsibility for quality, shipping and delivery, and for the performance of the finished line ... (BELL)
21.	ADD TITLE: Backed by Alcoa Headquarters & Field Engineering Staff.	Alcoa stands behind you with a complete headquarters and field engineering staff to assist with your customers problems. (BELL)
22.	ART: Alcoa 2. Dependable Quality	Every product in the Alcoa line gives your customers Dependable quality ...

FULLER & SMITH & ROSS INC.
CLEVELAND NEW YORK CHICAGO

FILM • TELEVISION

SCRIPT for

NUMBER	ACTION	SOUND
22.	continued	quality based on Alcoa's outstanding research, development, testing and production facilities (BELL)
23.	PHOTO: Group of ACSR samples ...	For example, let's look at aluminum conductor ... By one standard, the ASTM specs, aluminum conductors may look the same ... But, by other standards ... (BELL)
24.	PHOTO: Same as 21 ... cross out all but one labeled ALCOA ...	The electric light and power industry's own, Alcoa Aluminum Conductor is a preferred product. Here are the plus factors you give your customers when you sell Alcoa Aluminum Conductor ... (BELL)
25.	ART: Montage of photos of testing of ACSR ...	Every run tested throughout every production phase for metallurgical, mechanical, and electrical uniformity ... (BELL)
26.	PHOTO: Reel of cable coming off strander ...	Consistently uniform manufacture and tight stranding ... (BELL)
27.	PHOTO: Group of different sizes of cable ... including covered wire and triplex ...	Cable for every service requirement, including designs for special applications. (BELL)

[fol. 5510]

FULLER & SMITH & ROSS INC.
CLEVELAND
NEW YORK
CHICAGO

2326

FILM • TELEVISION

SCRIPT FOR

NUMBER	ACTION	SOUND
28.	PHOTO: Group of accessories TITLE: ALCOA Accessories	Alcoa engineers developed the basic designs for most of the accessories needed for aluminum conductors ... (BELL)
29.	PHOTO: CU Hand installing dead-end on conductor ...	For example, Alcoa developed and patented the design of this "anubbing type" dead end. Made of high strength, heat-treated aluminum alloy, it saves the time and trouble of wrapping the conductor with armor wire ... (BELL)
30.	PHOTO: Dead end on pole ...	This design develops 95% of the cable strength and prevents slippage of the steel core on ACSR. It also reduces vibration fatigue failure at the mouth of the clasp. (BELL)
31.	PHOTO: Loop-type dead end on pole ...	Alcoa engineers also developed these high efficiency clamps for loop type dead-ends... (BELL)
32.	PHOTO: Group of compression fittings.	Compression fittings for dead-ends, joints, and other applications were originally developed by Alcoa ... (BELL)

7

FULLER & SMITH & ROSS INC.
CLEVELAND NEW YORK CHICAGO

FILM • TELEVISION

SCRIPT

NUMBER	ACTION	SOUND
33.	PHOTO: Armor rods being installed on cable ...	And, armor rods, both straight and tapered, were the result of Alcoa's continuing research on the problems of vibration fatigue. (BELL)
34.	PHOTO: Montage of research lab photos:	Alcoa Research is constantly testing and trying new ideas to improve Alcoa accessory performance and manufacture. For example ... (BELL)
35.	PHOTO: CU: Hand holding parallel groove clamp ...	This is an Alcoa parallel groove clamp. One major problem with this type of connector is contact resistance ... (BELL)
36.	PHOTO: Test set-up for clamps in lab.	As a result of extensive tests made by Alcoa's Electrical Conductor Research Laboratory the aluminum grooves of these clamps receive a special treatment in manufacturing ... (BELL)
37.	PHOTO: CU: Clamp connection. Overlay Title: Contact Resistance Reduced 82% ...	Tests indicate that because of this treatment plus a factory dip in KO-OX-ID, the customer receives this Alcoa clamp with an 82% reduction in contact resistance. (BELL)

[fol. 5512]

FULLER & SMITH & ROSS INC.
CLEVELAND
NEW YORK
CHICAGO

FILM & TELEVISION

SCRIPT FOR

NUMBER	ACTION	SOUND
38.	PHOTO: Group of Parallel Groove Clamps of all types ...	This is only one plus factor you give your customer with Alcoa Parallel Groove Clamps ... Their proved design and quality manufacture assure customer satisfaction and longer service. (BELL)
39.	PHOTO: Montage ... Accessory Mfg. ...	And, Alcoa research to improve performance is continuously in operation guiding the design and production of Alcoa conductor accessories to assure you of dependable quality and extra selling advantages ... (BELL)
40.	PHOTO: Group of covered wire and triplex ... TITLE: Alcoa Covered Wire and Cable ...	Alcoa developed and produced the first covered aluminum conductor over 30 years ago. Some of this conductor is still in service. The same high standards of quality are maintained today in the manufacture of Alcoa covered wire and cable. (BELL)
41.	PHOTO: Copy of test report ... Sample of triplex ...	For example, every length of Alcoa self-supporting secondary distribution and service drops ... must successfully withstand an AC test voltage of 1500 volts.

FULLER & SMITH & ROSS INC.
CLEVELAND NEW YORK CHICAGO

FILM • TELEVISION

SCRIPT FOR

NUMBER	ACTION	SOUND
41.	continued	Certified test reports are available. (BELL)
42.	REPEAT FRAME 22.	You can easily see how the dependable quality of all Alcoa electrical conductor and accessories can help you make more sales ... (BELL)
43.	ART: ALCOA 3. Advertising	Another important point is ... Alcoa's continuous advertising arriving before you and paving the way for more sales ... Alcoa is a well known name to your customers ... and, that's only one way Alcoa advertising works ... (BELL)
44.	PHOTO: Group of ads ... Electrical ads in foreground...	Alcoa uses many kinds of advertising ... for many purposes ... Each kind is carefully planned toward specific objectives ... for example ... (BELL)
45.	PHOTO: National magazine covers and TV set.	Take general advertising ... the kind that appears in national magazines and on television ... (BELL)

[fol. 5314]

FULLER & SMITH & ROSS INC.
CLEVELAND NEW YORK CHICAGO

2330

FILM • TELEVISION

SCRIPT FOR

NUMBER	ACTION	SOUND
46.	TITLE: PURPOSE: ADVANCE THE CAUSE OF ALUMINUM MAINTAIN ALCOA'S LEADERSHIP	Its purpose is to advance the cause of aluminum against other materials, and to maintain Alcoa's position of leadership in the industry ... (BELL)
47.	PHOTO: Group of Industrial Magazine covers (electrical field)	Then consider Alcoa's extensive trade advertising ... (BELL)
48.	TITLE: PURPOSE: ACQUAINT PROSPECTS WITH ALCOA PRODUCTS, ADVANTAGES, AND TECHNIQUES.	Its purpose is to acquaint your prospects and customers with Alcoa electrical products ... their advantages and the techniques for using them ... (BELL)
49.	PHOTO: Sales follow-up sheet ... and ad schedule sheet.	And advertising, like selling must be continuous ... it must make calls again and again ... or lose its effectiveness ... (BELL)
50.	PHOTO: Group of magazines. TV set ... Electrical ads in foreground.	Therefore, Alcoa Electrical Conductors and Accessories appear regularly in the general advertising program of Alcoa. (BELL)
51.	PHOTO: Sample ad over Trade Magazine covers (Utility Campaign)	And, Alcoa advertises to your Utility and Rural Electrification customers through ads like these. (BELL)

[fol. 5515]

2331

FULLER & SMITH & ROSS INC.
CLEVELAND NEW YORK CHICAGO

FILM - TELEVISION

SCRIPT FOR

NUMBER	ACTION	SOUND
52.	PHOTO: Sample Al. Bar Ad, over Magazine Covers ...	Alcoa Aluminum Bus Bar is advertised with a regular campaign in these publications read by industrial firms, contractors and engineers... (BELL)
53.	PHOTO: Direct Mail Pieces on electrical products.	To localize and tie all Alcoa advertising to you ... direct mail pieces, like these with your imprint, are supplied for mailing to your customers and prospects. (BELL)
A.	PHOTO: Product Literature on electrical products.	Alcoa also supplies many kinds of useful product and technical information literature for your customers .... (BELL)
B.	PHOTO: Motion Picture Cans and Films ...	... And Alcoa motion pictures such as "On the Money" and "Electric Wiring with Aluminum" help your customers make better use of Alcoa Aluminum Conductor and Accessories ... (BELL)
C.	ART: Repeat Frame 43.	The biggest advertising program in aluminum history is working for you every day for extra sales and profits. (BELL)

FULLER & SMITH & ROSS INC.
CLEVELAND · NEW YORK · CHICAGO

FILM • TELEVISION

SCRIPT FOR

NUMBER	ACTION	SOUND
57.	ART: Repeat Frame 9.	These are the selling advantages you have with Alcoa ... a complete line of aluminum electrical conductor and accessories, of dependable quality ... backed by a powerful continuous advertising program. (BELL)
58.	ART: ALCOA ... First In Aluminum	You have these advantages because ALCOA is first in aluminum. (BELL)
59.	ART: ALCOA ... First in Aluminum Conductor and Accessories	And, Alcoa is first in Aluminum Conductor and Accessories. (BELL)
60.	PHOTO: Salesman looking at graph of expanding markets ...	You can use Alcoa experience to help you make more sales and extra profits in this growing market for Aluminum conductor and accessories ... (BELL)
61.	PHOTO: Group of electrical products ...	So, take this opportunity to increase your sales and profits ... push your complete line of Alcoa products ... recommend and sell them to your customers ... then you will profit by experience ... (BELL)
62.	ART: END TITLE:	MUSIC UP AND HOLD TO END.

[fol. 5517] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 236

Rome Cable Corporation

1955 Sales Conference

"Copper or Aluminum"—G. E. Rolston

We will mail to you shortly a copy of Aluminum Magnet Wire Price Sheets. I wish to call to your attention the new case price of 60.01¢ per pound. The quantity discount from base is based on 5,000 pounds, compared to 15,000 pounds for copper and is 2½ cents per pound as compared ¾ cents per pound for copper. The adders have been multiplied by a factor of 3.3 times the adder for copper magnet wire. This pricing structure is based on the theory that we should receive the same dollars per thousand feet, (no pounds) for covering any given metal. In other words, it costs us the same amount of money disregarding scrap, which is negligible, to cover 1000 feet of a given size of aluminum as it does to cover the same size copper conductor. Machine speeds are the same, the amount of covering is the same and for all practical purposes all cost factors, such as labor, expense and overhead are identical for performing our work on a per-thousand foot basis.

This brings up the subject of pricing insulated cables having aluminum conductor with any type of insulation and covering. Here, also, we maintain that we should receive the same dollars for performing our services for covering aluminum as we do for covering copper. Taking into consideration the slightly lower cost in freight because of the reduced weight, we have factors that we use and, without going into exact details, to price a piece of aluminum cable, we use the following method. For example, to price a quantity of #4/0—600 volt RR cable—first we subtract from the selling price the price of the #4/0 copper conductor. The remainder is the dollars we receive for covering the conductor with 5/64" RoMarine insulation and 4/64" NeoPrene sheath. We believe we should be paid the same dollars and cents per thousand feet to cover #4/0 Alu-

minum, so we merely add the selling price per thousand feet for the insulated and jacketed aluminum cable.

Unfortunately, there is some indication that other manufacturers in the industry either do not agree with this formula or are not cognizant of the effect it will have on a profit and loss statement. There is a price sheet in the industry today that lists #4/0 Type RR cable—aluminum conductor at a selling price cheaper than the selling price for #4/0 RR cable copper conductor less the #4/0 copper conductor. In other words, some manufacturer is apparently willing to cover #4/0 copper for a given figure and #4/0 aluminum for a much lesser figure. This simply does not make sense economically, and if there is a great swing to aluminum conductor and this pricing policy was followed, there simply wouldn't be enough dollars at the end of the year to meet all our expenses.

With this 43 cent plus copper market that we now have, you will find when you return from this meeting a greatly increased interest in aluminum wire and cable of all types. U. S. Rubber is still promoting RH-RW and TW Aluminum Building Wire, including the branch circuit sizes. We, as a company, have not promoted Aluminum Building Wire and have not announced that we are in the Aluminum Building Wire business. If, and when we do, however, we would prefer to manufacture size #2 and larger—however, we may be forced to go to #6, but in no event will we manufacture aluminum building wire in the branch circuit sizes —#8, #10, #12 and #14.

[fol. 5518] We feel that the end user should be experienced in the use of and handling of aluminum building wire and that this is not the case with some of the people that are working with branch circuit wiring. Generally, an electrician using #2 and larger will be a qualified, competent electrician, trained in the use of aluminum conductor and the chances of getting into trouble are, of course, less. For example, Alcoa, who have had as much experience in the aluminum building wire field as anyone in the country, have experienced difficulties in the branch circuit sizes with respect to connectors, and so on.

We realize that you are being asked what our thoughts are as far as aluminum conductor is concerned. The only information that we will give to a customer will be of a

very basic and fundamental nature, and it will have to be up to your customer to make the decision as to whether or not he wants to use aluminum in the place of copper. There are certain problems of installation and connectors and things of that nature that will have to be solved.

In summary, Mr. Rolston stressed that, if the swing to aluminum conductor increases to any great extent within the next three to five months, we will have a difficult time in securing enough metal to keep up with orders. In view of this, he asked that any inquiries for large amounts of aluminum for delivery within the next three to five months to be referred to Rome before acceptance.

[fol. 5519] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 242

Rome Cable Corporation

1958 Sales Conference

C. H. Ellis—Production Highlights . . . and Lowlights

What I would like to do is brief you as well as I can on the happening since you were here last because I feel there has been a lot of progress. I feel that this down-turn that we had, some of the changes in our labor relations, and the attack on costs may have been one of the finer things that could happen to us. You know it is difficult to make changes when you are loading all of your equipment and your manpower. When you have enough time to breathe and select and do some of the things that Jack brought out from the "Wall Street Journal", you find that you can get ambitions to do a lot more than you possibly thought before. Basically we would like to discuss the area that you occupy here.

We told you last year that when the Engineering building was completed, the Lab went into their Gold Coast, that we were going to try to assemble our operations from 3 blocks into 1 where we could make decisions with the flexibility that was required. We found that being so far

apart we couldn't actually get first things first on a day to day basis and that's what you will have to do in these times. We realize it. Ross has preached that we must be flexible and I know this sales group is finding that out just as much as we are. I want to assure you that we have tried to help.

Now basically in this building now, we have our top operations group right in the center, we have our industrial engineering and our mechanical engineering on this top floor on either side of us and downstairs we have the production programming, the personnel department, and we have the technical supervision section along with the production supervision. It only takes a moment to assemble the heads of all of those departments and make decisions and it is certainly working out excellently. Now in doing this lay-out, we made some analysis which runs into the cafeteria section and in the cost saving requirements, we found that that was quite a heavy cost. Actually, our estimates at the present time in physical cash lay-out runs between 35 and 50 thousand dollars a year saving and in man power saving assuming only 10 minutes per man and that is a very small amount of time to estimate that we had lost per man under our old system, it runs to another 50 to 70 thousand dollars a year. It just happens to be one of the things as Jack mentioned, about transportation costs. One of the things that he spoke of in our new scrap handling set-up. It is surprising how you can have high cost operations that are amenable to analysis and elimination. In our personnel, the changes have been minor in content and major in application. Lee White came from the Lab and took over the technical supervision. He has eight men under him which includes a plant chemical control lab and raw material control and a compound mixing lab. Those were originally a part of laboratory control. In addition he has his trouble shooters and is getting them trained, and himself trained, to cover the whole plant effectively.

In our relationship with the laboratory and the engineering department, we are coming to an excellent understanding of the responsibilities of each and I believe it is showing results. As Mike Popchik and Sid Mills said, I think that we are getting good, and we will get much better application of the needs for new products, the lab developement in getting into the swing of plant operation which will

certainly give you people a better service and a better product. We have had a lot of new products in the last eight months. I will discuss some of them a little later when we get into departments. Austin Woolley, who had the technical supervision, is now assistant to Bill Jones. Bill is retiring the first of the year, and Frank will have a man, [fol. 5520] over in that very important rubber covered and plastic section, that has a good, broad, technical background and also a good production and personnel background. It is part of the plans that were laid out several years ago. We have moved some other people from the technical supervision sections into operations and in this way, we feel that we are going to improve our personnel. As some of us are getting a little older, we are very, very cognizant of the fact that we want to leave the plant in good strong new hands. I look down this particular sales group; I see a great many that are my contemporaries; I see the younger group and I even see the second younger group coming in and those are the boys both in sales and production that we are all going to rely on.

Now for equipment development plans, we take our first basic fundamentals of the rod mill. The rod mill is not a large department. It has varied since we started from 23 to 30 men depending upon the increased production that was developed and we have added new equipment. We have added a coil tier that is new. There are only about two or three of them in existence and we still have bugs to work out; but, it saves us a great many man hours. A year ago it took 27 men to operate the mill. As of this moment, we are operating with 20, and a saving of 7 men in the rod mill is a lot of money. That is a high paying place. Probably 6 or 7 thousand dollars a year, depending upon the overtime. We do have problems as far as meeting all of the technical requirements. Some of it is inherent with the type of operation. It is one of the problems that Rudy has; to see if there is a better way to get a copper rod from a wire bar. We have had some experience in aluminum and continuous casting, and we can see a lot of advantages. The problem of ends on rods as they are fed into these rolls is difficult. There were many improvements and savings there.

In the bare wire, the most notable change was the divorc-

ing of the die shop from the bare wire operation and putting a supervisor, a trained and well adapted man, to head up the die shop and we are now making our own diamond dies and establishing much better standards for all of our dies. We were fortunate in getting Billy Roux, who ran his own die business, his whole family has a background of dies from the old Rome Wire Company, and it is a notable improvement in our ability to get economies and better quality. Also in that department of bare wire, we are replacing our small stranders. That may not mean so much to you, but it does to us because of the increase in instrumentation cable business and the added requirements for the small strands that has developed. We have additional units and more that will be ordered. We have also, at long last, approached a large package of fine wire overcoming the technical problems of payoff. It is our feeling that that is definitely accomplished and we will be into the large package of fine wire in a very short time. We are in our own operations, and it is now just a matter of getting spools to supply our customers. We are now talking about 40 and 50 lb. packages of #30 and finer.

The aluminum department—we have our ups and downs due to the aluminum business in general, but as far as operation is concerned, it has been quite satisfactory. From our Properzi process, with a notable improvement, we are able to produce for our own use and supply, when we have need for it, a 4,000 lb. package of aluminum rod. That's equivalent to roughly, 12,000 lbs. of copper and that is a heck of a lot of volume. This is a very economical way for your customers to handle aluminum rod as we have certainly found out. We are in a position to supply this package, and would recommend consideration of it by any of [fol. 5521] your potential customers—at least on an experimental basis. We can see no reason why it should not ship well. We have also developed the payoff rack to handle these 4000 lb. coils, which could be supplied to your customers at a reasonable cost.

We would now like to take up the Rubber Covered and Plastic Department. When you visit this department you will see the large 44" cabler which will be ready to operate within a few days, handling high number multiple conductor instrumentation, telephone, and certain con-

trol cables. This unit is supported by 30" cablers which are the base assembly for 4, 5 or more conductors which we finally assemble in the large cabler. There are two of these that are replacing four old vertical cablers, which happen to be one of the types of equipment that I think caused us more trouble in our development of instrumentation cable than any other piece of equipment we have. They were darn fine units to make SJ cord, but they were lousy units to handle the size 18-22 conductor with about a 10 mil wall. They could wreck more than we could really handle. These are out of the picture. We have acquired additional 24" Edmonds twisters to make the pairing. We have put in strand pre-heaters in the plastic machines which is a technical requirement long recommended by the laboratory.

Then we come to our mixing department. I had some very nice compliments from some of the boys that I didn't really feel might have the appreciation for what we are doing in that department. This matter of cold feed has been just about one year longer in coming to a head than we had anticipated. I have always said we were optimists, I have always said we try to get 90% correct, but I think in this one we were only about 50%, but we got it and under the guidance of the lab and Lee White and his technical group, we are making improvements in the mixing time. I think quality standards as of this date, are the best we have ever had and in addition, we have cut the cost $70,000 a year in mixing; and our bogey for the completion of the job is an additional $50,000 which I believe will be forthcoming when the completed job is done. Roller feeds on the CV's—they had man power elimination as the original desire, but quality has proven of equal importance. We have three in operation and they will be expanded to all units. When you get into such things as Butyl and some of the other different compounds we find that the old methods of feed do not work. The surface adhesion of the compounds are different and we do have lots of problems. Mechanical adaptations, such as roller feeds, can improve that. Equipment that we still have to install to complete this particular set-up are four new 1½" plastic extruders. You viewed the prototype in the laboratory. Again, that was a long development. I think probably, Rudy, Mac and I all believe it took a lot longer than it should have, but

we made a lot of improvements that we didn't think of when we first started. The basic idea is in reverse—slow down the production—sounds like a crazy thing, and get multiple units so that we can eliminate re-spooling, so that we can spool finished packages, so that we can provide an insulation that has a higher dielectric, because it isn't under stress at extrusion, so that we can handle very small conductors as you heard yesterday. We know we can handle size 26; and I am quite confident that we will get clear down to size 30 to meet our very tough competition that makes such special cables. We want to get into that business. We will have four of those in production in about a month or a month and a half. One of our other bottlenecks was spiral marking. Those are not the nicest operations in the world. They take a lot of technical control to produce a consistent stripe and you certainly do get into trouble with your customer if you don't have a consistent stripe, and, one that will remain on the wire under any conditions. It has been a bottleneck, so we are doubling our productive capacity. [fol. 5522] These should be ready, I believe, about the end of this month. We have made improvements on the regular tubers because there is more heavy insulation high voltage type that is required and have made improvements in our practices of extrusion by use of vacuum. We are quite sure we can lay on jackets that are extremely accurate concentrically; something that we hadn't really thought that we could do quite as well, up until a few months ago. Lee is actively developing that, for not only that type of cable, but possibly into insulations as well. We are expanding our diameter control equipment.

We are trying to automate within the flexibilities that we have to have for the very large number of items that we have to produce. I was one who applauded quietly when Glenn asked you to take 26 items off your list if you are going to have one more to it. It is surprising the loss of production that occurs with multiple set-ups, due to the number of items. We hope some time to see the statistics and the economics and get a relationship between the pieces of equipment you have and the number of items that have to be produced. I think you have heard, more accurately than I can give you, information about the flat and square enamel equipment. You saw it; its been a technical devel-

opment and I believe that we are just about ready to take over. We have had our problems. Fortunately, some of the problems on our base wire had plenty of lead time to resolve the new flat rolling equipment that we developed last year and which has stood us in such good stead for the Simplex type of very accurate flats. That information, development of edging molds, is quite helpful and also the cleaning of those flats is quite helpful in our development of enameled flats and squares. I think we can satisfy you when we get into operation for you.

Jack mentioned the copper scrap. That was a very funny thing. We had heard that at least one company had eliminated the baling and burning of scrap. Sometimes you can make as much money on your salvage as you can on your product and with the low prices that we have, salvage operations become quite a good savings item. We have another problem, of course; that is the area problem, as we had our scrap department right in our oldest building and in a long range view, we are always looking towards elimination of that old high cost maintenance building. You probably saw out in the mill those large containers that we have. Jack did a fine job in working out with our copper people the way in which we can handle it and we now just take these containers and send them right over to the car, dump them in, pile them, push them, separate them, and we do not have all that manual job of separating, burning, baling, assembling the loads; it's all out in one crack. We can keep our plant cleaner, we can give Jack a better turnover of scrap and we make very, very fine savings in the whole operation.

A little data on labor savings. We realize that we must have more efficient methods of operation and have made some notable improvements. We tried to assemble some way to graphically put it to you. In the first place, during the downturn in business from October 1957 to April 1958, we laid off 220 employees. October wasn't the high point in our employees of last year, but it was the beginning of the heavy downturn. We have put back approximately 170 of these. That has helped our labor relation problem exceedingly. But, as far as the number of employees, we tried to pick out during last year, a month that might be comparable with this year and analyze it, good or bad, as

to either our savings in labor or excess use of labor. We found that April 1957 had about the same productive out-[fol. 5523] put in the two main departments of the rubber covered and plastic as June of 1958. We used these two combinations to analyze. In the first place, the rubber covered and plastics as far as the manpower utilization for output, using 100% for April of 1957 went up to 112.3% for June of 1958. The general out-put was the same, but we do know that the complexity of the cables manufactured in June of this year was greater. In other words, we actually required more man hours per pound of copper and aluminum in this year than we did last year, but we still had a 12% improvement. In the number of people who are in these two departments, we had 319 for the same general out-put in April 1957, and only 257, or saving of 61 people in June of this year, of operation.

Now some of these changes that I have told you about equipment have been accountable for some developments of industrial engineering, namely a workload method of analysis, getting more work out of people. Elimination of cafeteria is some of it. But it does make a sizeable improvement. I am very happy that we had some of these improvements when we had the price situation or it would have been even worse. I don't mean that, by any means, we are finished. Jay has a cost reduction section integrated with two other sections and hypothetically we have a lot of places to still attack. Service departments dropped from 308 to 261 men for these same two months, or a saving of 47, about 100 less people in the two main operations. I will have to say that our efficiency in our magnet and weatherproof dropped about 15%, mainly due to reductions in orders, making it impossible to get efficient crews to give the service. Rod mill went up 3.7% in these months, but that 3.7 is actually much higher because there happened to be a month of June that we were working out the details of the coil tier. I would like to just refer back a moment to the plastic department and rubber covered. Instrumentation cable has been a beautiful opportunity to fill the mill, to get some activity, to get some experience, and I feel very strongly that with these new cable twisters, with the new plastic extruders, with the new spiral marking and one additional development that we still have to accomplish, is

high speed damage free shielding. We have a lot of improvements to make in that and when we complete that set-up we will have a good opportunity to be one of the first in that growing line of operation. Just one last thing; the relationship between the lab and engineering and the operations. Rudy outlined the theory last year and I concurred. We have had many meetings on it. I believe that when we complete the orientation between these two sections that we will have one of the fastest action product development and factory control organizations in the wire industry.

[fol. 5524] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 243

cc: D. H. Thayer—Rome
S. Johnston—Chicago
P. J. Lopushinsky—Rome
R. R. Davis—Kansas City

January 31, 1958.
Gesco—Des Moines

Dear Pete:

Attached is an application for a consignment of aluminum products at the General Electric Supply Company in Des Moines, Iowa. This consignment is requested because a certain amount of business has been promised to us through this wholesaler by the Iowa Power & Light Company.

This is the same utility that purchases our products through Interstate Electric Supply Company and per permission from Jack Woods the same prices will apply on the contract which I will receive until the first of July of this year. These prices are based upon the February 15th, 1957 sheet and the cost to the wholesaler is as follows—

Triplex—The maximum price less 15 and 7½ per cent.
Weatherproof—The maximum price less 15 and 5 per cent.
ACSR and Bare Aluminum—The maximum price less 5¢ a pound and 3 per cent commission.

Covered products are shipped only into the wholesaler's stock. Bare products are shipped only direct.

I have hopes and have been led to believe by the utility purchasing agent that although we are starting out in a small way this business should increase appreciably during the coming year. At the start we are going to stock only Triplex and the utility has suggested the following—

30,000 ft. "Carp"
2,000 ft. "Shad"
1,000 ft. "Barricuda"

He should purchase this much each month and in any case has guaranteed to purchase it every two months.

Since we have done previous work on this and I feel assured this consignment will be approved I have told the customer he may place his original order.

The wholesaler has also requested a consignment of our copper products but I have asked him for more data before I pass a request onto you. When this is received I will contact you.

Yours very truly, ——, ——.

RRD:bc
Enc.

[fol. 5525] cc: D. H. Thayer—Rome
P. J. Lopushinsky—Rome
S. Johnston—Chicago

January 31, 1958.

Mr. H. B. Heitzman,
General Electric Supply Company,
108 East Fourth Street,
Des Moines, Iowa

Subject: Iowa Power & Light Company

Dear Heitz:

This is to advise that my headquarters in Rome have advised that it will be satisfactory for you to place your first consignment order prior to the signing of consignment agreement. In other words, we feel that the agreement

is routine and so that we might get some of the business in February from the Power Company it might be well for you to place an order immediately.

In accordance with our conversation with Rex Jorgensen yesterday will you kindly make the original order out as follows—

30,000 ft. #4—3/Condr. Aluminum Triplex—code name "Carp" in 500 ft. paper wrapped coils
2,000 ft. #2—3/Condr. ditto—code name "Shad" on 1,000 ft. non-returnable reels
1,000 ft. #1/0—3/Condr. ditto—code name "Barricuda" on 1,000 ft. non-returnable reels

On the face of your order in large type please put "On Consignment". Please send your order to this address.

You will hear from us very soon concerning the signing of a formal consignment agreement.

Yours very truly, R. R. Davis.

RRD:bc

[fol. 5526] In United States District Court

Plaintiff's Exhibit 245

cc: E. C. West—Nashville

April 8, 1958.

C. J. McMurry—Atlanta
J. R. Woods—Rome
Townsend Hardware Co.
Jackson, Tennessee

Dear Mac:

With reference to your memo of April 4, I am sure you can understand when I say I am not particularly anxious to have the aluminum business you outlined at prices shown because of the profit squeeze on this product. However, if you feel that it would help your relationship with the jobber

to be competitive on orders of this nature, I would suggest that you go ahead and attempt to get the order on the basis of Southwire's prices.

Very truly yours, ——, ——.

JRW:reh

[fol. 5527] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 246

cc: A. D. R. Fraser
G. E. Rolston
D. H. Thayer
G. A. Brodock

April 24, 1958.

File
J. R. Woods

Aluminum Price Situation

The following is background on aluminum developments leading to our price authorization of April 22nd. Competitive reports and correspondence substantiating this information are attached to Mr. Rolston's copy.

On March 27th, Stan Williams advised that we had a telephone call from Mr. Granger of Aluminum Limited Sales, reducing pig by 2¢ a lb. Stan checked with Alcoa and Kaiser but could not get confirmation that they would follow.

Alcoa and Kaiser went to 24½¢ EC pig on April 1. Both announced that appropriate reduction in fabricated products would follow shortly.

We revised metal symbol on aluminum orders but made no move to revise prices except on "firm except metals" orders (Detroit Edison and Commonwealth Edison only).

We heard nothing of aluminum conductor price changes and feelers to Alcoa and Kaiser indicated an intent on their part not to adjust prices.

On 4/3, Kaiser advised that they were reducing ⅜" EC rod in standard coils to 28¢ a lb. This reduction made the adder over pig 3.5¢ a lb. as opposed to the previous 8.10¢ a lb.

We received conflicting reports on competition as follows:

4/8—New England advised that Kaiser had reduced list prices on covered conductor by 15%. Bare and ACSR by 3 to 5¢ a lb. This report was revised on 4/9 with the statement that no official list reduction had been made but Kaiser had authorized distributors to use 10% beyond sheet where necessary.

4/9—Atlanta reported that Kaiser had adviced Gesco—Johnston City price on any quantity of covered aluminum was best column less 15% either for drop shipment or shipments to stock.

4/9—Kansas City advised Kaiser reduced Central Illnois triplex contract price by 2¢ a lb. aluminum weight.

4/10 & 4/11—We tried to clarify above reports but could not get proof that the uniform price existed. Detroit solicited several Anaconda and Kaiser jobbers who had not heard of any competitive move on either company. Discussions with Alcoa and Kaiser confirmed that no official move had been made, however, Kaiser stated that they were meeting what they saw.

[fol. 5528] 4/14—Reports from St. Paul on a published opening for municipal on 80,000 ft. of Triplex showed Kaiser direct at list less 15, Reynolds and Southern through jobber at list less 15, Alcoa list less 10 and Anaconda at list less 8.

4/14—Report from Stew Johnston on discussion with Kaiser stated that they are not disturbing contracts with unspecified balances but they are quoting lower prices on new contracts. Could not determine if "new contracts" meant extending coverage beyond June, 1958.

As indicated above, prices have definitely broken but impossible at this time to determine exact level. It would appear that competition is being met as it is seen. We have no exposure to large Bare and ACSR jobs, but rumor is that prices are off 3 to 5¢ a lb.

Since April 1st, we have met a few prices on covered aluminum, but in no case have we offered firm prices beyond June, 1958. See competitive reports attached.

4/16—Kaiser advised two Tennessee jobbers to quote list less 15 on Triplex and Line Wire with normal distributor's discounts beyond. Bare and ACSR 3 to 5¢ a lb. off the sheet, all prices firmed for 120 days.
4/17—Gib Wolfe advised that Kaiser had quoted Aerofin on rods at 31¢ a lb. This compares with our price of 33.10¢ after correction for 2¢ drop in pig. He did not know if this price was based on standard coils or a large package. A.D.R.F. expressed interest in retaining this business. Without definitely committing ourselves to this low price, I discussed this with Gib Wolfe on 4/22 and encouraged him to investigate further with the customer. He will meet with them on 4/23. We furnished Gib with pictures of the 4,000 lb. coil package and asked him to get customer's reaction.
4/17—Bill Miller reports that Anaconda extended aluminum contracts with Eastern Shore through 1958.
4/18—Ted Stokke reports that aluminum contracts with Northern States Power have been extended through 1958.
4/19—Received positive evidence that Alcoa sold jobber for a utility, Neoprene Line Wire at list less 15 and 7½, per authorization of 2/28/58.

[fol. 5529] Based on the above, we made the move as outlined in my telegram of April 22nd. A cost study based on more popular items of Triplex and Line Wire indicates that current lists less 15% is just about our cost.

Very truly yours, ——, ——.

JRW:reh

[fol. 5530] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 248

October 15, 1958.

Mr. R. S. Keefer, President,
The Okonite Company
Passaic, N. J.

Dear Stu:

I can well understand the good and sufficient reason for not being able to discuss the very important news released yesterday.

Congratulations to both you and Al. for the excellent arrangement you have made for your share owners. I think congratulations are due to Kennecott for acquiring such a fine organization as you and Al. have working with you.

The ranks of good independent companies are rapidly diminishing.

Please convey to Al., and the others in your fine organization, our sincere congratulations on this important step for all of you.

Kindest regards.

Sincerely, ——, ——, President.

ADRF/m

[fol. 5531] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 249

N. M. Kehew, Pittsburgh

November 24, 1958.
(Dictated 11/21/58)

L. T. Guess
Pittsburgh Office
Mr. T. L. Gilbert
Fabricating Division
Massena Works

Re: Covered Conductor Forecast

I am attaching a copy of a forecast of covered conductor business for 1959 which I prepared with the assistance of Mr. Kehew. This forecast may be considered conservative since I followed the graphical trends of present business conditions. It is a well-known fact that in late 1957 and the major part of 1958 there were economic factors which upset covered conductor business as well as general business. Trade papers and magazines indicate that most economists predict expanded business conditions for 1959, although there are some who feel that there will be a leveling off of business, i.e., neither a peak nor a downward trend. The graph that I used would indicate business conditions somewhere between these two.

I would like to call your attention to the last tabulation which indicates a change from open line wire for service drop to triplex and also a change from open line wire to secondary cables. When changes are being made from open line wire to service drop, I would expect the normal percentage break between neoprene and polyethylene to apply. However, when changing from open line wire to secondary cables, I expect the majority of this to be neoprene since most power companies want to maintain service at all costs on their secondaries; and neoprene admittedly will stand higher temperatures before failure than polyethylene.

Another trend that may influence your selection of a [fol. 5532] twister is that of increased sizes of triplex both

for service drop and for secondary cables. I expect increased use for #2 and 1/0 for service drop and increased use of 4/0, 266,800 cm and possibly larger sizes for service cables.

I feel very strongly that cross-linked polyethylene will cut into both regular polyethylene and neoprene sales as soon as the patent situation is cleared up. Even after the patent situation is cleared up, there will be a little time lag in education of the general public; but since we are considering purchasing new equipment, I think we must take cross-linked polyethylene into consideration in our expansion plans.

L. T. Guess.

LTG:erm

cc Messrs. R. W. Knapp, Pittsburgh, J. L. Healy, Pittsburgh, N. M. Kehew, Pittsburgh.

[fol. 5533]

Covered Conductor Forecast

Peak—Fall—1959	800,000 Lbs.—Al.
Three-Month's Average During Peak	725,000 Lbs.
Mean Average at End of 1959	600,000 Lbs.

Polyethylene and Neoprene Requirements During Period

		Peak—800,000#	3-Mo. Av.—725,000#
Polyethylene	64%	510,000#	465,000#
Neoprene	36%	290,000#	260,000#

Line Wire and Secondary and Service Drop Cable Straight Line Projections

	Polyethylene		Neoprene	
	Peak	3-Mo. Average	Peak	3-Mo. Average
Line	200,000#	181,000#	92,000#	84,000#
Service Drop	310,000#	281,000#	198,000#	179,000#

Line Wire and Secondary and Service Drop Cable Expected Change-Over from Line Wire

	Polyethylene		Neoprene	
	Peak	3-Mo. Average	Peak	3-Mo. Average
Line	180,000#	163,000#	80,000#	73,000#
Service Drop	330,000#	299,000#	210,000#	190,000#

[fol. 5534] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 250

Internal Correspondence

Jan. 30, 1959.

From: F. L. Magee, Pittsburgh Office
To: Mr. P. T. Coffin, Pittsburgh Office
Re: Accurate Insulated Wire Corporation (Johnson Machinery Company—Newark, N. J.)

Attached is Mr. Joseph Leonard's letter of January 26th, which is self-explanatory. Mr. Leonard had previously phoned me as a result of his reading about our acquisition of the Rome Cable Corporation. He said his company had exclusive rights to the sale of the Accurate property and equipment for the production of insulated electrical conductors.

I inquired as to the reasons for this company being sold, and he said that it came out of a family squabble. As I get it, some of the older generation passed away and the younger generation could not get along. As a result, he said the plant had been shut down for six months.

I don't know whether the plant is for sale as is, or whether some of the equipment could be purchased separately. If we are interested, of course, Mr. Leonard seems to be the man to reach.

I am also sure that it will be obvious to you there could be some interest on the part of the Rome Cable Corporation, and if they do not already know about it, you might want to pass the information on to Ross Fraser for whatever it is worth to him.

F. L. Magee.

FLM:RAH
Cc—Mr. R. V. Davies, Mr. J. P. Haight.

[fol. 5535] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 251

Internal Correspondence

February 2, 1959.

From: Philip T. Coffin
Pittsburgh Office
To: Mr. T. O. English
Pittsburgh Office

Re: Accurate Insulated Wire Corporation (Johnson Machinery Co.—Newark, N. J.)

I attach to this letter Mr. Frank L. Magee's letter of January 30th to me, a letter dated January 26th, 1959 to Mr. Frank L. Magee from Mr. Joseph Leonard of Johnson Machinery Company, and a notice of sale of the equipment together with a brochure describing the equipment in the Accurate Insulated Wire Corporation at New Haven, Connecticut.

We had known for sometime that Accurate Insulated Wire Corporation was out of business, but we were not aware of the fact that the equipment was for sale.

I can see how there might be a very good possibility that after we acquire Rome Cable Corporation, certain of the equipment in Accurate Wire might be very useful in expanding certain of our operations or be useful for cannibalizing such equipment when and if we and Rome Cable appraise our joint manufacturing assets. I suggest, therefore, that the proper person in our Purchasing Department write Mr. Leonard a letter phrased in such a way as to not stir up the animals particularly, but to keep Johnson Machinery Company "on the hook" to some extent until after the Rome acquisition will have become a figurer complet, and after which time we can sit down with the Rome Cable people and look into the matter with a much more practiced eye than ours.

Perhaps you do not agree with this procedure. If not, of course, I shall be glad to discuss the matter with you, but

in any event the letter to Mr. Magee deserves a prompt answer.

Philip T. Coffin.

PTC:ags
CC: Mr. F. L. Magee, Mr. R. V. Davies, Mr. J. P. Haight.

[fol. 5536] For Sale

Complete rubber & plastics insulating wire plant: Ready to go, set up to manufacture all types of rubber & plastics wire. Underwriter Laboratories Approved products.

Machinery Consists of:

4½" Davis CV Unit with capstan & dual reel take-up, 3½" Royle CV unit with capstan & dual reel take-up 60" Rubber Mixing Mill, 60" rubber warm up mill, 4½" Hartig Strainer, 3¼" Hartig Electrically heated plastics extruder with capstan & dual reel take-up, 2 Entwistle labeling machines with spark testers, payoff stands and rereelers, laboratory test equipment, respooling and rereeling setups, 24 carrier Wardwell braiders, 16 carrier braiders, twiners, twisters, coilers, pay-off stands, spark testers, productometers, rubber cutters, grinders, maintenance machine shop, Ingersoll Rand air compressors, 75 HP steam generator. Buildings have approximately 50,000 sq. ft. of well maintained floor space, good labor market.

Can purchase with or without real estate.

Do you have or know of a small wire drawing or wire insulating plant for sale? We have a ready customer who desires a small operation?

We are always interested in buying individual machines for the wire industry.

Call Joseph Leonard.

Johnson Machinery Company, 683 Frelinghuysen Avenue, Newark, New Jersey, Bigelow 8-2500.

[fol. 5537] February 4, 1959.

T. O. English
Pittsburgh Office
Mr. P. T. Coffin
Pittsburgh Office

I am enclosing an extra copy of this letter in case you need it in connection with advising Ross Fraser as to the status of this situation from our standpoint.

T. O. English.

TOE:bw

[fol. 5538] In United States District Court

Plaintiff's Exhibit 253

April 30, 1959.

Mr. Dixon Lewis
Pittsburgh
Philip T. Coffin
Pittsburgh Office
Mr. L. P. Favorite

Pittsburgh Office

Re: J. R. Richards Company, Carnegie, Pennsylvania

Mr. Hack McCullough invited Ralph Davies and me to have lunch with him about two weeks ago, and it turned out that he was interested in two subjects. One was the proverbial request that we look into giving McCullough Electric an exclusive Alcoa distributorship for its electrical products. This, of course, was pushed off as in the past.

The second subject, however, was of an entirely different nature. Hack pointed out that J. R. Richards Company was a manufacturer of steel conduit boxes and associated fittings such as nipples, nuts and washers. It is a family owned affair and one which he felt could be purchased at a very reasonable price. He added that he was drawing it to our attention because he felt sure that Alcoa would be in the business of making aluminum boxes and associated

fittings and that the acquisition of J. R. Richards would be by far the best and quickest way for Alcoa to get into the business.

I have looked into the matter somewhat and find that J. R. Richards is indeed a closely held family affair. Mr. J. R. Richards, who Hack says is in his sixties and probably about ready to retire, is president. Mrs. J. R. Richards is secretary and Mr. J. R. Richards' brother, Harry Richards, is sales manager. A Mr. Charles Crouch is treasurer. The company was formed about ten to twelve years ago with capitalization of $150,000.00—1,500 shares at $100.00 each. The report I saw did not state whether all of the stock had been issued. In 1958 sales were about $1,000,000.00, and earnings are reported to be satisfactory since the company's [fol. 5539] inception. It has a net worth of about $250,000.00.

The company has its main plant in Carnegie—a rather neat operation that I drove by a few days ago—and another operation of some sort on the outskirts of Bridgeville which I have not yet seen. Hack has been after me several times to know what action Alcoa proposes to take and states that if we do not buy the company, it will either be sold to someone else or be dissolved.

Dixon Lewis and I are both seeking the best advice we can as to what recommendation should be made in regard to such an acquisition. The purpose of this letter, therefore, at the moment is purely informative, and I hope to have recommendations ready within a week or so.

I have discussed this matter briefly with Mr. Hickman. In his opinion if we were to make this acquisition it would not prejudice our acquisition of Rome Cable Corporation with the Department of Justice, both because the company is small and has virtually nothing in common with either Alcoa or Rome Cable Corporation.

PTC:gs

Philip T. Coffin.

CC: Mr. F. L. Magee, Mr. R. V. Davies, Mr. R. B. McKee, Mr. L. E. Hickman, Mr. Dixon Lewis

[fol. 5540] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 254

May 1, 1959.

Leon E. Hickman, Pittsburgh
Mr. F. L. Magee, Pittsburgh

Legal

A telephone call with Ross Frazer yesterday afternoon disposed of Narragansett Wire Company. He thinks very poorly of the company whether directing his thoughts to equipment, policies or personnel, and has the hope that somebody will buy them to clean up a mess. Obviously, that somebody should not be Alcoa.

Mr. Fraser confirmed his intention of being in Pittsburgh on Wednesday and Thursday, May 6 and 7, and expressed the hope that he might see each of those to whom a copy of this letter is being sent, in addition to his scheduled meeting with you.

I am having Herbert Bergson in Pittsburgh on Thursday morning and would like to preempt about an hour of Mr. Fraser's time in the middle or latter part of that forenoon.

Leon E. Hickman.

LEH:frl

cc: Mr. M. M. Anderson, Mr. R. B. McKee, Mr. A. P. Hall, Mr. N. R. Althauser, Mr. E. B. Wilber.

[fol. 5541] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 257

G. L. McCutchan,
Rome Cable

July 8, 1959.

C. L. Kessler
Metallurgical Dept.
Massena Fabricating Works
Mr. A. G. Church
Pittsburgh Office

Re: Copper-Coated Aluminum Wire

On June 23 Messrs. W. F. Lowry and John Havrila visited Massena for the purpose of discussing what we could do to provide samples of insulated bunched conductors for trials at the American Insulated Wire Corp., Division of Leviton Mfg. Co. During their visit they spotted some of the copper-clad EC wire fabricated by cold drawing copper tubing over EC rod.

Mr. Ben Leviton has been interested for some time in such a product for application in the missile field where reduction in weight is of considerable importance. Another requirement for this application is the ability to readily solder joints.

I suggested Mr. Lowry write to Messrs. Miller and Coffin and acquaint them with this potential application. A copy of Mr. Lowry's letter of July 1 to Mr. Miller is attached. Leviton would be interested in purchasing 5/16" dia. redraw rod for their wire drawing operations at American Insulated Wire Corp.

On July 1, I discussed the possibilities of making this product with Mr. George McCutchan, Director of Research, of the Rome Cable Corp. I suggested that we employ 4" dia. copper tubing filled with EC molten aluminum. The thickness of the copper cladding would be approximately 10% of the cross-sectional area. These copper clad EC billets could then be heated to approximately 950 Degs. F. and rolled into 5/16" dia. redraw rod on the Rome Mill. Mr. McCutchan indicated that the length would have to be

held to a maximum of about 40" to fit their furnace equipment which normally operates at 1750 Degs. F. He was [fol. 5542] dubious about their ability to roll such a combination at 950 Degs. F., but agreed to review the matter with the rest of their organization and let me know whether such a trial could be conducted at Rome.

Since copper seriously contaminates our rolling and drawing equipment, resulting in numerous embedded particles of copper in the subsequent aluminum production, it seems desirable to consider the fabrication of this item at Rome where copper is rolled and drawn on a routine basis.

Assuming Rome is agreeable to a trial of this product, Massena will be glad to procure the necessary copper tubing and fill it with molten EC. I will keep all concerned advised when I hear from Mr. McCutchan.

CLK:B C. L. Kessler.

cc: Messrs. David B. Miller, Pgh., P. T. Coffin, Pgh., E. C. Hartmann, ARL, New Kens., R. R. Cope, Pgh., G. L. McCutchan, Rome Cable, N. B. Lane, L. H. Arbegast, C. B. Travis, Jr.

[fol. 5543] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 258

To: All Salesmen
From: D. H. Thayer-Rome
Date: December 8, 1959
Subject: Aluminum Building Wire

You have received Distributors' net price lists on items of Aluminum Building Wire and published list price sheets are now ready for distribution to the trade. The issuance of these price lists signals our entry into the insulated aluminum conductor market *to the extent of the building wire types of construction.* Specifically this activity is to include, and currently be confined to the following types:

Type RHW—Braided
Type TW
Type SE, Style U
Type RHW—Neoprene, Style *RRD*

Kaiser and General Cable have published list prices in the hands of the trade and it is my belief that Anaconda will, also print sheets. Published Distributor's discount is 20 per cent. However, in meeting the present competitive practice applying to copper conductors you may quote Distributor's discounts of 20 and 5 per cent for outright purchase.

Branch Circuit Sizes

You will note that our published list prices for Types RHW—Braided, TW, and RHW—Neoprene, RRD cover sizes *6 Awg. and larger only.* This is by design. Our attitude toward branch circuit sizes 12 Awg., 10 Awg. and 8 Awg. will be one of sales resistance. It is not our intention to publish prices for this sizes. Stocks of these small sizes will not be maintained and we have no desire to solicit or accept orders for them. I believe it is generally acknowledged that no real economy results from the use of aluminum conductors in branch circuit sizes and that you will find our attitude in this respect in keeping with that of competition.

Maintenance of Stocks

It will not be our policy to consign insulated aluminum conductors in the Building Wire types referred to above.

A Rome factory stock of aluminum Type SE, Style U Service Entrance Cable has already been authorized. Similarly, stocks of Types RHW—Braided, TW and RHW—Neoprene, Style RRD will be authorized for regular maintenance at the factory.

We recognize the fact that stock availability at Stock Redistribution Points will be essential in the sale of aluminum Building Wires. However, we have no good criteria for the establishment of such stocks. Proper stock quantities and sizes will be indicated only by experience and will depend upon the extent to which copper conductor sales are [fol. 5544] converted to aluminum. Therefore it is asked that each Stock Redistribution location make the best possible analysis of its expected aluminum activity before entering stock requisitions on the factory. In placing stock requisitions we beseech your best judgment with regard to sizes and quantities ordered.

Based upon present Mill Condition, it probably will be some 7 or 8 weeks before stock becomes available here at the factory.

Our entrance into the aluminum Building Wire field implies, of course, the availability of promotional literature, technical assistance, conversion information, etc. These matters are now in the planning stage and will become a part of an aggressive building wire conversion program as time goes on. They will be developed and put into your hands as quickly as possible.

I should like to add that our activity and interest in the aluminum Building Wire field will be considerably influenced by the degree of stability (or lack of it) applying to present price levels. You are familiar with the reason for our past reluctance to participate in it.

Very truly yours, ——, ——.

DHT:reh

[fol. 5545] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 259

September 10, 1959.

H. J. Fahrney, Pittsburgh Office
Mr. F. W. Conrade, Atlanta Sales Office

Re: Southwire Corporation

In a recent conversation you asked if Alcoa can offer this company a hot metal contract for 1,500,000 pounds per month. At that time I indicated that I was quite sure that this would not be possible. I have since talked with several people in Pittsburgh and find that there are several reasons why a contract of this kind cannot be offered to Southwire. Will you please let us know their comments when you inform them that this cannot be done.

At the same time you also asked whether we can guarantee a maximum iron content of .12% in the 99.5 grade pig we are shipping to them. We have examined the analysis reports of recent shipments and find that we have actually

shipped them some metal with not over .12% iron, but in every case this was done to meet a delivery schedule requested by them. We cannot agree to a maximum iron content of .12% but Mr. Ferguson is making a further study of the grades of pig available to determine whether it is possible to guarantee a slightly higher average iron content, possibly between .15 and .20%. As you know, we now guarantee only that the maximum iron will not exceed.20%. We will let you know about this in a day or two.

H. J. Fahrney.

HJF/mht

cc: Messrs. L. P. Favorite, G. B. D. Peterson, R. T. Ferguson.

[fol. 5546] In United States District Court

Plaintiff's Exhibit 261

February 9, 1960.

Leon E. Hickman, Pittsburgh Office
Mr. A. R. Fraser,
Rome Cable Corporation, Rome
Mr. Samuel A. Rea,
Rea Magnet Wire Company, Inc., Fort Wayne

Legal

Re: Surprenant Mfg. Co., Clinton, Massachusetts

Will you please review the attached material and let me know whether either of you feels that Alcoa should be interested. We shall not give consideration to the matter here unless one or both of you strongly urges to do so. Even then, legal considerations may be a complete barrier.

LEH:jec

Leon E. Hickman.

[fol. 5547] IN UNITED STATES DISTRICT COURT

2363

PLAINTIFF'S EXHIBIT 263

REQUEST FOR AUTHORIZATION

204700

Pittsburgh Routing

1 ~~H. C. Gruber~~
2 ~~W. F. Sargent~~
3 ~~Leon E. Hickman~~
4
5
6
7
8 ~~N. R. Altheimer~~
9 E. A. Vaughn
10 ~~P. H. Isaacson~~

Date April 15 1960

Req. No. RCB-35

Auth. No. RC-3-1024

ROME CABLE CORPORATION — Name of Company

ROME, ~~NEW YORK~~ — Works

Request is hereby made for Authorization to make expenditures herein described:

Brief Description

Pittsburgh

~~INTERSTATE~~ CABLE ASSEMBLY EQUIPMENT

Estimate

Total Cost	$130,000
Less Materials on Hand	
Less Burden	
Estimated Cost	$130,000

Date — Works Manager

4/15/60 Date — President (of Subsidiary Co.)

Date — General Manager of the Division

Pittsburgh Office

Approval of this request is hereby recommended.

Date 4/20/60 Date
Date 4/20/60 Date
Date 4/20/60 Date
Date Date
Date Date
Date Date
Date Date
Date Date
Date Date
Date Date

Pittsburgh Office

Accounting Department

RECEIVED
APR 20 1960
N. R. A.

FINAL APPROVAL

Date 4/20/60 — Vice-Pres. A. C. of A.

PITTSBURGH OFFICE USE ONLY

When completed, the cost will be charged in approximate amounts as follows:

C.C.a. + Direct equipment

Date 4/22/60 (2)

[fol. 5548] READ CAREFULLY INSTRUCTIONS ON PAGE FOUR

Give the reasons for the expenditure, detailed description of the work to be done, and what will be accomplished thereby.

Answer questions on page four.

[fol. 5549]

RCR-35
4 15 60
Page 3

INTERSTATE CABLE ASSEMBLY EQUIPMENT

This equipment includes:

3 Planetary Cablers

Curing oven - walkin type

Striping tower

Lab type rubber mill

All molds

Deep freeze - cycling type at -40° C.

Assembly benches - all steel

Assembly fixtures - movable steel type

All tools - injection guns- soldering irons- hand tools

2 large payoff stands

Hot stamping equipment - 2 electrically controlled

Cable testing equipment

1 Autoclave

1 Jacketing gun - for blown-on jackets

2 Small spoolers

2 Hot presses - for molding

1 Injection press

All supplies on hand used in assembly business

All desks - drafting tables - calculators etc.

TOTAL: .$ 130,000

Note: The cost of dismantling moving and reinstallation has not been estimated. A Request for Authorisation covering these items will be submitted as soon as a reasonably accurate estimate or bid has been received.

[fol. 5550]

RCR-.[illegible]
(1-)[illegible]
P-[illegible]

INTERSTATE CABLE ASSEMBLY EQUIPMENT

This Request for Authorization covers the purchase of equipment for the assembly of missile type cables including striping of individual insulated conductors, cabling, jacketing of the cable and attaching mechanical and molded types of cable connectors.

This equipment is now owned by the Interstate Electronics Corporation, Anaheim, California. This company has decided to cease manufacture of these cable assemblies and has agreed to sell this equipment to us.

The acquisition of this equipment will make it possible for us to offer complete cable assemblies to the missile industry. As the manufacturer of these complete cable assemblies the users will have a reliable source of supply and a source which accepts total responsibility for these complex assemblies. The present normal arrangement is for the assembly companies to purchase the cable from a wire company, and purchase and attach the connectors. This arrangement presents a condition of divided responsibility as far as the users are concerned.

Trade sources indicate increasing interest in cable manufacturers getting an arrangement with cable assemblers. We also understand that there has been interest in acquiring their own assembly facility.

Increasing importance of the use of wire and cable for the missile industry has been a matter of interest to us for a number of years. We had another company called to our attention and carefully investigated the potential purchase, which of course could not be signed with the present suit hanging over us. Rome has been penalized in obtaining bulk orders. We have tried, and are trying, arrangements with two cable assemblers but the results have not been as satisfactory as we had hoped. The final establishment of a uniform specification on base construction of bulk cable further emphasizes importance of a producer-assembler connection. The purchase and use of this equipment should materially increase Rome Plant's production as a supplier of the

assembly plant. The equipment herein to be purchased was that of a company with whom we had contractual relations to apply connectors to bulk cable. Their decision to go out of this business was largely influenced by the standardization of specifications on bulk cable, which left them without a direct source of supply. In their going out of the cable assembly phase of their business it is possible for us to make purchase of their equipment and set it up as our own. Decision on this matter was arrived at after very careful exploration and discussion with both sales and technical people. Both Messrs. Bolston and Williamson made strong recommendations towards our doing something to fill in the gap in our ability to properly serve the missile industry. The equipment has been examined by Glenn Koger, Ross Fraser, Robert Bell, [illegible] U.S. Warren and we now have in our sales office in Los Angeles the man who formerly managed this operation.

It is anticipated that our monthly sales of these assemblies will approximate $150,000 and in addition our volume of individual insulated conductors manufactured in Rome will be increased accordingly. As this equipment lends itself to manufacture of prototype assemblies we will be in good position to obtain major orders for new construction as they are developed.

It is intended to lease approximately 20,000 sq. ft. of floor space in a building located near Los Angles warehouse for this operation if this Request is approved.

[fol. 5552] MEMORANDUM 2368

4/19/60

Mr. Fraser assures me that this assembly equipment is exactly what Rome needs to do an effective job in missile-type cables. The Interstate Electronics Corporation has closed down its cable division and its equipment is for sale. A detailed list will be given to Mr. Fraser later and he will make a bid on the basis of this general authorization. If you have any questions I suggest that you telephone Mr. Fraser at Rome and clear the matter promptly. I shall be out of the city for two weeks after this week and I am most anxious to have this Request for Authorization cleared before I leave if we are going to approve it. It seems to me that we have little choice but to follow Mr. Fraser's advice in an item of specialized equipment such as this.

LEON E. HICKMAN

[fol. 5553]

This Copy for

AUTHORIZATION

No. RC-34029

ALL PURCHASE ORDERS, INVOICES, SHOP ORDERS, AND PURCHASE REQUISITIONS MUST CARRY THIS NUMBER.

MR. P. H. LARSON

This AUTHORIZATION confirms REQUEST FOR AUTHORIZATION No. RCR-35

Dated April 15, 1960

ROME CABLE CORPORATION (Name of Company)

ROME (Works)

An expenditure in the amount of $ 130,000. as covered by REQUEST FOR AUTHORIZATION of the above number, has been duly approved.

Brief description of the project:

Purchase Cable Assembly Equipment.

I hereby certify that REQUEST FOR AUTHORIZATION bearing request number noted above has been duly approved and is on file in the Fixed Capital Division of the Accounting Department. This expenditure should be charged as follows:

CHARGE to Fixed Capital.

N. R. ALTHAUSER, Controller

Date April 22, 1960

By P. H. LARSON

Copies of this AUTHORIZATION have been issued to the President, Treasurer, Chief Engineer, Director of Purchases, Controller and Messrs. R. A. Hunt, I. W. Wilson, H. C. Erskine, L. E. Hickman, C. H. Ellis, L. B. Kuhns, L. Litchfield, Jr.

Vol. 55511

RC-34029
AUTHORIZATION NO.

Rome Cable Corporation
Rome
WORKS

Purchase Cable Assembly Equipment.
DESCRIPTION

RCR-35
REQUEST NO.

ATE
THORIZED 4/22/60 CHARGE: to Fixed Capital. (2)

F. I. NO.	DATE	AMOUNT	DESCRIPTION	ASSET NUMBERS
LA12 2	12-60	130,000.00	Equipment	

T CHARGED
FIXED CAPITAL

TOTAL 130,000. AMOUNT 130,000. DATE COMPLETED 12/

0282

[fol. 5555] READ CAREFULLY INSTRUCTIONS ON PAGE FOUR

Describe below the detailed estimated cost, showing separately the cost and kinds of materials, labor, expenses, etc., installation cost being shown as a separate item from equipment or structure. State in general terms the degree of accuracy of the estimate.

Date _____ Date _____

Date 4/25/60 L. D. Fiske, Jr. Engr. Date _____

Date 4/25/60 E. E. Quinn, Controller Date _____

Date _____ Date _____

Date _____ Date _____

Note:—The name and title of the person under whose immediate jurisdiction this request was prepared, must be signed above.

[fol. 5556] **INSTRUCTIONS CONCERNING REQUESTS FOR AUTHORIZATION**

(Revised as of 11-1-47)

1. All Requests for Authorization shall be made in triplicate, numbered consecutively by the Works issuing the Request, and be prefixed by the indicative letter assigned to that Works; two copies should be retained by the Works (one of which is for the Property Accountant and one sent to the General Manager in Pittsburgh having supervision of such Works, who will in turn route it to the proper people in Pittsburgh.

2. On Pages 2 and 4 of this form give an outline of the reason for the expenditure, a detailed description of the work to be done, and a summary of the objectives, as well as other information which may be requested in writing by the Accounting Department from time to time. A copy of explanatory drawings, sketches, photographs, and blue prints should be attached to and form a part of the request. On Page 3 should be shown the detailed estimate of cost for each unit of the work to be performed, broken down to show material, labor, and burden for each item in the estimate.

3. After the Request for Authorization has been duly approved, an Authorization will be issued from the Pittsburgh Office. All Authorizations will be numbered consecutively, regardless of Works submitting the Request, but the number will be prefixed by the indicative letter representing the Works which issued the Request. The Authorization will also carry, for cross reference, the Works number of the Request for Authorization.

4. If, after an Authorization is issued, changes appear to be necessary or desirable in the design, plan or scope of the work, all the facts and a new estimate in the form of a revised Request for Authorization should be prepared and submitted as outlined under (1) above.

5. If, at any time before a job is complete, it is apparent that it will require at least $2,000.00 more than was authorized, to complete the job, a revised Request for Authorization should be submitted promptly. However, no revised Request should be submitted during the calendar month in which a job can be reported complete.

6. Copies of Authorizations are regularly sent or routed to the President, Vice-President in Charge of Operations, Controller, Treasurer, Chief Engineer, Director of Purchases, General Manager of the Division, Works Manager, Works Office Manager, and Property Accountant. Designation of other individuals to receive copies of the Authorization should be made hereunder.

The following questions shall be answered:

1. Was this item included in the Authorization Budget? No Year _____ Item of Budget _____ Amount previously requested against this item _____ Amount remaining after this Request for Authorization _____

2. Estimated date work will be started? See Note . Completed See Note

3. State number of employees to be increased or decreased after this project is completed. Increase: 5 Salaried maximum 50 hourly.

4. Is any equipment or other facility being replaced? No If so, will it be sold, scrapped, or transferred? _____ What is its original cost? _____ Present Book Value? _____ If to be sold or traded in, what is estimated sales value? _____

5. Is any equipment being transferred from another plant? No What is the original cost? _____ Present Book Value _____

6. What disposition will be made of spare parts for equipment being retired? Not applicable.

7. Has any work been done or material requisitioned for this job? If so, explain why. No.

8. What is your expected rate of expenditures? Total expenditure in May 1960

Note: This Request covers acquisition costs only. A separate Request covering labor and materials for dismantling, moving and reinstallation will be submitted provided this Request for Authorization is approved.

[fol. 5557] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 264

March 1, 1960.

A.D.R. Fraser, Rome
Mr. R. McKee, Pittsburgh

Legal

As I told you last Friday on the telephone Lee Hickman before he left on vacation sent me the enclosed data sent to him by Ray Palmer, of the Boston office giving information regarding Suprenant Mfg. Co.

I received the data just as Lee was leaving and as I was about to leave for the Coast. We have known this Company for a number of years and hold them in high esteem. When I talked with Lee about it and I described the product to him he had considerable doubt as to the possibility of doing anything about it in view of the Justice Department's inquiry about Rome, Rea and Alcoa. We have carefully talked the matter over and reviewed their figures and while we recognize them as a "Tiffany" producer in their field, the location and duplication of equipment on many of the products from our present knowledge would indicate that our recommendation would be to turn it down.

If it is your decision that we should look further and visit the plant and do other things necessary to properly check all details we will, of course, be glad to do so.

Ross.

ADRF/m

cc: L. E. Hickman

Data returned to Bob McKee.

[fol. 5558] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 265

Internal Correspondence

April 13, 1960.

From: A.D.R. Fraser, Rome
To: Mr. L. E. Hickman, Pittsburgh

I am sorry that because of activities that you know about, that the Hitemp data was not returned earlier. I actually carried it to Pittsburgh last week, and had it with me at Ft. Wayne, but did not get a chance to talk about it. Certainly what has happened in the action of the Department of Justice in itself makes the decision quite definite that we cannot do very much about this at the present time. Chief Wilson has already had from Jack the opinion of our technical people and I have gone over it with him and I concur.

I have not returned the copy of the Eberstadt letter as I believe this was merely a photograph of the original letter to Frank Magee, but I will be glad to do this should you wish it.

A.D.R. Fraser.

ADRF/m
encls.

[fol. 5559] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 266

April 20, 1960.

Leon E. Hickman
Pittsburgh Office
Mr. Ray E. Palmer
Boston District Office

Legal

Re: Surprenant Manufacturing Co.

I note your letter to Mr. McKee under date of March 21st and had a chance to talk to Mr. Fraser yesterday concerning the captioned matter. If and when Messrs. Fraser or Williamson are in the vicinity of Boston, I am sure they would be glad to talk with Mr. Surprenant. However, the pending antitrust suit against the company for the purchase of the Rome assets makes it out of the question to consider any further corporate acquisitions, particularly in this field, as long as the antitrust action continues. Unfortunately, it is more likely to last several years than several months.

Leon E. Hickman.

LEH/jws

cc: Mr. R. B. McKee, Mr. A. D. Ross Fraser, Rome, Mr. R. L. Williamson, Rome.

[fol. 5560] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 267

August 22, 1960.

G. L. McCutchan
R. A. Schatzel

Re: SPT Cords With Aluminum Conductors

Purpose:

To develop SPT Cord with aluminum conductors and to study the possibilities of the use of aluminum for this application.

Discussion:

The use of aluminum for the conductors of flexible cords would provide an outlet for considerable quantities of aluminum if it could be proven satisfactory for this service. Alcoa has been working for quite some time with the American Insulating Company on the development of SPT Cord with aluminum conductors but the results have been somewhat less than satisfactory because of their inability to work closely enough with them to determine the problems involved in the manufacture of this product. The problem was, therefore, given to Rome Cable to determine if aluminum conductor SPT Cord could be economically produced and to investigate the possibilities of the use of aluminum for this application in comparison to the present U/L approved copper conductor SPT Cord.

Summary:

Samples of #16/2 and #18/2 conductor cord were produced. A preliminary study of costs indicates that a #16 aluminum conductor cord can be produced at a cost equal to or lower than the cost of a #18 copper conductor cord. The question was raised and tests were conducted which show that for this application, the aluminum equivalent may not need to be two AWG sizes larger than copper. If this is true, it would be a further cost advantage in favor of aluminum.

[fol. 5561] A comparison of the performance characteristics of aluminum conductor cord with copper conductor cord shows the aluminum to be relatively poor. The strength of the #16 conductor cord is approximately 75% that of the cord with #18 copper conductor and its flex life is roughly ⅓ that of copper. Underwriter's Laboratories have expressed themselves that for aluminum to be considered for this application, it should perform better than 50% as well as copper.

Procedure:

Sample Development

Wire Drawing—At the start of this investigation it was assumed that the .010" aluminum wire for stranding would be drawn at Rome. Several attempts were made to draw this on the old Rome fine wire drawing machines which had been set up for this purpose. After a considerable amount of work and investigation it was concluded that these machines were unsuitable due principally to slow drawing speed and excessive breakage. .010" EC H-19 wire became available from Massena and wire from this source was used for most of the samples produced. The cost data for drawing .010" wire at Rome, which is shown later in this report, is based on providing Vaughn Ring Blox fine wire drawing machines and assuming that one operator could operate five machines.

Stranding—The .010" wire was bunched before annealing to take advantage of the greater strength of the hard drawn wire. Stranded conductor for the original samples was produced on a New England Butt buncher. After the Cook buncher from Massena became available, all strand was bunched on this machine as it was considered much more suitable. To avoid excessive breakage of the individual wires, the bunching speed was reduced to 50% of [fol. 5562] that used for bunching copper strand. At this speed there were relatively few breaks, but as the machine is not equipped with automatic stops, whenever a break did occur there was a loose end in the strand.

Annealing—The stranded conductor was annealed to ¼ hard temper.

Retipping—The aluminum strand was not retipped before insulating as is the practice with copper strand. Previous experience had shown that bunched aluminum strand is easily damaged by respooling, resulting in broken wires which cause "bird nesting" and conductor breaks at the insulator. Additional study of this problem is necessary.

Insulating—Samples of #16/2 and #18/2 were produced without separator and with paper fold separator. Lengths ranged from 1000 Ft. to 2500 Ft., it being impossible to obtain longer lengths because of "bird nesting" and conductor breaks caused by the loose ends of broken wires in the strand. The samples with paper fold separator were run, for two reasons. It was thought that the use of a separator might solve the conductor breakage problem, but this did not prove to be true. It was also desired to obtain performance test data on the finished cord both with and without separator.

Samples and Preliminary Cost Data

Sample	Size	Strand	Insulated	Cost/M'
1	#18	16/.010" *	.126" x .227"	$ 7.38
2	#18	16/.010" **	.126" x .227"	6.72
3	#16	26/.010" *	.148" x .257"	10.18
4	#16	26/.010" **	.148" x .257"	9.09
5	#16	26/.010" paper fold *	.151" x .263"	10.42
6	#16	26/.010" paper fold **	.151" x .263"	9.31
7	#18	42/34 bare copper	.126" x .227"	9.36

* .010" EC H–19 purchased from Massena.
** 3/8" rod purchased from Massena and drawn to .010" at Rome.

[fol. 5563] Tests:

Overall Strength Test—Samples of the finished cord were broken on the Scott rubber tensile testing machine. The results are the average of three tests.

Flexing Test—Samples were flexed on the Bureau of Mines Flex Testing Machine through an arc of 180° under tension of a six-pound weight. Results are the average of three tests.

Twisting Test—Samples were subjected to a twist test using the U/L twist testing machine for heater cords. Results are the average of three tests.

Results:

Sample	Lbs. Break	Flexing Test Cycles to Failure	Twisting Test Cycles to Failure
#16 26/.010 SPT-1 Al. Condr.	67.5	55	24
#16 26/.010 SPT-1 Al. Condr. with paper sep.	68.0	74	33
#18 16/30 SPT-1 Al. Condr.	39.0	43	16
#18 42/34 SPT-1 Copper Condr.	90.0	369	99
#18 16/30 SPT-1 Copper Condr.	88.0	220	65

The use of aluminum conductor in flexible cords was discussed with the Underwriter's Laboratories to obtain information regarding tests and test requirements that would be involved to obtain U/L approval. They seemed convinced that EC grade aluminum would not be suitable for this service. The proposed test program which was developed previously for American Insulated and Alcoa and which would be followed if we were to submit was reviewed.

a. Breaking strength would be compared with copper. The tensile would be made on uninsulated strand.

[fol. 5564] b. A complete study of the soldering techniques would have to be made in view of the fact that aluminum is reportedly much more difficult to properly solder than copper. In addition there would be a test on the flexibility of the soldered joint.

c. A current flow test through soldered joints would be made which would be for roughly 60 days with a predetermined amount of current flowing. Following the current test the tensile strength of the joint would be made.

d. A thorough study of the compatibility of insulating materials with the various soldering fluxes that might be used would have to be made.

e. Various flexibility tests in comparison with #18 AWG copper would be made. These tests conceivably could range from a simple twist with pliers to the more complex cable flexing machines that we have. A lateral loop test would be involved here also, which is simply measuring the number of cycles taken to break the conductor when two points of the conductor are held a distance of 12 inches apart and these points brought together and separated. This again would be compared with copper.

f. The effects of corrosion on aluminum conductors under various atmospheres would be investigated.

g. The impact test would be made as well as the standard crushing test.

In all the above tests they did feel it reasonable to expect that aluminum would do at least half as well as the results on copper. Up to this point their limited investigation indicates that aluminum is roughly about ⅓ that of copper with regard to flexibility. Out test results confirm this also.

[fol. 5565] Conclusions:

1. Samples of aluminum conductor SPT-1 cord have been produced with a limited amount of success. It is believed that considerable improvement can be made but that EC grade aluminum will always be a problem from the standpoint of conductor breakage at the insulator. Breakage is no problem with copper conductor.

2. Performance tests show aluminum conductor cord relatively poor in comparison to copper. Improvement in this respect will be necessary before consideration can be given to submitting to the Underwriters.

3. The preliminary cost data indicates that it would be possible to produce the aluminum conductor cord at equal or lower cost as compared to copper conductor. This, of course, would depend on how successful we might be in overcoming strand breakage as production loss from this cause is not reflected in the costs shown here.

G. L. McCutchan.

GLM:hh

[fol. 5566] To: G. L. McCutchan

Could we incorporate reinforced strand to meet U/L tests? Maybe one (or few) strand(s) of stainless or alumoweld would do the trick.

E.K.D.

[fol. 5567] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 268

ALCOA

First in Aluminum

Aluminum Company of America
1501 Alcoa Bldg., Pittsburgh 19, Pa.

News Release

For Further Information: Laurence S. Sewell, Jr.,
ATlantic 1-4545, Ext. 2861

For Release Friday, January 20, 1961,
Or Anytime Thereafter

East Los Angeles, Calif., January 20, 1961—Expansion to meet the growing and complex needs of the missile, rocket, and electronic instrumentation fields was announced today by the Rome Cable Division of Aluminum Company of America.

A. D. R. Fraser, Rome Cable president, said that the division has established new electrical cable production facilities, geared to these "markets of tomorrow," in a new plant here.

Called the Special Products Facility, the new production unit is now in operation. Its task, Mr. Fraser said, is custom fabrication of cables and cable assemblies, to customer specification, utilizing the full capabilities of Rome Cable.

Specialized equipment of the new unit permits a wide range of complex and highly specialized electrical cables and assemblies. Among its capabilities: single cables measuring up to four inches in diameter; cables consisting of as many as 330 separate conductors; incorporation of special connecting devices reliable under severe environmental conditions; and unusual configurations of cable, suitable for the rigid requirements of space craft and ground support equipment.

[fol. 5568] As a part of the Rome operation, the new plant offers particular advantages to its market. A coordinated

source of supply, it provides complete responsibility and quality control from raw material to finished product.

The new Special Products Facility is located in a new building in the east Los Angeles area, which also houses Rome's regional warehouse. The location places the plant close to Southern California's high concentration of aircraft, missile, and electronic industry centers.

Mr. Robert D. Golly has been assigned as general manager of the new facility.

[fol. 5569] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 269

Internal Correspondence

July 31, 1959.

From: R. W. Knapp
Pittsburgh Office
To: Mr. D. R. Little
Massena Works

Re: R/A M-2520—Neoprene Equipment R/A M-2523—Twister & Rewind Unit

Attached you will find the above captioned requests for authorization that you requested to be canceled in your letters of July 27 and July 28 to Mr. J. R. Pellegrino.

R. W. Knapp.

RWK:es

cc: Mr. J. R. Pellegrino—Massena Works, Mr. N. B. Lane—Massena Works.

[fol. 3570]

IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 270

Request for Quotation

INQUIRY NO. [illegible]

FROM: Boston DISTRICT DATE: November 7, 1960

TO: CENTRAL QUOTATION DEPT., ROME, N.Y. Req. #135052

INQUIRY FROM: Boston Edison Co. (Mr. A.W.Sullivan)

FOR SHIPMENT TO:

— THE FOLLOWING MATERIAL —

Please let us have a quotation - bid due on or before November 14 - on the following:

10,000 ft. Line Wire
#1/0 A.G - copper - neoprene covered (#1/0)
in accordance with Spec. 32.4-3.3
rev. December 3, 1958 @ - - - - -$163.00/M ft.

Please submit alternate quotation on Aluminum equivalent

November 10, 1960

On the aluminum equivalent quote #3/0 - 7 strand aluminum, 4/64" Neoprene, code word "Holly" at $98.50 M ft.

Policy 3 applies on the copper item. Policy 1 applies on aluminum item.

F.O.B.Destination
TERMS: ½ of 1% on copper
Net 30 days on aluminum
SHIPMENT: 5 weeks plus test report time if required.

R.A. Dunn:mab

TERMS Standard discount dates apply
☐ ½ of 1% ☐ 2% Other
Shipment if other than mill condition sheet
☐ F.O.B. Destination unless otherwise noted

Distributor Comm. if any
☐ Net ☐ 5% Other

☐ Competitive Report Requested

District Office Note That All Inquiries Must Contain All Necessary Data Including the Following Details Wherever They Are Applicable

1. Size and Stranding
2. Temper
3. Number of Conductors
4. Voltage, if other than 600
5. Type of Insulation
6. Type of Sheath, Jacket, or Covering
7. Finish
8. Lengths and or Pull-up Required
9. Any Special Specification, Requirement or Application
10. Delivery Desired

[fol. 5571]

Copy to Mr. W. Blake Duffy

November 14, 1960

Boston Edison Company
Purchasing Department
182 Tremont Street
Boston 12, Massachusetts

Attention - Mr. A. W. Sullivan
Purchasing Agent

Gentlemen:

REQUEST NO. 195052

In reply to your request of November 4, we wish to submit our quotation as follows:

60,000 ft.	#1/0 Copper Neoprene covered Line Wire in accordance with Spec. E2.4-3.3 rev. December 3, 1958	$163.00 M ft.
Alternate:		
60,000 ft.	#3/0 7 strand Aluminum, 4/64" Neoprene code word "HOLLY"	$ 98.50 M ft.

F.O.B. Destination
Shipment: 5 weeks - plus test report time, if required
Cash Discount: Copper Item - 1/2 of 1% 10 days - Net 30 days
Aluminum Item - Net 30 days

Copper Item: All shipments will be invoiced at the prices stated herein except for adjustment either upward or downward for the producers price of metal on date of shipment. These prices are based on copper at 30.00¢ per lb. Should shipment be deferred by the customer beyond 6 months after date of order acknowledgment shipments will then be invoiced at the Company's price in effect on date of shipment.

Aluminum Item: All shipments will be invoiced at the Company's price in effect on the date of shipment.

Reels will be billed extra. Full credit will be allowed on return of empty reels, if in good condition, within 12 months, to our factory at Rome, New York.

Very truly yours,

ALVA D. STEIN

ADS/nb

5571

[fol. 5572] IN UNITED STATES DISTRICT COURT

2385

PLAINTIFF'S EXHIBIT 271

Request for Quotation

INQUIRY NO. BO 2356

OM: Boston DISTRICT DATE: November 7, 1960

CENTRAL QUOTATION DEPT., ROME, N.Y. [illegible] CABLE PROTECTION Req. #134950

QUIRY FROM: Boston Edison Co. Mr. A. T. Sullivan)

R SHIPMENT TO:

— THE FOLLOWING MATERIAL —

Please let us have a quotation - bid due on or before November 14 - on the following:

400,000 ft. Line Wire
#2 AWG - copper - neoprene covered
In accordance with Spec. 82.4-3.3
Rev. December 3, 1958
@ - - - -$99.00 M ft.

Please submit alternate quotation on Aluminum equivalent

November 10, 1960

The aluminum equivalent would be #1/0 - 7 strand aluminum, 4/64" Neoprene, code word "Sequoia" at $61.00 M ft.

Policy 3 applies on the copper item. Policy 1 on the aluminum item.

F.O.B. Destination
TERMS: ½ of 1% on the copper
Net 30 days on aluminum
SHIPMENT: 5 weeks plus test report time if required.

R.A. Dunn:mab

MS: (Standard discount dates apply) ☐ ½ of 1% ☐ 2% Other _____
ment if other than mill condition sheet
B. Destination unless otherwise noted.

Distributor Comm. if any
☐ Net ☐ 5% Other _____ ☐ Competitive Report Requested

t Office Note That All Inquiries Must Contain All Necessary Data Including the Following Details Wherever They Applicable:

1. Size and Stranding
2. Temper
3. Number of Conductors
4. Voltage, if other than 600
5. Type of Insulation
6. Type of Sheath, Jacket, or Covering
7. Finish
8. Lengths and/or Put-up Required
9. Any Special Specification, Requirement or Application
10. Delivery Desired

5572

[fol.5573] Copy to Mr. D. Blake Duffy

November 14, 1960

Boston Edison Company
Purchasing Department
182 Tremont Street
Boston 12, Massachusetts

Attention - Mr. A. J. Sullivan
Purchasing Agent

Gentlemen: REQUEST NO. 134950

In reply to your request of November 4, we wish to submit our quotation as follows:

400,000 ft. #2 AWG Neoprene covered Copper Line Wire
In accordance with Spec. 32.4-3.3 Rev.
December 3, 1958 $99.00 M ft.

Alternate:
400,000 ft. #1/0 7 strand Aluminum 4/64" Neoprene
code word "SEQUOIA" $61.00 M ft.

F.O.B. Destination

Shipments: 5 weeks - plus test report time, if required

Cash Discounts: Copper Item - 1/2 of 1% 10 days: Net 30 days
Aluminum Item - Net 30 days

Copper Item: All shipments will be invoiced at the prices stated herein except for adjustment either upward or downward for the Producers price of metal on date of shipment. These prices are based on copper at 30.00¢ per lb. Should shipment be deferred by the customer beyond 6 months after date of order acknowledgment, shipments will then be invoiced at the Company's price in effect on date of shipment.

Aluminum Item: All shipments will be invoiced at the Company's price in effect on the date of shipment.

Reels will be billed extra: Full credit will be allowed on return of empty reels, if in good condition, within 12 months, to our factory at Rome, New York.

Very truly yours,

ALVA D. STEIN

ADS/nb

[fol. 5574] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 272

April 19, 1960

G.A. BADDOCK

JAMES S. SCHEFFNER

ST. LOUIS OFFICE

REFERENCE: DOW CHEMICAL CORP.
BATON ROUGE, LA.
CUSTOMER INQ. #70090-7-11

I will list below the constructional details of all the items involved along with the alternate construction which will be the same as the construction asked for except omitting the copper drain wires. This, of course, applies only to the 15 KV items. The technical data will be listed separately.

With regard to supervision of installations, etc., advise them that we will do this free of charge providing that a reasonable amount of time is required. Just for your own information, we believe that this item of supervision may be asked for in view of the problems that were encountered on the 15 KV item a couple years back in Freeport, Texas. The items are as follows:

Item 1 - 2805 ft. - 1,000,000 C.M. - 91 strand ECH-26 Aluminum, strand shielding, 14/64" N.M. polyethylene, Dow Chemical Compound #103A1, 15 mil butyl semi-conducting bedding tape, 24 x #18 AWG tinned copper wires spirally wound and evenly spaced, .005" tinned copper shielding tape, 1-1/2" wide, 1/4 lapped, footage tape, Vinyl cable tape, 7/64" N.M. polyethylene jacket, Dow Chemical Compound Q4205.3, O.D. 2.02", weight is 2190 lbs. M ft. @ - - - -$1880.00 M ft.

Alt.

Item 1A- Ditto except omit the copper drain wires, O.D. 1.95", weight is 1850 lbs. M ft. @ - - - - - - - - - - -$1705.00 M ft.

Item 2 - 2805 ft. - Ditto Item 1 except 700 MCM - 61 strand copper, O.D. 1.83", weight is 3270 lbs. M ft. @ - $2345.00 M ft.

Alt.

Item 2A- 2805 ft. - Ditto except omit drain wires, O.D. 1.77", weight is 2935 lbs. M ft @ - - - - - - - - - - -$2150.00 M ft.

Item 3 - 17,100 ft. - 700 MCM - 61 strand aluminum, same description as Item 1, O.D. 1.83", weight is 1770 lbs. M ft. @ - $1480.00 M ft.

C.A. BROOCK

[redacted]

JAMES S. [redacted]

ST. LOUIS OFFICE

Alt.

Item 3A- 17,100 ft. - Ditto except omit copper drain wires, O.D. 1.78", weight is 1440 lbs. M ft. @ - - - - $1285.00 M ft.

Item 4 -17,100 ft. - 500 MCM copper, otherwise same as Item 3, O.D. 1.68", weight is 2540 lbs. M ft. @ - -$1717.00 M ft.

Alt.

Item 4A- 17,100 ft. - Ditto except omit the copper drain wires, O.D. 1.62", weight is 2250 lbs. M ft. @ - -$1545.00 M ft.

Item 5 - 39,600 ft. - 500 MCM aluminum, ECH-26, 61 strand, strand shielding 14/64" H.M. polyethylene, Dow Chemical Compound #103A.1, 15 mil butyl semi-conducting tape, 24 x #18 AWG tinned copper shielding wires spirally wound and evenly spaced, .005" tinned copper shielding tape, footage tape, Vinyl cable tape, 6/64" H.M. polyethylene sheath, Dow Chemical Compound Q4205.3, O.D. 1.61", weight is 1515 lbs. M ft. @ - - - - - - - - - - - - - - -$1065.00 M ft.

Alt.

Item 5A- Ditto except omit copper drain wires, O.D. 1.55", weight is 1135 lbs. M ft. @ - - - - - - - - - - - $ 895.00 M ft.

Item 6 - 39,600 ft. - 350 MCM - 61 strand copper - Ditto Item 5, O.D. 1.46", weight is 2025 lbs. M ft. @ - -$1440.00 M ft.

Alt.

Item 6A- Ditto except omit copper drain wires, O.D. 1.40", weight is 1870 lbs. M ft. @ - - - - - - - - - - - - $1280.00 M ft.

Item 7 - 5000 ft. - 1,000,000 C.M. - 61 strand ECH-19 aluminum, 6/64" blak polyethylene, Dow Chemical Compound #303A3, O.D. 1.36", weight is 1122 lbs. M ft. @ - -$ 505.00 M ft.

Item 8 - 5000 ft. - 700 MCM - 61 strand copper - Ditto, O.D. 1.16", weight is 2315 lbs. M ft. @ - - - - - - - - 54.72¢ per lb.

Item 9 - 30,000 ft. - 700 MCM aluminum - 61 strand ECH-19, 6/64" black polyethylene, Dow Chemical Compound #303A3, O.D. 1.16", weight is 811 lbs. M ft. @ - - - - $ 405.00 M ft.

Item 10- 30,000 ft. - 500 MCM - 37 strand copper - Ditto, O.D. 1.03", weight is 1648 lbs. M ft. @ - - - - - - - - -55.07¢ per lb.

All prices are list and include the following distributor's commission:

All 15 KV items - 2-1/2%

Copper Weatherproof items - 3/4¢ per lb.

Aluminum Weatherproof items - 3%

TERMS: ½ of 1% on the High Voltage items and Copper Line Wire items.
Net 30 days on the Aluminum Line Wire items.

In accordance with their instructions, the following information is to be submitted with the bid:

1. Paragraph 2.7 lists Dow Compound #Q4205.3. We believe this to be H.M. polyethylene and not a PVC material as indicated in this paragraph.

2. In regard to paragraph I.1A. On material that is to be supported by a messenger, etc. and where there will not be any in-Tension splices, the use of ECH-26 Aluminum has been found by many industry standards to be suitable. Where in-Tension splices might be encountered, ECH-19 Aluminum has been found to be more suitable. The ECH-26 temper offers a little more flexibility and ease of handling when installing, splicing, etc. over the ECH-19 temper.

These cables can be manufactured with either temper. For line wire, we recommend ECH-19 temper. For the Power Cable to be supported by a messenger, we feel the ECH-26 temper to be better suited from a standpoint of easier handling in the field, etc.

3. Current Carrying Capacities - 15 KV Cables based on 40° ambient temp.
(a) 1000 MCM Alum. - 630 Amps.
(b) 700 MCM Copper - 635 "
(c) 700 MCM Alum. - 520 "
(d) 500 MCM Copper - 530 "
(e) 500 MCM Alum. - 400 "
(f) 350 MCM Copper - 425 "

4. Diameters - 15 KV Power Cables
(a) 1000 MCM Alum. - 2.02"
(b) 700 MCM Copper - 1.83"
(c) 700 MCM Alum - 1.83"
(d) 500 MCM Copper - 1.65"
(e) 500 MCM Alum. - 1.65"
(f) 350 MCM Copper - 1.46"

[fol. 5577]

April 19, 1960

G.A. BRODOCK

ROME

JAMES S. SCHEPPACH

ST. LOUIS OFFICE

5. AC/DC Ratios of Cables

(a)	Aluminum	1000 MCM	- 1.026
		700 MCM	- 1.013
		500 MCM	- 1.007
(b)	Copper	700 MCM	- 1.034
		500 MCM	- 1.018
		350 MCM	- 1.009

6. Resistance (Ohms/1000 ft at 25C)

(a)	Aluminum	1000 MCM	- .0181
		700 MCM	- .0256
		500 MCM	- .0356
(b)	Copper	700 MCM	- .0159
		500 MCM	- .0220
		350 MCM	- .0311

7. Breaking Strength

(a)	Aluminum	1000 MCM	- 12,010 lbs. Min.
		700 MCM	- 8,408 lbs. Min.
		500 MCM	- 6,003 lbs. Min.
(b)	Copper	700 MCM	- 21,340 lbs. Min.
		500 MCM	- 15,240 lbs. Min.
		350 MCM	- 11,100 lbs. Min.

8. Coefficient of linear expansion per degrees Centigrade - Polyethylene

$$1o - 18 \times 10^{-5}$$

9. Current Carrying Capacity - Weatherproof Cables

(a)	1000 MCM Alum.	- 780 Amps.
(b)	700 MCM Copper	- 780 "
(c)	700 MCM Alum.	- 600 "
(d)	500 MCM Copper	- 610 "

10. Diameters - Weatherproof Cables

(a)	1000 MCM	- 1.36"
	700 MCM	- 1.16"
	500 MCM	- 1.03"

[fol 5578]

April 19, 1960

G.A. BRODOCK

KCMK

JAMES S. SCHEPPACH

ST. LOUIS OFFICE

Page 5.

11. Breaking Strength - Weatherproof Cables

(a)	1000 MCM Alum.	16,260 lbs.	Min.
(b)	700 MCM Copper	31,150 lbs.	"
(c)	700 MCM Alum	11,620 lbs.	"
(d)	500 MCM Copper	21,940 lbs.	"

F.O.B. Destination

SHIPMENT: Start 7 weeks, complete 9 weeks after receipt of order. I have not gone to the trouble of getting a more accurate promise as I cannot tell when this material is required.

As you know, we currently have 42,000 ft. of 1,000,000 C.M. and 13,000 ft. of 700 MCM - 15 KV being negotiated for Dow Chemical at Freeport, Texas. I don't have the advantage of knowing how our prices lined up there, but these prices are comparable to these.

We will agree to the guarantee clause as shown in their inquiry.

GAB:HAB

G.A. BRODOCK

[fol. 5579] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 273

Rome Office

April 21, 1960.

The Dow Chemical Company
Louisiana Division
P. O. Box 150
Plaquemine, Louisiana

Subject: Your Inquiry No. 70090-7-L1

Gentlemen:

Thank you for your inquiry dated April 7. Quotation and technical data follows:

1. 2,805 ft.—1,000,000 C.M.—91 strand EGH-26 Aluminum, strand shielding, 14/64" H.M., polyethylene, Dow Chemical Compound #103A1, 15 mil butyl semi-conducting bedding tape, 24 x #18 AWG tinned copper wires spirally wound and evenly spaced, .005" tinned copper shielding tape, 1½" wide, ¼ lapped, footage tape, Vinyl cable tape, 7/64" H.M. polyethylene jacket, Dow Chemical Compound Q4205.3, O.D. 2.02", weight is 2190 lbs. M ft.
@.....$1880.00 M ft.

Alt.
1A. Ditto except omit the copper drain wires, O.D. 1.95", weight is 1850 lbs. M ft.
@.....$1705.00 M ft.

2. 2,805 ft.—Ditto Item 1 except 700 MCM—61 strand copper, O.D. 1.83", weight is 3270 lbs. M ft.
@.....$2345.00 M ft.

Alt.
2A. 2,805 ft.—Ditto except omit drain wires, O.D. 1.77", weight is 2935 lbs. M ft.
@.....$2150.00 M ft.

[fol. 5580]

3. 17,100 ft.—700 MCM—61 strand aluminum, same description as Item 1, O.D. 1.83", weight is 1770 lbs. M ft.
@.....$1480.00 M ft.

Alt.
3A. 17,100 ft.—Ditto except omit copper drain wires, O.D. 1.78", weight is 1440 lbs. M ft.
@.....$1285.00 M ft.

4. 17,100 ft.—500 MCM copper; otherwise same as Item 3, O.D. 1.68", weight is 2540 lbs. M ft.
@.....$1717.00 M ft.

Alt.
4A. 17,100 ft.—Ditto except omit the copper drain wires, O.D. 1.62", weight is 2250 lbs. M ft.
@.....$1545.00 M ft.

5. 39,600 ft.—500 MCM aluminum, ECH–26, 61 strand, strand shielding, 14/64″ H.M. polyethylene, Dow Chemical Compound #103A.1, 15 mil butyl semi-conducting tape, 24 x #18 AWG tinned copper shielding wires spirally wound and evenly spaced, .005″ tinned copper shielding tape, footage tape, Vinyl cable tape, 6/64″ H.M. polyethylene sheath, Dow Chemical Compound Q4205.3, O.D. 1.61″, weight is 1515 lbs. M ft.
@.....$1065.00 M ft.

Alt.

5A. Ditto except omit copper drain wires, O.D. 1.55″, weight is 1135 lbs. M ft.
@.....$895.00 M ft.

6. 39,600 ft.—350 MCM—61 strand copper—Ditto Item 5, O.D. 1.46″, weight is 2025 lbs. M ft.
@.....$1440.00 M ft.

Alt.

6A. Ditto except omit copper drain wires, O.D. 1.40″, weight is 1870 lbs. M ft.
@.....$1280.00 M ft.

7. 5,000 ft.—1,000,000 C.M.—61 strand ECH–19 aluminum, 6/64″ black polyethylene, Dow Chemical Compound #305A3, O.D. 1.36″, weight is 1122 lbs. M ft.
@.....$505.00 M ft.

[fol. 5581]

8. 5,000 ft.—700 MCM—61 strand copper—Ditto, O.D. 1.16″, weight is 2315 lbs. M ft.
@.....54.72¢ per lb.

9. 30,000 ft.—700 MCM aluminum—61 strand ECH–19, 6/64″ black polyethylene, Dow Chemical Compound #305A3, O.D. 1.16″, weight is 811 lbs. M ft.
@.....$405.00 M ft.

10. 30,000 ft.—500 MCM—37 strand copper—Ditto, O.D. 1.03″ weight is 1648 lbs. M ft.
@.....55.07¢ per lb.

We shall guarantee the cable is of first-class material and workmanship and in lieu of other claims against it shall agree to replace: (1) any length of cable which fails under normal and proper use within one year of date of installation, and (2) any length of cable which fails within two years of date of installation which shows defects in material or workmanship, provide that in each case an immediate written notice of such failure is given to the vendor. All replacements by vendor under this guarantee shall be made free of charge F.O.B. Job Site.

We would also like to have the following information considered a part of this quotation.

1. Paragraph 2.7 lists Dow Compound #Q4205.3. We believe this to be H.M. polyethylene and not a PVC material as indicated in this paragraph.
2. In regard to paragraph 1.1A. On material that is to be supported by a messenger, etc. and where there will not be any in-Tension splices, the use of ECH–26 Aluminum has been found by many industry standards to be suitable. Where in-Tension splices might be encountered, ECH–19 Aluminum has been found to be more suitable. The ECH–26 temper offers a little more flexibility and ease of handling when installing, splicing, etc., over the ECH–19 temper.
   These cables can be manufactured with either temper. For line wire, we recommend ECH–19 temper. For the Power Cable to be supported by a messenger, we feel the ECH–26 temper to be better suited from a standpoint of easier handling in the field, etc.

[fol. 5582]

3. Current Carrying Capacities—15 KV Cables

(a)	1000 MCM Alum.	—630 Amps.
(b)	700 MCM Copper	—635 "
(c)	700 MCM Alum.	—520 "
(d)	500 MCM Copper	—530 "
(e)	500 MCM Alum.	—400 "
(f)	350 MCM Copper	—425 "

4. Diameters—15 KV Power Cables

(a)	1000 MCM Alum.	—2.02"
(b)	700 MCM Copper	—1.83"
(c)	700 MCM Alum.	—1.83"
(d)	500 MCM Copper	—1.65"
(e)	500 MCM Alum.	—1.65"
(f)	350 MCM Copper	—1.46"

5. AC/DC Ratios of Cables

(a)	Aluminum	1000 MCM—1.026
		700 MCM—1.013
		500 MCM—1.007
(b)	Copper	700 MCM—1.034
		500 MCM—1.018
		350 MCM—1.009

6. Resistance (Ohms/1000 ft. at 25c)

(a)	Aluminum	1000 MCM—.0181
		700 MCM—.0256
		500 MCM—.0356
(b)	Copper	700 MCM—.0159
		500 MCM—.0220
		350 MCM—.0311

7. Breaking Strength

(a)	Aluminum	1000 MCM—12,010 lbs. Min.
		700 MCM— 8,408 lbs. Min.
		500 MCM— 6,003 lbs. Min.
(b)	Copper	700 MCM—21,340 lbs. Min.
		500 MCM—15,240 lbs. Min.
		350 MCM—11,100 lbs. Min.

[fol. 5583]

8. Coefficient of linear expansion per degrees Centigrade—Polyethylene
$16-18 \times 10^{-5}$

9. Current Carrying Capacity—Weatherproof Cables

(a)	1000 MCM Alum.	—780 Amps.
(b)	700 MCM Copper	—780 "
(c)	700 MCM Alum.	—600 "
(d)	500 MCM Copper	—610 "

10. Diameters—Weatherproof Cables

(a)	1000 MCM	—1.30"
	700 MCM	—1.16"
	500 MCM	—1.03"

11. Breaking Strength—Weatherproof Cables

(a)	1000 MCM Alum.	16,260 lbs. Min.
(b)	700 MCM Copper	31,150 lbs. Min.
(c)	700 MCM Alum.	11,620 lbs. Min.
(d)	500 MCM Copper	21,940 lbs. Min.

With regard to supervision of installations, we will do this free of charge providing that a reasonable amount of time is required.

F.O.B.—Destination

Terms—High Voltage items and Copper Line Wire items:

Invoices dated 1st to 15th, ½ of 1% cash discount if paid on or before the 25th, net 15th of the following month. Invoices dated 16th to the last day of month, ½ of 1% cash discount if paid on or before the 10th of the following month, net last day of the following month.

Aluminum Line Wire items:

Net 30 days from date of invoice.
Shipment—Start 7 weeks, complete 9 weeks after receipt of order.

15 KV Power Cable Items:

All shipments will be invoiced at the prices stated herein except for adjustment either upward or downward for the Producers price of metal on date of shipment. These prices are based on copper at 33¢ per lb.—alum. 26½¢ lb. Should shipment be deferred by the customer beyond 6 months after date of order acknowledgment, shipments will then

be invoiced at the Company's price in effect on date of shipment.

[fol. 5584] Aluminum and Copper Line Wire Items:

All shipments will be invoiced at the Company's price in effect on the date of shipment.

This quotation subject to 30 day acceptance and the terms and conditions appearing on the reverse side of our letterhead are to be considered a part of this quotation.

Very truly yours, Aluminum Company of America, Rome Cable Division, C. D. Blair.

CDB:mfc

CC: (NI00) Mr. C. D. Blair, Rome Office.

[fol. 5585] In United States District Court

Plaintiff's Exhibit 274

October 30, 1958.

Public Service Elec. & Gas Co.,
80 Park Place
Newark 1, New Jersey

Attention: Mr. J. J. Coleman, Buyer

Gentlemen:

With reference to your letter inquiry dated October 23rd, we are pleased to quote on secondary self-supporting cable as follows:

Specification No. 84-1—Copper
Specification No. 85-1—Aluminum

Stock Code	Description	Quantity—Ft.	Price M' Net
03-1741	#4/0—3/cond. aluminum	10,000	$ 950.00
Or			
03-1812	#2/0—3/cond. copper	10,000	$1419.00
03-1743	397,500cm 3/cond. aluminum	10,000	$1658.00
Or			
03-1813	#4/0—3/cond. copper	10,000	$2016.00

Prices based on 29¢ copper
25.20¢ aluminum

Delivery: F.O.B. Destination.
Terms: ½ of 1% 10 days, net 30.
Shipment: Approx. 7-8 weeks lead time required.

The terms and conditions appearing on the reverse side are to be considered a part of this quotation. On Copper items, prices stated herein shall be subject to adjustment to the Company's prices in effect on date of shipment. However, such prices shall not exceed any lawful ceiling prices established and in effect at the time of shipment. On aluminum items, prices and charges exclusive of applicable quantity extras shall not be increased on items shipped on or before 1/31/59 and shall not be increased more than 5% on items shipped after 1/31/59 but before 7/31/59.

Very truly yours, Rome Cable Corporation, W. S. Williams.

WSW:DSB

[fol. 5586] July 14, 1958.

R. D. Golly—Los Angeles
G. A. Brodock—Rome
Southern California Edison

This will confirm my TWX of July 10th advising you estimating prices as follows:

Their Spec. 20-220 5 KV Ambrac, #4 copper @.....
$348.00 M ft. #1/0 aluminum @.....$470.00 M ft.

Very truly yours, ——, ——.

gab:mab

[fol. 5587] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 282

March 23, 1959.

Dixon Lewis
Pittsburgh Office
Mr. J. B. Holloman
Chicago Office

Re: Rome Cable Corporation

Attached is a copy of a letter from Mr. Dwight Thayer, Sales Manager of Rome Cable Corporation. As you know, the Rome people have been very cooperative in suggesting names of their own distributors who are interested in Alcoa conduit. We realize that it is not possible to either contact or sign up all of these distributors immediately, nor in some cases is it practical to do so. Assuring that the merger with Rome will be consummated later this week, we believe that our best interests may be served by having as many of the present Rome distributors on our team as possible. This will enable us rather quickly to offer the same package now offered by Kaiser, a combination of aluminum insulated conductors and aluminum conduit.

Please use the information in this letter for what you think it may be worth.

Dixon Lewis.

DL/rl

cc: Messrs. R. R. Burns, Chicago, D. R. Whitlow, Chicago, W. B. Zellars, Chicago, Dean Garner, Des Moines, W. W. Knapp, Minneapolis

Attachment

[fol. 5588]

Rome Cable
Corporation
Rome, N. Y.

March 20, 1959.

Dwight Thayer
Sales Manager

Mr. Dixon Lewis,
Aluminum Company of America,
1501 Alcoa Building,
Pittsburgh, Pennsylvania

Dear Dixon:

I understand from our St. Paul office that Bill Knapp has made the necessary arrangements with H. and C. Electric, Mankato, Minn. for a consignment of aluminum conduit. I appreciate very much your cooperation in this matter and hope that your Minneapolis office found it possible to contact that list of other wire and cable distributors of ours which I gave to you.

Reports coming to me indicate that the Kaiser pressure is growing stronger as far as distributors are concerned and more and more distributors are becoming interested in aluminum conduit. It is our strong desire to call these names to your attention so that our distributors may be in position to compete with the growing trend toward aluminum conduit and in order that Alcoa may get the business rather than Kaiser.

General Electric Supply Company, Indianapolis, is a particularly good distributor as far as we are concerned and I understand from Stewart Johnston, our Chicago manager, that your local people have now agreed to take care of this house with the consignment of aluminum conduit.

There are other good wire and cable distributors of ours in our Chicago territory and here again we dislike very much to see distributors who have been doing a good job for us on wire and cable and have a consignment of wire and cable from us, ending up with a consignment of Kaiser aluminum conduit. I cannot help feel that in the long run it would be much to Alcoa's advantage to have these accounts. The names I have in mind are—General Electric

Supply Company—Fort Wayne, Indiana; Ralph David, Inc., Logansport, Indiana; Danville Electric Supply Company, Danville, Illinois; B. L. Robinson and Co., Burlington, Iowa.

[fol. 5589] I believe our Chicago man has had some contact with your Chicago people with regard to this matter but feels that he has not created much interest on their part.

It is my sincere hope that you can initiate some action toward the end of taking care of those names I have listed. Any contact with our Chicago office should be addressed to Mr. Stewart Johnston or in his absence Mr. T. C. Spriggs.

I shall appreciate very much your consideration of the above.

Sincerely, Dwight Thayer, Sales Manager.

DHT:reh

[fol. 5590] In United States District Court

Plaintiff's Exhibit 287

To: Los Angeles
San Francisco
Portland
Seattle
Salt Lake
Denver
Los Angeles—Arizona
From R. E. Gates—Torrance
Date: May 8, 1959
Subject: Aluminum Rigid Conduit

Supplementing Dwight's letter of April 29th, we are happy to report that the second increment of our initial Aluminum tubing order placed on Vernon works has been received at Torrance. The third increment which will give us a full range of sizes ½" through 5" inclusive is scheduled for delivey at Torrance Monday, May 11th. We believe that we will be able to start shipping against your aluminum conduit orders May 18th. Beginning on the same date, we will be able to fill your order requirements for aluminum

couplings but it appears that we are 4 to 8 weeks from fulfillment of standard 90° aluminum elbow requirements. We do not at present know the answer with regard to filling requirements for special radius aluminum elbows. You will be advised.

The prototype order quantities suggested in Dwight's letter was based on experience to date but was arrived at prior to the reduction in price initiated by Kaiser Aluminum and effective April 27th. We believe under the present price differential tht you will find demand more closely parallels standard mix for steel conduit. Keeping in mind the fact that there are some prohibitions by local code authorities against the use of aluminum in some places where steel is accepted plus the fact that distributors may tend to over-order on a consignment basis, we would suggest that you discuss carefully with your distributor his initial consignment order.

The aluminum industry has adopted standard packaging for aluminum conduit and fittings which differ from our standard packaging for steel. In the interest of time we plan to ship aluminum conduit and fittings in the same standard package as you and your customers are used to for steel. In addition to the time element, we see no reason to suggest that the distributor order 50 each ½" and ¾" aluminum elbows to complement 1500 feet and 2500 feet respectively of ½" and ¾" aluminum conduit. I estimate the ratio of steel elbows per 10' length of steel conduit used is approximately one to 100 of ½" and ¾", seven to 100 of 1" and twelve to 100 of 1¼" and larger. I am sure your distributors are aware of this. Due to the ease of bending of 1" aluminum and smaller, we doubt that aluminum elbow demand will equal that shown above.

You are in a unique position—you offer your distirbutor the only source of all his conduit needs for shipment at one time from one place. If you have any questions please advise.

R.E.G.

REG/hf

[fol. 5591] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 288

To: G. E. Rolston, Jr.—Philadelphia
From: R. E. Gates—Torrance
Date: May 8, 1959
Subject: Atlantic Refining Company—Rigid Conduit

Dear Glenn:

Many thanks for your report of Rigid Conduit tests being conducted by Atlantic Refining Company. Glenn Koger and the boys were mighty happy to learn that our product is noticeably superior. We hope that the final report will find us in the same relative position.

I gather that Aluminum proved superior to not only all other steel conduit but also ours. Since you can now sell Aluminum Conduit, you won't have to worry about us.

Many thanks, again, and we look forward with interest to your report of Atlantic's final evaluation.

Very truly yours, R.E.G.

REG/hf

[fol. 5592] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 289

cc: D. H. Thayer—Rome
P. J. Lopushinsky—Rome

May 20, 1959.

Stewart Johnston—Chicago
R. R. Davis—Kansas City
Dutton Lainson Co.—Hastings, Nebraska

Dear Stewart:

Attached is my consignment request for them covering aluminum conductor products and aluminum rigid conduit. I have used the aluminum rigid to get their aluminum conductor business.

The figures at first glance might seem to be incongruous but I want to point out that up to this month we have only sold them cartoned bare and W/P. If you look over their

incoming orders for this month I think you will agree that the Triplex has been pretty good.

Actually when I ask Mr. Phillips to give me some sales figures for aluminum conductor he wrote and told me that in the past 90 days they have sold 13,482.22 worth of ACSR and 7,023.61 worth of drop cable. I have cut this in half.

He mentions that they also stock Triplex at North Platte and intimates that he wants a consignment there. I am going to try to stall him until we get a pattern with the Hastings house.

I am particularly glad to tie up with these people because of the way they work. They want to do a good job for every supplier so they try to hold the number of suppliers down. I think this will be a good account.

Yours very truly, ——, ——.

[fol. 5593] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 290

Mr. A.D.R. Fraser, Rome

Internal Correspondence

June 8, 1959.

From: Philip T. Coffin
Pittsburgh Office

To: All Conductor Salesmen
District Mgrs.—Ass't District Mgrs.
Branch Managers—Resident Managers
Chief Administrators

Re: Sales Organization for the Handling of ALCOA Aluminum and Steel Conduit

A few days ago, Mr. R. B. McKee, in a confidential letter to all District Managers and Officers of the Company, advised that preliminary steps had been taken to transfer the entire responsibility for the sale of all Alcoa aluminum conduit to Rome Cable Corporation. The following reasons for this move, we believe, will be quite obvious.

Rome Cable Corporation has had not only several years experience in the conduit field, but also many years of experience in the associated field of the insulated conductors that are so frequently carried in conduit—building wire, power and control cables, etc., Rome also has a broad distribution through probably twice the number of distributors that Alcoa has and also operates ten warehouses of its own. All of you, of course, know that conduit is sold entirely through distributors. Also bear in mind that Rome is the principal steel conduit factor in the eleven western states. Its superior quality steel conduit, EMT, and steel tubing, and very recently, aluminum conduit on a toll basis for Alcoa, are all manufactured in its plant at Torrance, California.

Mr. Dixon Lewis will be responsible for the sale of both aluminum and steel conduit and will report directly to Mr. Glenn Rolston, Vice President and Manager of Marketing, Rome Cable Corporation. Mr. Lewis will assume these duties immediately, and accordingly you may expect to hear from him promptly regarding any new policies or changes in policy he may wish to institute in connection with conduit distribution and sales.

[fol. 5594] Since Mr. Lewis has been responsible not only for the sale of aluminum conduit but also for the activities of consigned stock distributors and agents while he was attached to my office, it will, of course, become necessary to have the distributor-agency activities placed under the guidance of someone else. Until this matter has been satisfactorily resolved, Mr. Lewis will carry on in a dual capacity wherein he will coordinate Alcoa's distribution policies with those of Rome.

We realize that several of you at least have already heard something of these organization changes as well as rumors of others; we shall try to keep you posted as further developments transpire.

Philip T. Coffin.

PTC:ags

Copies: All Officers, Assistant Officers, Product Managers, Ass't Product Managers, Mr. A. D. R. Fraser, Mr. G. E. Rolston, Mr. Dixon Lewis, Mr. Vaughn Chase.

[fol. 5595] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 291

ALCOA
First In Aluminum

Aluminum Company of America
1501 Alcoa Bldg., Pittsburgh 19, Pa.

News Release

For Further Information: Laurence S. Sewell, Jr.
ATlantic 1-4545, Ext. 467

For Release Tuesday, June 16, 1959, Or Anytime Thereafter

Pittsburgh, Pa., June 16, 1959—Aluminum Company of America today announced that responsibility for sales of all Alcoa aluminum conduit now is being transferred to Rome Cable Corporation, which recently became an Alcoa subsidiary.

Addition of the Alcoa line to that of the Rome, N.Y., firm will make available to the electrical industry a full line of aluminum and copper conductors and accessories and aluminum and steel conduit from a single nationally known supplier.

Dixon Lewis, Alcoa's assistant manager of electrical conductor sales since 1953, has been named product manager of conduit for Rome Cable, according to Glenn Rolston, vice president and manager of marketing for Rome. Mr. Lewis will be on Mr. Rolston's staff, but will continue to be based at Alcoa's home offices in Pittsburgh.

[fol. 5596] "The new combination of Alcoa and Rome Cable technical experience in the field of conduit and conductors, plus the joining of research, manufacturing, and sales and distribution facilities, should prove a major asset to the growing electrical industry," Mr. Rolston said.

Mr. Lewis joined Alcoa following his graduation as an electrical engineer from Cornell University in 1927. He has served the company continuously in the conductor sales field since that time, in Detroit, St. Louis, Washington, D.C., and Pittsburgh.

[fol. 5597] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 292

Internal Correspondence

June 25, 1959.

From: J. E. Perryman
Pittsburgh Office
To: District Sales Office Managers
ADRF

Re: Sales Office Information Bulletin No. 78
Sale of Aluminum Conduit By Rome Cable Corporation

The entire responsibility for the sale of all Alcoa aluminum conduit will be transferred to Rome Cable Corporation, a wholly owned subsidiary of Alcoa. Rome's past sales activity has been in the steel conduit field and the insulated conductors that are frequently carried in conduit. This product is sold through distributors and jobbers and Rome has a broader distribution through this means than Alcoa. This means, any sale of aluminum conduit will be handled through the Rome Sales Organization. Rome will establish their own distributors and jobbers as outlets for aluminum conduit; therefore, those distributors and jobbers now established as Alcoa's will either be converted to Rome Cable Distributors or the distributor agreement will be discontinued.

Aluminum conduit will be manufactured by Alcoa at two locations; Alcoa's Lafayette Works and on a toll basis at Rome's Torrance, California, Works. It is the present plan that aluminum conduit will be supplied from the stocks at these two locations. Rome's Torrance Works will supply from their stocks the eleven Western states (Washington, Oregon, California, Idaho, Nevada, Arizona, Montana, Wyoming, Utah, Colorado and New Mexico). The aluminum conduit required for the remaining states will be fabricated and supplied from Alcoa's Lafayette Works.

The sale of aluminum conduit to the eleven Western states mentioned above will only involve Alcoa's Los Angeles Sales Office. The individual sales made through the Rome Sales Organization and shipped from the Tor-

rance Plant will go directly from the Rome Sales Organization to Rome's Torrance Plant. It will be necessary to transfer the toll production of aluminum conduit from Rome's Torrance Works to Alcoa consigned stock. To accomplish this Rome will issue an "Advance Order" to cover a month's production to Alcoa's Los Angeles Sales Office who in turn will issue a consignment order for this production.

[fol. 5598] The sale of aluminum conduit for the remaining states will be shipped from our Lafayette Plant. Such sales requirements will be channeled into Alcoa's Sales Offices through Rome's Sales Offices and will be processed in the following manner:

Order entry

1. Orders for aluminum conduit will be received from Rome Cable Corporation for shipment to Rome Cable's customers. Rome Cable Sales Office will forward a copy of their Advance Sales Order (sample copy attached) to the nearest Alcoa Sales Office for entry. This sales order will have all of the information necessary to enter an Alcoa Sales Order for the aluminum conduit specified. The Alcoa sales office is to ignore the "Sold To" name shown on the sales order since all "Invoice To's" will be Rome Cable Corporation, Agent, Rome, New York. The "Ship To" address will be the same on both the Rome sales order and the Alcoa sales order. The customer's order number shown on Rome Cable's sales order is their Customer's purchase order number and this number should be shown on the Alcoa sales order form under "Customer's Purchase Order Number". It will *also* be necessary to show Rome Cable's Purchase Order Number, which is shown on their form as "Our Order Number", on the Alcoa sales order under "Government Contract Number". It is necessary to follow this procedure to show both Rome Cable's Customer's Purchase Order Number and Rome's Purchase Order Number to provide both purchase order numbers as references on Package Tags, Shipment Manifest, Invoices, etc.

2. Alcoa sales orders will be allotted direct to Lafayette, Indiana, for conduit and New Kensington, Pennsylvania, for couplings and elbows.

3. The Sales Order Acknowledgment copy will be mailed to the Rome Cable Sales Office originating the Rome Cable Sales Order.

[fol. 5599] 4. Since Rome Cable Corporation is acting as an agent for Alcoa for the sale of aluminum conduit, the terms and price of the order should be "Consignment".

5. It is the present plan to use a separate Bill of Lading, Shipment Manifest, Shipment Notice and Package Tags for shipments of aluminum conduit and couplings. These documents will contain a combination name of Alcoa and Rome Cable Corporation. These forms are not available at this time but will be printed and distributed to the appropriate shipping points for their use. (Until these documents are received, a rubber stamp containing the name "Rome Cable Corporation" should be prepared by Lafayette and New Kensington Works of a sufficient size to be conspicuous. This rubber stamp should be placed on the documents mentioned above in the same approximate area as the name Alcoa or Aluminum Company of America appears.) It will be necessary for the sales offices to include an acknowledgment note on the Alcoa Sales Order as follows:

> "The Bill of Lading, Shipment Manifests, Shipment Notices, and Package Tags, will be supplied on special Rome-Alcoa forms."

Scheduling

Aluminum conduit is not sold directly to the ultimate user, therefore, all requirements will originate with Rome Cable's Distributors or Jobbers. The delivery of this product to the ultimate user is normally supplied from Rome's Distributor and Jobber stock, therefore, any item not in Rome Cable stock will require prompt shipment. Rome will enter sales orders for two purposes; one to supply their distributors with a stock of aluminum conduit and the other for their customer's immediate use. We are primarily concerned with those orders received requiring immediate delivery. It will be necessary for the Rome Sales Organization to clarify the urgency of those orders placed with Alcoa Sales Offices. These requirements can normally be broken into three categories: (1) Conduit re-

quired to meet a specific delivery requirement. This would [fol. 5600] normally be an immediate requirement which is not available from one of Rome Cable's Distributors or Jobbers. (2) Initial Distributor's stock. (3) Stock replacement. Rome's Sales Offices will supply this information on their sales order in the "When Required" block. When necessary Rome Cable's requirements should be expedited through Production Planning in the same manner as you would expedite any order requiring rush delivery. Other than the immediate requirement, the orders should be entered in the current schedule for this product.

Notice of Shipment

Shipment of aluminum conduit from the Lafayette Works will be included on the Daily Shipment List, the same as any other Alcoa Sales Orders. This information should be supplied to Rome's Sales Offices immediately upon receipt. If a regular Shipment Notice is required, it will be specified in the same manner as any other Alcoa Sales Order. The important thing is to keep Rome posted as to the current shipping information to enable them to service their customers.

Invoices

Rome Cable Corporation is acting as Alcoa's agent in the sale of aluminum conduit; therefore, consignment invoices will be issued to Rome Cable Corporation, Rome, New York, on each shipment from Alcoa's Lafayette and New Kensington Works. In the case of the Vernon Works, they will receive a monthly sales order from the Los Angeles Sales Office based on Rome's Torrance Works production and will issue a consignment invoice based upon the Los Angeles Sales Order. It is necessary to invoice all of the aluminum conduit to Rome Cable Corporation for the purpose of bookkeeping the consigned stock regardless of the "Ship To" address.

We are listing below Rome Cable Sales Offices that will be entering orders for aluminum conduit. These offices are listed in two categories: (1) Those offices supplying the [fol. 5601] eastern states and (2) those offices supplying the eleven western states.

Offices Supplying the Eastern States

New England—"NE"
A. D. Stein, Inc.
80 Federal Street
Boston 10, Massachusetts
Tel: Hancock 6-7272

New York State—"NYS"
Rome Cable Corporation
330 Ridge Street
Rome, New York
Tel: Rome 3000

Pittsburgh—"Pitts"
Rome Cable Corporation
414 Oliver Building
Pittsburgh 22, Pennsylvania
Tel: Atlantic 1-0816

Chicago—"Chg"
Rome Cable Corporation
4505 West Grand Avenue
Chicago 39, Illinois
Tel: Spaulding 2-2700

Minnesota—"St. Paul"
Rome Cable Corporation
345 N. Wheeler Avenue
St. Paul 4, Minnesota
Tel: Midway 6-7201

Southern (Sub)—"So-Ga"
Rome Cable Corporation
156 Simpson Street, N. W.
Atlanta 13, Georgia
Tel: Murray 8-9860

New York Metropolitan—"NY"
Rome Cable Corporation
60 East 42nd Street
New York 17, New York
Tel: Murray Hill 2-6590

Philadelphia—"Phila"
Rome Cable Corporation
12 South Twelfth Street
Philadelphia 7, Pennsylvania
Tel: Market 7-2070

Ohio—"Ohio"
Rome Cable Corporation
729 Society National Bank Building
145 Public Square
Cleveland 14, Ohio
Tel: Superior 1-1240

Chicago (Sub)—"C-St.L"
Rome Cable Corporation
6617 Clayton Road
St. Louis 17, Missouri
Tel: Volunteer 3-4944

Detroit—"Det"
Rome Cable Corporation
521 New Center Building
Detroit 2, Michigan
Tel: Trinity 2-7578

[fol. 5602] Offices Supplying the Eleven Western States

Chicago (Sub)—"C-RM"
E. T. Vonier, Inc.
1160 Elati Street
Denver 4, Colorado
Tel: Keystone 4-0533

Central Pacific District—"PAC-SF"
Rome Cable Corporation
1100 Selby Street
San Francisco 24, California
Tel: Valencia 6-3580

Central Pacific (Sub)—"PAC-SF-U"
Rome Cable Corporation
230 South Fourth, West
Salt Lake City 1, Utah
Tel: Elgin 9-8811

South Pacific District—"PAC-LA"
Rome Cable Corporation
P. O. Box 6720
2510 South Malt Avenue
Los Angeles 22, California
Tel: Raymond 3-3631

North Pacific District—"PAC-SEA"
Rome Cable Corporation
3430 Fourth Avenue, South
Seattle 4, Washington
Tel: Main 4-3017

J. E. Perryman.

JEP/mat

Copies to: Asst. District Sales Office Managers, Branch Sales Office Managers, Resident Sales Office Managers, Product Managers and Assistants, Industry Managers, All Administrators, Credit Representatives, Electrical Conductor Salesmen. Messrs. M. M. Anderson, L. E. Hickman, R. V. Davies, R. B. McKee, L. P. Favorite, F. J. Close, G. B. D. Peterson, S. T. Gustina, J. V. Kohler, W. K. Unverzagt, G. O. Sterling, H. L. Hall, J. T. McCullough, Dixon Lewis, Glenn Rolston, Rome Cable Corporation, Rome, New York, J. P. Lamoureux, Lafayette Works, F. A. Fickes, Jr., Lafayette Works, J. P. Freeman, Lafayette Works, J. R. Bell, New Kensington Works, R. G. Loughran, New Kensington Works, Leon Veitch, New Kensington Works, A. H. Luther, Cressona Works, L. R. Overly, Cressona Works, P. D. Bosworth, Cressona Works, H. R. Dodge, Vernon Works, M. K. Stabe, Vernon Works, A. E. Grandey, Vernon Works.

[fol. 5603]

2415

ROME CABLE CORPORATION

ROME, NEW YORK

73000	6/9/59	CHICAGO	51-270	6/10/59

SOLD TO: THE A B C COMPANY
11 STATE STREET
CHICAGO, ILLINOIS.

SHIP TO: THE A B C COMPANY
11 STATE STREET
CHICAGO, ILLINOIS.

RUSH ALL POSSIBLE.

PPD.

2%/15TH PROX/NET CASH IMMEDIATELY THEREAFTER

F.O.B. POINT: DEST.

ITEM NO.	QUANTITY ORDERED		DESCRIPTION 454	
1.	5,000 FT.		1/2" RIGID ALUMINUM CONDUIT 963-05-00-008	
2.	1,000 FT.		3/4" RIGID ALUMINUM CONDUIT 963-07-50-009	

THIS IS A SAMPLE ORDER
DO NOT ENTER

CONSIGNMENT ORDER

ALCOA OFFICE

8 1616

[fol. 5604] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 308

ROME CABLE
CORPORATION

ROME, N.Y.

REPORT SUBMITTED TO THE BOARD OF DIRECTORS
OF ROME CABLE CORPORATION AT THEIR MEETING
DECEMBER 10, 1958

I give below record of Sales and Earnings by fiscal years through March 31, 1958, and by quarters for the current year, the month of October and estimates for November:

Fiscal Year Ended	Net Sales			Earnings
March 31, 1937	$ 1,798,092			$ 1,616
March 31, 1938	4,957,103			71,027
March 31, 1939	5,370,665			245,036
March 31, 1940	6,080,902			297,736
March 31, 1941	9,465,451			431,501
March 31, 1942	11,631,785			592,135
March 31, 1943	12,712,333			367,654
March 31, 1944	16,909,735			466,709
March 31, 1945	22,798,218			486,653
March 31, 1946	16,975,009			398,973
March 31, 1947	18,436,305			1,359,593
March 31, 1948	25,202,853			1,152,579
March 31, 1949	26,088,523			1,115,960
March 31, 1950	19,602,984			302,209)
		Plus: Transfer from contingency reserve		150,000)
				452,209
March 31, 1951	35,142,901	Net	$1,922,136	
		Minus Transfer to Copper Reserve	150,000	1,772,136
March 31, 1952	52,657,848			1,753,651
March 31, 1953	54,632,976			2,008,321
March 31, 1954	44,114,825			1,637,787
March 31, 1955	39,186,095			930,879
March 31, 1956	56,996,682			2,023,070
March 31, 1957	52,790,055			2,255,819
March 31, 1958	40,614,730			1,019,071
April-June Quarter	8,490,983			(10,868)
July -- Sept. Quarter	9,522,551			122,704
Total Six Months	18,013,534			111,836
October 1958	3,580,000			63,000
November " (Est.)	3,104,000			42,000
December " (Est.)	3,291,000			38,000
Total Third Quar. (Est.)	9,975,000			143,000
Total Nine Mos(Est)	$ 27,988,534			$ 254,836

[fol. 5605]

ROME CABLE CORPORATION

Earnings for the second fiscal quarter were better than the estimate at our September meeting. Estimates for the current quarter indicate a 5 per cent increase in sales and projected earnings of $143,000, or 25 cents a share.

SALES AND ORDERS

The breakdown of sales comparison of the first eight months of 1958 with the same period in 1957 by product class is listed below:

	April-November* 1958	April-November 1957	% Increase or (Decrease)
Rods	$ 3,210,000	$ 3,842,000	(16.5)
Bare	3,230,000	3,373,000	(4.2)
Weatherproof	755,000	1,073,000	(29.6)
Magnet	960,000	1,507,000	(36.3)
Rubber Covered	9,815,000	11,959,000	(17.9)
Aluminum	2,090,000	2,590,000	(19.3)
ROME PLANT TOTAL	$20,060,000	$ 24,344,000	(17.6)
Torrance-EMT & Industube	$ 2,540,000	$ 2,220,000	14.4
Rigid	2,520,000	3,223,000	(21.8)
TORRANCE TOTAL	$ 5,060,000	$ 5,443,000	(7.0)
COPE	$ 1,020,000	$ 1,463,000	(30.3)
TOTAL SALES	$26,140,000	$ 31,250,000	(16.4)

* Preliminary

October sales were the highest since August a year ago. Unfortunately, the steady improvement in billing volume which continued through October reversed in November and volume dropped back about 14 per cent below October, the poorest month since July. Incoming orders had shown steady increase for every month since last December but in mid-November noticeable declines appeared bringing total incoming back to March-April-May levels. December should show some improvement. The rapid rise and fall in the world copper market and year-end dressing up of balance sheets may have had some effect in this most recent reaction. We know it has also affected other companies in our industry.

[fol. 5606]

ROME CABLE CORPORATION

BACKLOG OF ORDERS

		Value
December 31, 1957	Rome -Copper Products	$ 1,895,000
	Aluminum	257,000
	Torrance-EMT & Industube	132,000
	Rigid	78,000
		$ 2,362,000
June 30, 1958	Rome - Copper Products	$ 1,575,000
	Aluminum	295,000
	Torrance -EMT & Industube	171,000
	Rigid	88,000
		$ 2,129,000
November 22, 1958	Rome -Copper Products	$ 1,988,000
	Aluminum	222,000
	Torrance -EMT & Industube	139,000
	Rigid	99,000
		$ 2,448,000

From the above you can see that most ordering is still on a near-term basis.

RAW MATERIALS.

Copper supply tightened in October and early November due to strikes and on October 23rd the price increased to 29 cents. World price went above 30 cents. World statistics for October showed a large drop in available stocks. In the last few days, however, custom smelter price dropped to 28-1/2 cents reflecting drying up of buying and settlement of strikes.

Aluminum and steel have been in ample supply. Rumors continued to circulate on a possible aluminum price increase early in January, estimated to be 1.3 cents per pound, which would restore the two cent drop initiated by Aluminium, Ltd. last summer. Since writing the above some aluminum producers have announced price protection for six months until July 1, 1959 which belies any such rumor.

PAYROLL STATISTICS

ROME	Week Ending	No. Employees	Total Payroll	Avg. Wkly. Wage	Avg. Hrs. Per Wk.	No. Salaried Emp.
	11/24/57	M 781 F 30 811	$75,527	$ 93.13	40.2	458
	6/8/58	M 620 F 21 641	$ 61,967	$ 96.97	40.9	426
	11/23/58	M 712 F 29 741	$ 75,760	$ 102.24	42.5	430

[fol. 5607]

ROME CABLE CORPORATION

PAYROLL STATISTICS - Cont'd.

	Week Ending	No. Employees	Total Payroll	Avg. Wkly. Wage	Avg. Hrs. Per Wk.	No. Salaried Emp.
TORRANCE	11/24/57	124	$ 12,319	$ 102.21	39.9	55
	5/25/58	126	13,465	107.22	39.8	56
	11/16/58	136	16,237	120.71	41.9	56
COPE	11/23/57	56	$ 3,864	$ 68.99	38.2	34
	5/24/58	51	3,592	70.43	38.7	32
	11/22/58	45	3,247	72.15	38.7	30

Rome employment in late November is at the best level since about the same time a year ago but some shorter shifts will be necessary in December. Total number of salaried workers is down more than 10% from peak levels. In accordance with contract provisions Torrance hourly employees were granted a 7 cents per hour increase in October. Rome increase of 7 cents per hour becomes effective December 15. Salary increases of $13 per month were also made for both plants.

On October 1st we restored the salary cuts for all employees above $750 per month. The 5 per cent cut on those below $750 per month had been restored on August 1st. This total salary reduction saved almost $40,000 while in effect.

PRICES

In the early part of our fiscal year prices on many construction wires were at or near the lowest level since before World WarII, and have remained at lower levels for a more extended period than has been true in the same past period. The latest sheet of early November does recognize increased copper cost from the 25 cent low and a certain amount of price improvement on some competitive sizes, but still are far from satisfactory levels. Thirty per cent of the volume in October of these items were at the April price level with additional discounts. We still have some half million dollars of building wire jobs to be shipped in the balance of the fiscal year at these ruinous prices.

Because of competitive bidding on some Government jobs wherein two small competitors were shown to drop the price below published sheets, one of the producers cut bare and ACSR 1.3 cents per pound and insulated products another 10 per cent. This action alone will cost us an estimated $40,000 for the balance of the year. The practices of producers in slashing prices on fabricated products and taking their profit from volume of prime products is extremely vicious.

[fol. 3008]

ROME CABLE CORPORATION

ROME

There has been a steady improvement in volume at the Rome plant but for the first seven months of the fiscal year billings are almost 18 per cent behind a year ago. A portion of this is lower copper prices but a very sizable amount is lower selling prices. Prices on many construction wires in the first quarter of our fiscal year were as much as 40 per cent below that of a year ago. If October sales had been billed at current construction wire prices, results would have grossed $61,000 more.

Our enamelling equipment for rectangular magnet wire got into production in August and is getting excellent reception from our customers. The rapid growth of acceptance of this product is changing from glass and other types indicates the pressing need for one additional machine.

TORRANCE

Volume at Torrance has held up better than at either of the two other plants. Production of up to 4" conduit will get under way this month but will not be much of a factor in the current fiscal year. We have an agreement with Kraloy Company in Los Angeles to sell plastic conduit on a satisfactory basis. We are negotiating for finishing the production and sale of aluminum conduit with another Company in the Los Angeles area providing the pipe.

COPE DIVISION

Volume at Collegeville is down more than either of the two other plants. This has been due to additional manufacturers getting into the field and very low prices on sizable jobs. We are introducing a new product which is called "Controlway" without any elaborate tooling, which is estimated to add about 20 per cent to our trough sales next year. They have been working on an interesting Bus Box product which will probably take several months to perfect, design and tool. This has been developed by our Cope people working with our Engineering and Laboratory sections in Rome, and we have high hopes for its possibilities.

RESEARCH & ENGINEERING

We have actually introduced our new Spacer and have a small installation with Commonwealth Edison in Chicago. Great interest is being expressed in this product by utilities because of its lower net cost of installation, and also by many other companies in the industry. We have applied for a patent on this. We are currently working on a very sizable inquiry for Public Service & Gas of New Jersey.

More interest is being expressed also in our flame resistant polyethylene. This may have commercial possibilities of it being combined with the Spacer in high voltage cable.

[fol. 5609]

ROME CABLE CORPORATION

CAPITAL EXPENDITURES

Through October 31 we have expended approximately $800,000 of the $1,100,000 of capital expenditures approved for 1958. Of the total approvals $750,000 represented carryovers from 1957. On the unexpended balance approximately $40,000 will be carried over to 1959 fiscal year. Breakdown of the $1,100,000 is roughly - Rome $575,000, Torrance $500,000 and Cope $25,000. We have preliminary requests for 1959 exceeding one million dollars. In view of the current earning results I recommend total informal approval of $250,000. $140,000 Rome, $100,000 Torrance and $10,000 Cope. We need another enamel oven in Rome at an estimated cost of $80,000, and Torrance should decide on type of high frequency welding head and power supply to enable us to make aluminum tube. The cost of this unit is estimated at $65,000.

DIVIDEND

Consideration should be given at this meeting on payment of Common Stock Dividend payable in January.

PROFIT-SHARING AND EMPLOYEE DIVIDEND

In view of low earnings I recommend that we continue to make no payment to the Profit-Sharing Trust or Employee Dividend.

The Profit-Sharing Trust with J.P. Morgan & Co. Incorporated as Trustee had a book value of $164,986, and a market value of $191,700 as of December 1, 1958 and shows over 16 per cent appreciation. Estimated return was $7,188 or 4.40 per cent on book value.

ROME CABLE FOUNDATION, INC.

While it has been customary to take action on contribution to the Rome Cable Foundation, Inc. at this meeting we recommend no action at this time.

ORGANIZATION CHANGES

We are very happy that our friend of long standing, Mr. Albert D. Berning, former resident partner of Ernst & Ernst and now consultant for his firm, has agreed to work with us also as a consultant. His broad background and experience in industry generally, and his knowledge of our organization and problems should prove most helpful to us.

The position of Advertising Manager, which was open after the resignation of Paul Nelson, was filled by the appointment of Albert Dudreck his assistant. Doubts as to his being able to take over full charge were definitely removed by

[fol. 5610]

ROME CABLE CORPORATION

ORGANIZATION CHANGES - Cont'd

the fine manner in which he handled the department in the several months after Mr. Nelson's resignation.

GENERAL

I hope that the major portion of the meeting will be consumed in certain discussions on "Whither Goest Thou?" for the Company.

Respectfully submitted,

H. T. Dyett,
Chairman of the Board

[fol. 5611] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 315

Rome Cable Corporation
Torrance Sales Conference

March 21 and 22, 1952

[fol. 5612] Rome Cable Corporation

1952 Torrance Sales Conference

Outside Sales Personnel

1. H. S. Warren—Los Angeles, Calif.
2. O. O. Stedman—Los Angeles, Calif.
3. E. W. Bray—Los Angeles, Calif.
4. R. E. Gates—Los Angeles, Calif.
5. C. H. Kaufman—San Francisco, Calif.
6. G. F. Black—San Francisco, Calif.
7. H. L. Rawlings—Salt Lake City, Utah
8. K. B. Arnett—Seattle, Wash.
9. A. M. Mitrovich—Portland, Ore.
10. A. D. Peabody—Dallas, Tex.
11. Stewart Johnston—Chicago, Ill.
12. T. H. Stokke—St. Paul, Minn.
13. E. T. Vonier—Denver, Colo.

Rome and Torrance Personnel

14. A. D. R. Fraser—Rome, N. Y.
15. G. E. Rolston—Rome, N. Y.
16. R. A. Schatzel—Rome, N. Y.
17. O. I. Lewis—Rome, N. Y.
18. D. H. Thayer—Rome, N. Y.
19. A. A. Andersen—Torrance, Calif.
20. Gilbert Woodill—Torrance, Calif.
21. C. H. Samson—Torrance, Calif.
22. J. E. Hoberecht—Torrance, Calif.
23. F. B. Francis—Torrance, Calif.
24. F. N. Taxon—Torrance, Calif.
25. S. V. Bonanomi—Torrance, Calif.
26. Jerry Moran—Torrance, Calif.

[fol. 5613]

Rome Cable Corporation

Torrance Sales Conference

March 21 and 22, 1952

General Program

Friday—March 21

8:00 A.M.—Leave Chapman-Park Hotel for Torrance plant
9:00 A.M.—Opening remarks
9:30 A.M.-12:00 N.—Plant visit
12:00 N.-1:15 P.M.—Luncheon at Chapman Park Hotel
1:15 P.M.-5:30 P.M.—Conduit sales session
6:30 P.M.—Dinner—Chapman-Park Hotel

Saturday—March 22

9:00 A.M.-12:00 N.—Wire and cable sales session
12:00 N.-1:15 P.M.—Luncheon Chapman-Park Hotel
1:15 P.M.-4:00 P.M.—Wire and cable sales session
4:00 P.M.—Adjournment

Agenda

Rome-EMT

Report by District Managers on order backlogs, current demand, future outlook and competitor activities.
Effect of industry split on price levels.
Need for continuation of rationing.
Prevalence of ratings, military and other.
Suggestions for stimulation of sales.
Present status TV mast business.
General construction picture—1950 vs. 1951 vs. 1952.
New size mix.
Zinc situation—allotments, etc.
Consigned stocks—necessity for.
Sales statistics—GESCO and WESCO.
[fol. 5614] Suggestions for improvement Torrance Sales Service.
Need for information competitor prices, quality, services and policies.

Suggestions as to literature both EMT and Rigid.
Caution re military specs.—Export packing, etc.
Comparison of sales by Districts—1950 vs. 1951.
Other items of topical interest.

Rome-RIGID

Discussion of Sendzimir process by R. A. Schatzel.
Desirability of sample kit and discussion of its contents.
Discussion of order backlog and mill condition.
Production increase forecast—G. Woodill—Status new heavy mill.
Military demand various districts—outstanding jobs obtained.
Discussion of competitive price situation various districts—possible need for limited freight absorption.
Necessity for 2½ to 4" sizes.
Demand, if any, (other than military) for black enameled and statement of our policy with respect to manufacture.
Attitude of N.P.A. toward ratings in Conduit Industry and their effect in getting steel allotments.
N.P.A. attitude toward jobber stocks.
Status of price levels and O.P.S.
Attitude of N.P.A. in matter of essentiality of steel electrical raceways.
Advertising plans rigid.
Other items of interest.

[fol. 5615]

Rome Cable Corporation

Torrance Sales Conference

March 21 and 22, 1952

Friday Morning Session—March 21, 1952

Torrance Plant Visit

Upon arrival at the Torrance plant the group assembled for brief opening remarks by Messrs. G. E. Rolston and Gilbert Woodill.

Assignment of individuals to plant guides was made and the rest of the morning was spent in inspecting the Torrance plant facilities.

Friday Afternoon Session—March 21, 1952

General Sales Discussion—G. E. Rolston

In the way of introductory remarks Mr. Rolston expressed to the Torrance plant personnel the frank exchange of opinions characteristics of Rome Cable sales conferences and invited their participation in discussion.

Rome-RIGID

Mr. Rolston described the customer interest he had found on his trip down the West Coast in our production of rigid steel conduit and outlined briefly production problems encountered by the plant. In view of our present rigid conduit backlog and the need for prompt delivery, Mr. Rolston asked Mr. A.D.R. Fraser for a resume of the plant's production picture.

Mr. Fraser first stressed to the group the desirability of treating production data as confidential and went on to explain that a thorough study of the rigid conduit situation had been made at the plant and expressed the opinion that delivery of hot dip galvanized rigid conduit was some 60 days away, although alleviation of the situation had been found in the possibility of electrogalvanizing. It was estimated that with permission to electrogalvanize, shipment of ¾" could be effected within a week or ten days and 1" and ½" shortly thereafter. In the interest of customer

service the company will absorb freight differences where small shipments are considered necessary to satisfy the customer.

In the meanwhile progress is being made daily on the new hot dip galvanizing unit, the difficulties experienced being nothing more than those attending any new equipment project. Hope was expressed that the plant would be able to start shipping some hot dip galvanized rigid conduit before the end of April.

In the meantime, sales personnel were urged to get specifications changed from hot dip to electrogalvanizing wherever possible.

Mr. R. A. Schatzel presented explanation and discussion of the Sendzimir process of hot dip galvanizing steel pipe. In complimenting the Torrance plant personnel on the production job done to date, Mr. Schatzel outlined some known competitive practices in the manufacture of rigid conduit, all of which brought out the anticipated superiority and [fol. 5616] uniformity of Rome-RIGID quality. In explaining the Sendzimir process it was noted that uniformity and quality of zinc coating are all-important to the quality and workability of the finished product. Timing in the process of golvanizing is essential and comparison was drawn between Torrance's automatic operation and the haphazard methods of competition. It was pointed out by Mr. Schatzel that Rome Cable would be the first to use the Sendzimir process in the galvanizing of pipe and mentioned the success of Armco in applying the process to sheet steel over a period of some fourteen years.

Mr. A. A. Andersen supplemented the above remarks by pointing out that Rome Cable would be the first to manufacture rigid conduit by cold forming and electrowelding. He also laid stress on the merits of Torrance's shot-blasting process in that it avoids conventional pickling of the steel and has the effect of toughening the surface of the steel, therefore, enhancing ductility of the finished pipe.

Mr. Rolston urged sales personnel to be alert to city, county, or state regulations requiring submission of samples for approval. We should make an effort to get on as many approved lists as possible and have found ourselves ignorant of the sample submission requirement in instances in the past.

Mr. Rolston raised a question concerning the desirability or necessity of selling kits in the promotion of Rome-RIGID. Consensus of opinion indicated that a selling kit was desirable as a sales tool for our own personnel, as well as jobbers' salesmen in promoting Rome-RIGID business. Mr. D. H. Thayer solicited comment as to the nature and contents of such a sales kit and response indicated that it should not be too heavy and that it should contain samples of both Rome-RIGID and Rome-EMT, including test pieces as it was felt that the abuse these pieces show is one of our strongest selling points. It was felt also that the sales kit should include product literature pertaining to Rome-EMT and Rome-RIGID. Mr. Thayer will attempt to develop these suggestions into some more definite shape for further consideration.

Mr. O. I. Lewis outlined the general order backlog and mill condition on Rome-RIGID.

While as of March 21 we had on our books orders for 5,093,000' of Rome-RIGID, this only represented some 3,500 tons of pipe against an anticipated output of 1,800 tons per month.

Mr. Lewis presented statistics which indicated our profitable market for Rome-RIGID as being confined to seven western states. Figures further indicated that these seven states represent about 15% of the national sales potentiality. Further comparison indicated that to sell our expected plant capacity for Rome-RIGID we would need 41% of the potential total sales in the seven states to be served from Torrance. It was agreed that this picture called for the utmost in sales effort.

Mr. Rolston stressed the desirability of acquaintance with military and governmental purchasing offices at all levels, as well as complete knowledge of governmental specification details. We should be alert to unusual packaging re-
[fol. 5617] quirements or "catch" clauses which might increase our costs. Mr. Lewis reviewed current military orders on our books and indicated going price levels. Mr. Rolston defined this military business as looking attractive and Mr. Fraser urged a continuing flow of competitive and trade information to Rome.

In discussing the competitive price situation Mr. Lewis presented a map which, based on comparative freight rates,

indicated our profitable Rome-RIGID market to be pretty much confined to the seven western states. Our F.O.B. Torrance price sheet shows a price disadvantage of some $.50 to $1.00 per cwt. in the Mountain states. The Plains states, including a greater part of Texas, plus southeastern U.S., show a price disadvantage in excess of $1.00 per cwt. These figures would seem to pretty well define our Rome-RIGID market and eliminate the possibility of stocking and selling it out of our present Dallas, St. Paul and Chicago warehouses.

In concluding discussion of rigid conduit, Mr. Rolston asked for opinions regarding the necessity of Rome-RIGID in sizes bigger than 2". Opinions expressed indicated the need for conduit sizes up to 4", it being felt that lack of the complete range would in some instances cause us loss of business. There seemed to be no unanimity in opinion as to the demand for these heavier sizes percentage-wise. Those present were urged to try to get some figures indicative of this demand so that the seriousness of the problem might be better evaluated. Mr. Rolston advised the group that this matter would receive consideration as long as it was considered to be a sales obstacle.

Rome-EMT

Primary discussion evolved around the decided falling off of customer demand for electrical metallic tubing. Plant stocks have increased rapidly and the product is backing up in our warehouses, as well as wholesalers' inventories. There has been some evidence of price cutting.

Mr. Rolston related his visits with customers down the entire length of the Pacific Coast in which he found evidence of a slackening demand and posed the question for group discussion. In the roll call discussion which followed, reasons for the falling market were expressed as:

Shortage of copper wire to go in the conduit
Dumping of inventories from one territory to another
N.P.A. denial of building approvals
The unusually severe weather of western states

Regarding the outlook for the future, the consensus of opinion indicated an expected pick up in Rome-EMT business after a lull of possibly 60 to 90 days.

In discussing ways and means of stimulating Rome-EMT sales, opinion was expressed that TV mast business could have been improved if all sizes of EMT had been available. Opinion was expressed that the lack of 1½" had hurt this [fol. 5618] business in the Los Angeles area.

Mr. Woodill explained the unbalanced size availability as going back to the basic purchasing of steel. The correct gauge and width of steel has often times been unavailable and plant production has by necessity been predicated upon delivery of steel sheet and, therefore, often unbalanced as to size. However, this situation is improving and Mr. Woodill expected to be able to level out size discrepancies. Mr. Rolston pointed out that under today's competitive situation we must be more flexible as to conduit size.

Mr. Rolston pointed out our apparent misjudgment of the Rome-EMT elbow situation. Opinions as to what might be done to improve our sales varied but it was unanimously felt that both Rome-EMT and Rome-RIGID elbows were a necessary part of our line.

Mr. Rolston raised the question of the real need for black enameled rigid conduit. There seems to be very little need for it, based on the opinion that customers will take it only when they can get nothing else.

Priority Ratings

As they pertain to Rome-EMT and Rome-RIGID, Mr. Lewis expressed the opinion that priority ratings other than A through E now have little significance, except that in accordance with the basic priority setup a rated order does supersede an unrated order, production-wise. NPA's attitude toward jobber's stocks seems to be that they are necessary and proper. Mr. Lewis made reference to the Conduit Industry Committee's recent article on the essentiality of steel electrical raceways as part of a program to impress upon NPA the necessity of material allotment for conduit manufacture.

We have reprints of this article available and customer distribution of them was urged.

Consigned Stocks

In the discussion of this subject recognition was given to the necessity of consigning Rome-EMT in order to maintain

a competitive position. Requirement figures were collected from those sales districts involved for the purpose of seeking executive approval for the granting of consignments. Sales managers will be advised of authorizations as approved.

Until the availability of Rome-RIGID improves no authorization for consignment of this product will be granted.

Advertising

Mr. Thayer outlined briefly advertising plans as they pertained to both Rome-RIGID and Rome-EMT. The program has been given impetus by the taking of additional space [fol. 5619] in Electrical West and the immediate plan is to place emphasis on Rome-RIGID, thereafter combining or alternating the two conduit types.

The need of product literature was acknowledged and work will be started on the catalog section covering both Rome-RIGID and Rome-EMT.

Attention was called to the availability of Electrical Steel Raceways for customer distribution.

Question was raised regarding the effectiveness of direct mail effort and the general feeling seemed to be that it should be a part of our promotional effort.

Saturday Morning Session—March 22, 1952

General Sales Discussion—G. E. Rolston

Rome-EMT

As unfinished business, discussion took place regarding the market for Rome-EMT as TV masts. Opinions expressed brought out a number of differences in customer requirements depending upon geographical location, etc.

The market was recognized as one worth developing and Mr. Rolston urged that we attempt closer contact with the actual manufacturer of the masts, particularly where the business went through an electrical wholesaler. In other words, the business being non-electrical, we probably can save ourselves much grief by closer contact with the end use.

Commercial Tubing

This market was pointed out as being a sales possibility to which we should always be alert. Our Torrance facilities are suitable and it might well prove a production lifesaver in a time of slow electrical demand.

We cannot handle special alloys or stainless steel, but would like to receive all possible information on worthwhile business involving carbon steel tube.

Wire and Cable

The balance of Saturday's discussion was thrown open to Rome products without any formal agenda.

The first order of discussion, because of its present interest, pertained to aluminum conductors.

Mr. Rolston stated that on his trip down the coast he had seen considerable evidence of government pressure to substitute aluminum for copper. He quoted national statistics indicating the increased use of aluminum as an electrical conductor over a period of years.

[fol. 5620] Considerable confusion exists in government allocation of aluminum. Mr. Fraser reviewed some of the allocation problems as they have effected our own use of aluminum. Opinion was expressed that there would be more aluminum available for insulated conductors in the last half of 1952. Present availability, however, is tight and we have taken some orders in the hope of getting the necessary aluminum conductor. We may fall down on some of these and be subject to customer criticism due to circumstances out of our control.

Mr. Schatzel led a discussion of some of the uses of aluminum conductor. He related recent meetings of IPCEA and AIEE, both held in the attempt to find answers to some of the electrical problems, as well as to establish industry standards.

One big question remains to be the method of connections. As far as building wires are concerned there is no manufacturing problem, but rather a problem of our responsibility. There is still no satisfactory and proven method of connection. The compression type seems best, so far.

Mr. Schatzel stated that we feel aluminum conductors have a safe and permanent place in our picture; namely,

overhead as service drop or line wire and possible in building wires 1 AWG and larger where installation will be in the hands of trained personnel.

Industry efforts towards standardization currently involve establishment of standards for self-supporting service drop cable and the matching of conductor sizes of copper vs. aluminum, based on current carrying capacities.

Mr. Fraser referred to the recent agreement between Alcoa and Rome Cable. It is considered by us as an important "two-way street" in that we can get the benefit of their experience with aluminum conductors in exchange for our insulating knowledge. Mr. Rolston stated his expectation that the arrangement would lead to friendly competition of a high order. Sales personnel should make it a point to get acquainted with local Alcoa personnel. Difficulties will arise, a typical one being, inasmuch as aluminum is an allocated material, the possibility of Alcoa and ourselves quoting different delivery on the same job due to the fact that our allocation for a certain quarter may be all sold, whereas, they may have open availability. These situations will arise and will have to be worked out as they come up.

Mr. Rolston presented the aluminum price picture as being complicated due to the many variations and constructions. We are doing our best to get price sheets out in the field as quickly as possible. We will not issue a price sheet showing building wire smaller than 6 AWG and we prefer sizes 1 AWG and larger.

Mr. Schatzel explained the rather complicated number system used by Alcoa to indicate aluminum tempers. The Engineering Department will get out an information letter on this subject.

[fol. 5621] Moving from aluminum to copper discussion revolved around the pricing of power and control cables of the all rubber type, principally RoZone-RoPrene. Current pricing regulations for this type of cable cover a multitude of sizes and types. A real problem is involved in arriving at realistic prices. We have never been properly compensated for short runs. We have been following price regulations in this respect, with the result that some prices quoted have appeared out of line. We must, however, give these new short run charges a try until we find we cannot live with them and still be competitive.

Mr. Fraser expressed Rome Cable's determination to be competitive where competition is realistic.

Mr. Schatzel asked for competitive samples of rubber and Neoprene high voltage power cables (5 KV) from the field. Our costs on RoZone-RoPrene have been high. Competitive samples will indicate what our competitors are doing and may assist us in cost reductions. We recognize only Okonite and Kerite as being competitive to RoZone from the standpoint of quality. We do not want to lessen the quality of RoZone, but we must cut manufacturing costs.

Mr. Schatzel introduced the discussion of butyl vs. oil base compound and recognized the West Coast as being one place where competition has talked down oil base compounds in favor of butyl. While we may find ourselves coming to the wider use of butyl compound, we should in talking with customers make sure that comparisons between oil base and butyl are based on recognized industry tests . . . not trick ones. Oil base will still stand up favorably in comparison except, of course, for butyl's resistance to high temperatures.

Saturday Afternoon Session—March 22, 1952

General Sales Discussion—G. E. Rolston

This concluding session of the conference was devoted to analysis and review of the company's present overall order backlog. In other words, how realistic can we consider it?

The firmness of our backlog can materially effect both our short and long range picture from the standpoint of inventory, profitable production and serviceability to our customers. If there is copper now allocated in our backlog against worthless orders, we should determine that fact now and divert the copper to badly needed products, rather than waiting for cancellation and finding such diversion impossible. Discussion, therefore, was aimed at trying to find out "where we stand."

Comments and opinions were solicited from each sales district represented and while various explanations were made for apparent "soft" spots, the general consensus of

opinion seemed to be that the demand as reflected by our current backlog is real in most cases.

Mr. Fraser stated that responses to his recent questionnaire indicated our backlog to be 80 to 90% firm.

[fol. 5622] However, he urged that we examine closely our X-6 orders to be sure that we have the type of orders on our books that really mean something. Our large investment in outstanding reels was quoted by him as indicative of what we feel must be pyramiding inventories in the hands of customers.

The discussion was concluded with strong admonition by Mr. Rolston that we keep our ear to the ground with respect to our present backlog. We must be alert to any change or trend we see developing that may effect our backlog situation. Mr. Rolston recommended and requested that each salesman present set up his own personal system of keeping tabs on pushbacks and cancellations so that he may quickly sense any softening of the national market.

A plea was made by Messrs. Fraser and Rolston for continued competitive information of any kind. We have no desire to establish formal sales call records but Rome must be kept better informed of competition. The possible desirability of a simple multilith form for reporting competitive information was expressed and those present were urged not to withhold news of competitive practices just because they thought or assumed someone else would report the same information.

The afternoon session was concluded by adjournment at 4:00 P.M.

[fol. 5623] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 334

cc: D. H. Thayer, A. D. R. Fraser
To: G. E. Rolston
From: J. R. Woods
Date: May 5, 1959
Subject: Aluminum Sales Policies

Dear Glenn:

Ross asked me to outline some of the problems we have had or anticipate in the Alcoa affiliation. Naturally, my first desire is for a definite sales policy which will integrate the sales forces and take advantage of our combined efforts. I hope we can get some basic policies established in the near future so we can formulate effective sales plans. I believe we have a mutual understanding of these problems so I do not feel it necessary to elaborate on them.

The most pressing problem at the moment involves aluminum rigid conduit. We have made satisfactory arrangements to sell this product which will keep us from losing our distributors to Kaiser or Reynolds. The fact that both Rome and Alcoa are actively and independently soliciting customers, however, is bound to compound a problem we must face in the future. Our reputation, knowledge and establish relationships in the wholesaling field coupled with the broad line we can offer is going to make up a very desirable supplier, but a necessary part of our policy is in my opinion going to be selectivity. We will have a great deal to offer a wholesaler but this advantage will be substantially diluted if we offer it to a great many wholesalers. We are going to be faced with the problem of weeding out wholesalers and retaining only those that can do a good over-all job for us. Knowing this, it seems rather impractical for Alcoa to be adding conduit consignees that may have to be terminated if they do not fit into the overall picture. Terminating consigned stocks is at best a very messy job and in the process we might well do irreparable harm to our relationships with some wholesalers we might want in the future. The new aluminum conduit price and the possibility of a steel strike may well precipitate a de-

mand for conduit that would put aluminum in solid. We should be in a position to take advantage of these circumstances to establish and strengthen our position with good wholesalers, but this may be impossible to do because Alcoa's capacity will be spread around the country with consignees that we cannot build for the future with.

I will cite a case that illustrates the problem and I think points up the necessity of getting this matter settled immediately. As you know, we have never had good distribution in Maryland. The largest and by far the most desirable distributor covering this area is Tri-State Electrical Supply with a house in Hagerstown, Baltimore and Cumberland and branch houses in Chambersburg, Frederick, and Harrisburg. The ink was hardly dry on our affiliation agreement when I had a call from an old friend who is Executive Vice President of this company. He expressed interest in working with us and stated that he was going to concentrate on the thirty utilities and R.E.A.'s in his territory. He, therefore, was interested in the supplier [fol. 5624] that had a good reputation with the utilities, which we have, and, also, one who is a prime producer. He said we looked like the kind of a supplier with the kind of broad line he wanted. I stalled him off saying that we were going to be selective and that when we did enter into an agreement it would be on a partnership basis and that we would offer our broad line in return for preferential treatment. In other words, we would expect a good share of his regular business along with the overhead conductor he expected to get from the utilities. I also mentioned that aluminum conduit would be a very desirable part of our line, thinking I had a trump card to give him some food for thought. My plan was to bargain with him, our line including conduit for a substantial share of his over-all business. He called me back a few days later stating that he had signed up with Alcoa. He, also, expressed some concern over the fact that Alcoa recognized Line Material in Baltimore as a distributor and, also, that they had conduit consignment with some other small distributor in or near Baltimore. While I still have hopes of working out a deal with this customer, it is too bad that our hand has been weakened by dual effort. The sales advantages that Alcoa paid for cannot be realized if we continue to go our own

ways. We all realized that the affilition would cost both of us some business, but I fully expect that we will gain more than we lose. Unless we can come up with a coordinated sales effort the effect will all be on the negative side.

Very truly yours, Jr.

JRW:reh

[fol. 5625] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 348

J.H. Dyett

COPPER MEETING
April 20, 1939

PRESENT: J.H. Dyett, D.H. Thayer, G.W. Commerford, T.D. Bylin, J.S. Pendorf, F.S. Marks, Jr., R.G. Poole.

ABSENT: G.E. Rolston.

JHD mentioned that the copper market was weaker than it had been earlier in the month. The producers were selling at 11.5¢ and the custom smelters at 32¢. The metal is still in short supply.

In a discussion on INVENTORY JHD pointed out the 17% increase over a year ago in in-process stocks; the 20% decrease in consigned stocks; and the 14% increase in Rome finished stock. It was felt that the increase in Rome and a decrease in consignment showed a better disposition of finished goods.

The production in April is ahead of sales, with the exception of weatherproof. Some of this apparent overage in rubber covered is due to the late tabulation because of tab machine breakdowns. The total order backlog is down 900,000#, mostly reds.

JHD discussed the production and stocking of aluminum building wire at Rome and asked RGP to set up economic runs and inventory requirements. It appears that in order to meet competition, we are accepting orders, but will try to run economic lots. CHE stated that he did not feel the shipping room could stock any more than a very nominal amount of such wire without enlarging the present space. JHD said that as this program gets further along, we will have to analyze the possibility of such increase in space. It was not clear whether the sales department intends to stock at field levels.

There is expected to be approximately a 300-400,000# increase in rubber covered stock in April, and it was felt that our production should equal sales in May.

Through the 20th, transfers to rubber covered finished stock are 1,110,000#; ship out 946,000#; and transfers from bare wire to rubber covered 1,403,000#.

The following figures were given for May and June sales:

	May	June
COPPER		
Rods-Regular	1,460,000	2,000,000
-Toll	2,100,000	2,100,000
Bare Wire-Fab.	560,000	500,000
-Misc.	550,000	600,000
-Toll	85,000	100,000

[fol. 5626]

Copper Meeting
April 20, 1939

May and June sales(continued):

	May	June
Weatherproof	185,000	185,000
Magnet-Paper & Cotton	135,000	145,000
-Glass & Asbestos	60,000	60,000
-Forward	100,000	110,000
-Toll	-0-	-0-
Rubber Covered	1,600,000	1,750,000
-Toll	15,000	15,000
ALUMINUM		
Rods	40,000	40,000
Bare	50,000	50,000
Weatherproof	-0-	-0-
Rubber Covered	150,000	150,000
Toll	160,000	160,000

Copies to: A.D.R. Fraser
P. Lopushinsky

1772
1100
490
1450 sales
4812

1900
1130
490
1450
4970

RGP:AF

[fol. 5627] IN UNITED STATES DISTRICT COURT

2443

PLAINTIFF'S EXHIBIT 349

COPPER MEETING

JANUARY 22, 1960

PRESENT: J. M. DIETZ, G. E. HOLSTON, C. H. ELLIS, T. D. STEIN, J. S. PENDORF, R. G. POOLE.

ABSENT: G. W. CONNERFORD

GER mentioned the competitive situation with respect to building wire and said that RCC was 15% above the industry up to the price change of 1/21/60. He reported that St. Paul Warehouse was virtually selling nothing and other warehouses were in similar positions. The new price level has placed us competitive or 5% above some companies, a situation with which we can live. Power cables have shown a further decline, selling 20 - 30% off the sheet.

JMD said that the order backlog was down 30% since January 1st, mostly due to not selling as great a volume of rods. R/C sales through the 12th billing day are only 60% of the budget. Magnet is off due to lack of orders.

In a discussion of finished stocks, JMD said that they were high in relation to the current and expected sales volume. Therefore, it would be well to reduce production of construction wire types until sales pick up. It was decided to produce approximately 200,000 lbs. less than the expected R/C sales in February.

The receipts of copper in February will be approximately 3,200,000 lbs. unless the strikes are over; in which case up to 4,500,000 lbs. may be received.

GER asked about aluminum building wire stocks. Schedules for TW and RHW braided wire have been started in the mill and sheets for RHD will be sent over by George Campbell as soon as estimated sales figures have been received from Dwight Thayer. (These were promised on January 25.) TDS was asked to rush these through as soon as possible.

Ordering amounts should be reduced on regular scheduled items by George Campbell (this was done on 1/25, with the exception of Reflex since we are still considerably backordered for most sizes). The sales figures now being used are about 10% lower than 1959 volume. A check with GER will be made the middle of February to determine whether the sales volume is changing from the estimated budget.

Magnet stocks should be kept up since GER stated that we would not get any orders unless we have stock. Customers can get immediate or 3 - 4 day delivery from competitors and will not wait for manufacturing time.

TDS asked whether this was true about Weatherproof. GER said he would review the situation and advise, but that using as a guide the last three months' sales would give the Production Department approximate figures for saturated and finished stocks.

[fol. 5628]

Copper Meeting - Jan. 22, 1960

Through the 21st the Rubber Covered transfers were:

Bare to R/C	1,100,000 lbs.
R/C to Finished Stock	996,000
Ship Out	714,000

The following sales figures were given for February:

COPPER

Rods - Regular		900,000 lbs.	300,000 at 36-1/4 300,000 at average cost Westinghouse - we will use 600,000 of scalped instead of 900,000.
- Toll		2,000,000	
Bare Wire - Feb.		260,000	
	Req.	550,000	
	Toll	235,000	
M/T		175,000	
Magnet -	Paper	125,000	
	Glass	10,000	
	Cotton	15,000	
	Formvar	125,000	
	Toll	31,000	
R/C		1,200,000	Production 1,000,000. Housing starts are expected to be off in 1960 - competitive situation
" -	Toll	25,000	

ALUMINUM

Rods	25,000
R/C	215,000
Toll	190,000
Bare	90,000

March is expected to be the same as February with the following exceptions:

Magnet		350,000
	- Toll	15,000
R/C		1,400,000
Rods Reg.		1,300,000

April

RGP:AS

[fol. 5629] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 350

April 26, 1955.

Internal Correspondence

From: R. R. Cope
Sales Development Division
New Kensington

To: Memorandum

Re: Edward Ashley Associates

Ref: Aluminum Insulated Power and Feeder Cable

We intend to ask the captioned to undertake an engineering study to determine the economic aspects of the use of insulated power cables in multi-story office building construction and in industrial plants. This memorandum is being written simply as a guide in making a proposal to the captioned for this work.

Mr. Rodee of Edward Ashely Associates indicated that they would be prepared to make a study for us and that they would use information which they have generated not only in our own plants but in other plants and office buildings which they have designed. We feel that aluminum should be designed on the basis of aluminum's characteristics and not on the basis of a preliminary design in copper and then a substitution for equivalent current carrying capacity.

1. Compare the costs of an aluminum system versus a copper system for multi-story office building construction using some typical building. This study should include comparisons of insulated power and feeder cables, vertical bus risers, and the branch circuit conductors used for lighting.
2. Make a cost analysis to compare aluminum versus copper in the construction of a typical industrial plant. Such a study should include a comparison of power and feeder cables, control wiring, and branch circuit wiring.

[fol. 5630] The fact that aluminum weights one-half the copper conductor for equivalent current carrying capacity, makes it posible to use aluminum conductors in self-supported spans from roof trusses without the need for large conduits. Also in industrial plants, cable troughs can be used to advantage eliminating the need for increasing the size conduit to accommodate the larger aluminum conductor. We are in hopes that this can be taken to account in their engineering study since it will be reflected in the installation costs. It is certainly our intention that the cost figures represent the installed cost of aluminum versus copper so that this information can be used to promote the sale of aluminum wiring with electrical contractors, other consulting engineers, architects, and electrical inspectors.

R. R. Cope

RRC:mas

[fol. 5631] In United States District Court

Plaintiff's Exhibit 351

55 Sales.

R. A. Schatzel

General Engineering and Research Survey

I think we are ready to start the Engineering Session, and I would like to add my greetings and pleasure at seeing you all again. I hope that we can make this Conference of real value to you. I hope particularly, that we will be able to give you some of the answers that you have come here to get. In order to do that I will limit the general remarks that I might make to just as few as I can, and get into the meat of our discussion. Distributed around the table is a list which I have headed "Topics". I don't expect to cover them all, but it is hoped by your interest in these topics, or others, that you will be able to guide us into the things you want to have covered.

First of all, before we enter this list, I would like to just mention something of our Organization and our changes, and some of our plans. Last year you know I told you that we were endeavoring to, and had perfected three organiza-

tions, of which I was primarily a coordinator. The Engineering Department under Mr. Graham as Chief Engineer, and you know how effectively he has been operating in that; he, together with Mark Wolf are running the Engineering Department. Of course in the Laboratory I don't need to tell you that Mr. McCutchan has been doing his usual good job, with a tremendously increasing number of problems.

During the year 1954, we set up a department under C. H. Ellis, a Technical Superintendent in which we transferred Austin Woolley. This was to permit a closer and more complete technical supervision of the day to day plant problems that arise in manufacture, all of which were carried out by the Laboratory. The Laboratory had a sporadic and a multiple type of authority; sometimes none, but at least the multiple responsiblity. This change, I think, places the responsibility, authority, and the command where it belongs and allows for improvement in manufacturing control. During this past year—Charlie may cover this—I think we have greatly strengthened that department. One of our students, Mark Dollard, and one of our previous students, Joseph Duffy, are there, both competent and capable engineers. We hope that department will be further strengthened.

"Now how does that tie in with the Laboratory? The Laboratory is able to devote its time on service, and can strengthen its service of development and research. We have made some steps this year in strengthening the Laboratory; not as much as Mac would like, but we've made a step in that direction. We have transferred from the Laboratory one of the most capable of our Engineers—one of our former students—Ian Marwick to strengthen the Electrical Section. We are strengthening the Insulating Section of the Laboratory, and during the year we hope that the functions of the Laboratory will be departmentalized into a group of specialists developing greater efficiency along these particular lines. I won't try to outline what I mean, expecting this—we have not just one Laboratory—we have an Electri-
[fol. 5632] cal Laboratory, we have an Insulations Laboratory dealing with plastics and complex chemical materials, including rubber. That's one group. We have a Metallurgical Laboratory, we have a Product Development and Testing Laboratory, and we have an Analytical and Control Laboratory, all of which are coordinated and directed under our

Research Director, Mr. McCutchan, and his Staff. Those, I think, are improvements in Organization that we have under way.

We believe we have greatly strengthened our Inspection Department. Starting last year we had an addition there in a testing group under Bill Griffith, who Mr. McCutchan had trained and who had been further trained in our experience in Spiral 4. All of our products that go through the mill today are sampled on regular schedule and tested, and we get weekly and monthly, a uniform report which gives us an idea of the quality level that we're running. We have a pretty good check on sampling tests because the Laboratory itself picks up some samples. In this way we are building up a history of quality.

Now we are trying to tie that in with another development taking place which we mentioned to you in industry, and that is the development of Statistical Quality Control, which we have put under Ken Hamlin. More and more Industry groups are interested in that, and we are trying to write it into specifications so that instead of asking for all of the certified test reports, and having to sample from each individual order, we are gradually getting acceptance of an idea in Industry, that they will accept a certified report that this product, made on a certain basis, conforms to a quality level experience of the plant. This does away with a great deal of this individual and expensive testing. We have that written in IPCEA; we have it written in some A.S.T.M. specifications. We have Quality Control committees in both those groups, and we are trying to tie in that customers will accept evidence of a quality level performance basis of the plant in lieu of specific tests on the order. That puts the plant that's doing a job on a little different basis than fly-by-night people who cannot, and will not, keep that type of a record. So I think that overall we are making some progress.

The Laboratory has aided tremendously in furnishing personnel, as you can see, for all of these efforts. In the meanwhile we have the responsibility to replace and strengthen that personnel.

During the year as you know, Gray Howe has been very sick. I haven't seen him as much as I'd like to, but I wrote him a note within the last few weeks and had a call from

him. I asked this, perhaps when some of you fellows were here, and you had an opportunity, he'd feel like seeing you and he said he would be very glad to. So I hope that any of you that might be up that way and could stop in, will do so. I know he'll be glad to see you.

One thing I want to mention which is very important is that Phil Isom has been carrying on as the active head of the Inspection Department. He has done a very fine job. He isn't here this morning, but I wanted all of you to know [fol. 5633] that Gray has a good man pinch-hitting for him.

I think that covers generally our changes in Organization, with one exception, that in our Quality Control group we have taken on a student who has a Quality Control background and he, we believe, will help strengthen that particular function. With the assistance of the plant, the Quality Control group have taken over the process control. We have process inspectors, and we have finish inspectors. Process inspectors were reporting to Production and they were responsible for quality levels too. All of that has been put under the Quality Control group, and at the request of our Production Department we are trying to extend that activity into as many departments as we can. I think we're making progress. I think a good deal of it is not alone responsible or not alone credited to the Quality Control group, but to Production and particularly to Frank Baumler who has been following it very closely.

In the field work during the past year we have tried to keep Bob home a little bit more, but I think you'll testify that he's been doing the usual good job and spending just about as much time in the field. So is Mark, but between them I think they have been here enough so that I could get away once in awhile.

Mike Kopchik has extended his activities to a greater extent, Field Engineering, and during the past year he was also our schoolmaster. He took care of our Students, as well as the Mining Cable with Dick Gray and Gil Lipscomb. He'll have something to say about that. We hope during the year that we can extend that work somewhat. I believe we are a little better organized, and I think some of you have also seen Ed. Duffy out in the field once in awhile. Unfortunately we still have complaints and Ed we have

here as a trouble-shooter, and in each case he has done a very fine job. Backing them up is Lew Selden to take care of the Underwriters' activities and some of our other NEMA activities, and Mert Williams of course, together with Sid. Mills. We also have in the Engineering Department one of our Students, Dick Coop, and he is holding down a regular job there now. I think we have our Engineering pretty well organized and you can look for at least as good service as in the past year.

I'm going to digress a minute from the sheets I sent out to you, and mention one thing that comes under the item of Bulletins. Last year we told you that we would endeavor to get a list of those Bulletins up to date with the obsolete ones so that you could simply organize your book and keep it current. We have that accomplished now, We also said last year that we would try this year to have something to say at this meeting on a new addition of the Manual. We have something to say but we don't have a new Manual. We just haven't had the manpower or personnel to do it, but we believe that during 1956 we can get a new Manual. We have a great deal to put in it. Our present Manual is in many ways obsolete. Of course, all our references to In-[fol. 5634] dustry Standards are today obsolete. Most of the data is good, but incomplete. We have to have a completely new section on Aluminum. We have to have a section on Splicing. We have a considerable number of new tables that should be included. All of that is going to take a tremendous amount of work, but we hope to have it completed in 1956 and ready in 1957 which will be the tenth anniversary of the first edition. That's the best I can tell you now.

Now I would like to take up this list of Topics, and I see I have pretty nearly run out of time. We will run over these topics and cover the ones that you have the most interest in. The first one I have is Aluminum, and I'll mention what I want to and then ask you to bring up any questions you want. Understand that Bob will cover some of the details on this. The reason I have put Aluminum at the head of that list is that I know you've already seen a tremendously increased interest in the field. I've talked to a number of Utility engineers. Bunky and I were talking to one last Tuesday, and he repeated what many of them have repeated

to me, and which was quite contrary to what I've heard before. It is not, Why should we use it", but "Why don't we use it?" "How can we use it?" And that is the changed attitude on the part of Utility Engineers.

A few years ago I told you that you can't change the elemental properties of a metal. Aluminum has one set of properties, copper has another, and all the bunk in the world can't change it. They have certain advantages and they still do. The properties of Aluminum are not changed at all, but the economics are, and in Engineering I think we have to recognize two sets of facts. One is the technical side, the other is the economic. When the economic pressure, the economic advantage, is great enough, I think we can find Engineering ways to do things. The Engineer in Industry and Utilities have reached that point. So you're going to see and already have, a tremendous interest and willingness to use Aluminum.

In Bare wire many groups are using bar*d* hard-drawn Aluminum transmission lines, replacing ACSR. That is done particularly in Southern California, it's done in Philadelphia, and it's done in many of your Utilities in the South, and it's done for several reasons. The primary one is economics and ease of handling and installation, and the reliability of it has been quite well proven. So I think we can see an extension of that.

You've heard quite a little bit about Aluminum Alloys; I think the Kaiser Alloy is the principal one. On that I only mention it to give you the reasons why we haven't been quite so interested. We may have to be, but we took this up with the Aluminum Company over two years ago. We also took this up at a meeting which we had all three aluminum companies present—Reynolds, Kaiser and Alcoa—this subject of why they couldn't provide us with an Alloy similar to that being used in Europe under the name of Aldrey in England; Similac in France.

[fol. 5635] There are several other metals, and they're all about the same thing. They are a Silicone-Aluminum Alloy having about 55% conductivity instead of 61%, and a tensile strength of about the same as hard-drawn copper, or a little higher.

Now the reason that we have not been so interested is first, it's difficult and costly to process. It needs a heat

treatment. The second thing is that used in the hard-drawn condition, it has what is known as a very low "notch resistance". Give it a scratch, and bend it, and a kind of fatigue starts which develops into a complete crack, right through the metal. Now, during the past year you've seen recognition of that. You have seen recognition of that in the fact that Kaiser has brought out their ND-1 Alloy and it's identical. I have not had it analyzed, but it's a Silicone Alloy, the same as has been used in Europe under the names Aldrey and Similac. Kaiser have not listed it in a solid conductor form, but supply it only in stranded; and the whole reason for that is to minimize in the hard-drawn form this cracking or notch extension when you get a scratch on it. If you have a scratch on one wire you lose one-seventh of your strength, not 100% as you would in a solid conductor.

Since this has come up we have taken it up again with Aluminum Company. In view of the fact that they have been slow in the development of their steel covered aluminum, and which they had discussed with us two year ago—we've taken up with them now that we've reached a point whether we should now consider an Aluminum Alloy, Aluminum Company and ourselves. If your development of this Aluminum covered steel is going to continue to be indefinite and slow, shouldn't we both supply this kind of an Alloy? We have back from the Aluminum Company an answer that as far as they are concerned, their opinion is the same as it was—that we could do it if we wanted to and they'll supply it, they make it. But our feeling is that we are not in position where we would want to take the responsibility in view of their technical advice. Now we can't knock another fellow's product and we're not so sure that some of these types of criticisms in the alloys can't be overcome. They have another reason which we think is more compelling than that. They say that this alloy which Kaiser is furnishing is too expensive; that while Kaiser is furnishing it they think their prices are altogether too low, that it will cost much more.

During this I've mentioned this Aluminum covered steel and you've heard of that as ACSW. ALCOA are still in a development stage, and I'm convinced they are. They have just ordered a press to be installed to make that material.

So whatever you hear about it now—Glenn or Fred has written you, and we've kept pretty close to it, and we know at Massena they do not have a press. We know that the press at New Kensington which they are making this on is not one built for that purpose. All the material is being made at New Kensington and sent to Massena for drawing, and so it is still a developmental material. We believe though, that eventually it will be a very worthwhile material once it's completely developed.

Now I'd like to go just for a minute to aluminum insulated conductors. I've listed here primarily building and power. The same problem exists as far as use in building wire as has in the past, and we've talked about it at your previous meetings. The problem primarily is connectors and the training of men that handle them. But we believe that aluminum building wire or aluminum wire for power uses, if confined to larger sizes, we prefer No. 1, but it may [fol. 5636] be that No. 4 or something like that would be agreeable. They are going to be used because the economic advantages are there and in those larger sizes the connectors have been developed; the service records are good, and we have the type of material that can be used.

We also know the types of things we'll run into and the types of faults we'll run into. What I would like to warn you about is power cables, either overhead or underground. As long as it fits the economic picture it is going to be used. It does fit the economic picture today, and this engineer in Philadelphia said if we get to using it we will find the bugs and correct them. That is a completely different attitude than the Utilities Engineer has had and it's true, we have always had that ability. There's one thing though that I would like to warn you of and you in turn, the people you are dealing with. We've had it come up here in two or three cases. We've had samples sent in from the field which we are very glad to get and which we had talked to you about before, and which we want to compliment you on now. We are getting samples from the field and these samples came in from competitors. I think it was a compliment to our Sales force that our Engineering friends gave them samples of competitive cable and said, "Here's some cable that isn't yours, but we bought it and we've had trouble with it, and it's aluminum—one case Service Entrance Cable. Other

cases have been weatherproof and if we bought your material, would it be any different? Is this something that could be corrected?" We have had to go back and tell them in each case it wouldn't make any difference who you bought it from, it's inherent in the aluminum. In each case, no matter how good the insulation is, whether it is Polyethylene, the best rubber we can make, whatever it is; if you get a hole in the insulation and it comes near the ground, you're not going to have just an out, you're going to lose your conductor. Now you don't do that with copper, but you do with aluminum; you have corrosion and you'll have it turned practically into a white aluminum powder. Now that's going to happen whether we make it or whether any of your competitors make it, and so we've got to advise anyone that comes to us with that kind of thing that it is a property of aluminum. That's a calculated risk you take in making and using it; and if we don't do that, if we supply them with some idea that we can make an insulation that will overcome conditions like that we are going to be in interminable trouble. We believe that Industry is willing to recognize its deficiencies and use them in spite of it and that's the position we're in.

I think on Aluminum Magnet wire we've had indications that it will be used in fixed equipment. Whether it will be used in rotating equipment or not, I don't know. Mark and Glenn will have to talk to you about that, because up to the present time vibration and fatigue have been too great a hazard to overcome in rotating equipment. So in a transformer, fine—in a motor—no. I have some question about [fol. 5637] that. I understand that General Electric had used quite a little of it in motors, and I understand that Ford is using it in starting motors. So any statement that's made without qualification, you could probably prove me a liar in ten minutes.

We're going to have more use of aluminum in flexibles. I put down the word flexible because we've had a considerable interest in certain welding cables and it won't stop there. Wherever a flexible cord is handled, where size is not important but weight may be, I believe we've got to begin to look at aluminum and that takes in quite a field. How far that will extend is going to depend again on con-

nectors, and there have not been any suitable connectors developed yet for that type of service.

We are working with a committee that will put into the Code new current-carrying capacities for aluminum. We have practical agreement on that now. Those were developed in IPCEA and I believe that very publication of that will give more impetus to the extension and use of aluminum. I have already mentioned the limitations.

Now can I stop for a minute, and ask if you've got any general questions on that subject?

HSW—Rudy, when you mentioned that you might get corrosion of the whole insulation and you might lose your cable, do you mean lose from corrosion only, or might get a short circuit? RAS—Well, it will be used, lost both ways, Skip—it can be lost completely from corrosion. We've had samples in here where the wire was completely intact; hadn't been burned, but with moisture entering and with just a slight urge, that that material was so bittle it could be just picked out of there. HSW—Rudy, what do you mean about a hole? Do you mean a hole in the insulation? RAS—I mean pinholes, or a damage in the insulation. Damage can occur during installation and can occur during service. It never occurs during manufacture. HSW—Is the rate of corrosion greater on all aluminum or ACSR about the same or what? RAS—Well, that depends on the cover. HSW—What I'm talking about is covered conductors. Well I mean covered ACSR. RAS—I should say it would be the same. The aluminum would react just the same as aluminum. HSW—Primarily electrolysis? RAS—Primarily electrolysis, that's right. But it's very susceptible. CRE—You spoke about connectors for Welding cable not being developed. RAS—That's right. They're not satisfactory and a great deal of work is being done. AKB—Rudy, are we regularly making aluminum Magnet wire? RAS—We have made flat Magnet wire and I think we'll take orders if they're big enough, won't we Glenn? GER—We're going to cover that. I'll cover the commercial part. RAS—So you'll get that answer.

Now, might I just hurriedly run down a few of these things, because I want to leave some time for the most important part of this program. That's the reverse lay Aerial cable. I only need to say that we have a license. We are

building a machine. Charlie has been very active on this, and I know I've had needles from you fellows during the year on when we're going to be able to supply. I think that it will take some time to get that machine built. Charlie might touch on that with you, but we're preparing to be in position to supply Aerial Cable, reverse lay. I think that [fol. 5638] you are also aware of the fact that Aerial Cable is getting more attention today than I think it's ever got from Utilities.

Butyl Rubber. I simply will admit now we've had a whole lot of trouble during the hear—a lot that we didn't anticipate. I think that is probably natural when you get into a material that is as tricky to handle as Butyl is, and to start real volume production on it. You find a lot of things that you didn't know, and that's our position now. We are working on them and I think when you go through the Laboratory Mac will have some samples out there. But rather than samples I think I can tell you that both the mill to the Technical Superintendent's department, Laboratory and the Mechanical Engineering Department are putting that on the top of their list. There are mechanical changes that have to be made in our equipment before we can satisfactorily process it. Those are being pushed just as fast as they can. I've listed here RHW because that's a Butyl problem. Someone wrote in and asked when we would have approval. We've had approval for months. But until we are satisfied that we can completely and satisfactorily process it, we have not spread that information or taken orders. We've taken one or two because we thought we needed that to develop our experience. That, I believe, is closer to solution than the high-voltage. The RHW is not far off, so we expect to have something for you shortly. On that again, it's a mechanical and processing problem.

High-voltage Butyl during the year has developed quite a lot, and our competitors have made some improvement. We told you last year that there was one competitor that had a good product, about the only one we would be satisfied to sell. That isn't quite true today. We've seen at least one other competitor that has improved their Butyl high-voltage insulation and we don't doubt that there are others. As a matter of fact, we have one of our own; that if we can

get satisfied that we can process it, we're quite satisfied to offer.

At the next AIEE meeting in Chicago which will be next month, there's going to be a tremendous pressure on this Butyl problem, and our RoZone and oil-base insulations generally are under attack. They're under quite serious attack, largely because of heat resistance. At the next AIEE meeting there will be three papers presented on Butyl and in each one of them oil-base insulation will be directly compared to Butyl and undoubtedly that will have repercussions throughout the year. Bob, at the expense of encroaching on your time a little bit, I'm going to just mention some things which we feel in regard to these particular papers and in regard to this type of attack which is perfectly justified if held within proper limits. We believe that the better method would be to go out and make a positive statement about Butyl, and leave out the question of competitive materials which are oil-base. Now our statement on that is this, that we're talking about high-voltage cable. Butyl rubber, as far as high temperature is concerned, there's no question about its being better than any other rubber that's been developed for high temperature. That cannot be questioned successfully until you go to Silastics. [fol. 5639] However, we're talking about high-voltage, transmission of electrical power at high voltage. The successful use of rubber as an insulation in transmission of power at the high voltages has been due entirely to oil-base insulations. It is the only material that has been used up to a few years ago, so all the experience, all the history of the electrical industry in the use of rubber, the high-voltage has been based on oil-base insulations. And as we've gone along through those years, that experience has been good. It has weeded out all competitive material.

Now we come to a new material developed and we present a great deal of Laboratory information of tests at high temperatures, etc., which show that the oil-base material which has been used successfully, is not good. Whether you've got a problem there, your must admit that tested at these high temperatures, which the other material will stand, it does not show up good. But this isn't the way that oil-base insulation has been used. It has been used and recommended at a lower range of temperatures, and when

properly used, has back of it a very satisfactory experience which Butyl does not have.

When you have a group of Laboratory tests which deny your experience over a period of years, what do you do? Throw out your experience, or question your Laboratory tests? Question your interpretation of the data? I think that most engineers, most sensible people, will go back and examine their interpretation of the data, and if they do, believe they will offer this conclusion—that the most reliable insulation for high voltages to use at 70 degress and lower is oil-base. If you have to engineer a job, if you have to make a decision on an application where a temperature higher than that must be used, you have every right to use Butyl. If you want to use the material within the range of 70°, you have a right there to do whatever you want to—you can use Butyl or oil-base. In one case you're going to place your credance on your Laboratory tests and in the other case on your experience. I think that is the only way that we can answer that type of thing, and that is the thinking that we have that guided us. So I give it to you for whatever it might be worth to you.

I'm going to mention one other item and that's TreePlex, because I believe that the others will probably be all touched on in our discussions later. TreePlex of course is our Polyethylene with Nylon sheath. At the time that we brought that out we believed, and still believe, that it was a very fine product, and fine development. We ran into two things with it that we have had to back off on. One is the extrusion of Nylon on large sized conductors. We're making Nylon you know, regularly on your Control cable. We supplied a great deal of it for Field Wire. It is the Standard of the United States and every other NATO country, and stored in all the world. Every company that makes Field Wire extrudes miles of it every day; we did. We extended in the Laboratory and under Laboratory control in the plant its use up to larger sizes. However, when we come to turn it over to regular production, even under Laboratory control, we could not satisfactorily process it. We've tried [fol. 5640] various types of mechanical improvement we could think of; we had every assistance from the Production Department that we could get off from everyone else, and it just didn't work. So we have to correct that part of it.

The next thing was that we had some disturbing evidence. The Signal Corps after all these years, used it during the war, ten years afterwards, standardized on it in every country, and had commissioned Battelle Memorial Institute to conduct an investigation on aging of Nylon. Battelle came out with a report that we believe today and so does duPont, that it is a very academic type of thing; but nevertheless it had a tremendous influence, in which they said that Nylon would age two years. Certainly for a wire covering we cannot rely on material that would age two years. The criteria of their judgment was, after aging under ultraviolet light for a certain number of hours, which was equivalent approximately to two years, it would crack when bent at minus 40°. Now for Tree wire we don't care whether it bends initially at —40°. Very few of the tree wires that were ever made have coverings that will withstand bending at —40°. However, the whole age-resistance of Nylon exposed to weather was under question.

We've attempted to clarify that with duPont, calling their attention to the wide use and the fact that they had investigated the material, and that they had publications out which mention excellent weather resistance. We called it to the attention of duPont, and we've had a series of letters from them. In one of these in answer to a letter I wrote them, I had a letter back on May 5th of this year which stated as follows: "A critical analysis was made by our Research Laboratories after a nine-year Florida exposure of Nylon containing Carbon Black. This particular data was based on an 11 mil Monofilament which showed a moderate dropping off in tensile strength and elongation in a few years, but then leveling off at the end of the nine years, still retaining 45% of the original tensile strength and elongation at —23°." They were good enough to tie a knot, etc. We asked them then to see the original research data, which they agreed we could do. I'll make this story very short now in saying that duPont have agreed and have been co-operating with Mr. McCutchan in actually coming into our plant in running Nylon; developing Nylon that will run, or helping us to correct whatever conditions we may have here to run it, *or helping us to correct whatever conditions we may have here to run it,* and at the same time, extend this research into aging, and to supply us with the original

data on which these statements of life is based. When we get all that tied together we will then make our decision of starting up on TreePlex again. So before we go out again we're going to have a good story on the aging as well as being able to process it.

In the meantime we have had other developments of improvements in Polyethylene itself, in which we feel that perhaps by the time we have this corrected we may not need it. We may have a Polyethylene insulation with much better abrasion resistance and requiring no outer covering. Now that's the story as it exists; I'll be glad to answer any ques- [fol. 5641] tions that you might have.

Now there's one subject I want to mention here. Many of you have written in about 5 KV unshielded cable. Bob has mentioned our report which we sent out. The report establishes things that we all knew, but puts down in very definite form the risk that we're taking. The Laboratory is still conducting investigations, a more complete investigation, which we hope will become a paper we can publish in the Industry and then have the Industry itself know, which I think some may not, but there is a calculated risk. We're taking that calculated risk when we're supplying unshielded 5 KV cable. Yet for 4160 whenever we know what the particular installation conditions are we may have to broaden that during the year, but we want to control it as much as we can. I don't know that we'll ever be able to change the picture because there are as this report and as our experience shows, a great many places where 5 KV unshielded cable is satisfactory, but during the year we hope to clarify that picture and certainly we're going to continue to meet competition. I think that in general, that covers everything.

HWS—Rudy, the August 8 issue of Electrical World had an advertisement by Okonite—if you haven't seen it, I've brought one with me—why Okolite conductor, etc. Can you elaborate on that a little bit? RAS—No. I think I can't, we have looked into that, Okoloy coating is a lead coating in the place of tin, and this is the general picture; with these oil-base compounds we do have compounds with a rather high sulphur content, and when we have moisture present, in the presence of moisture, with sulfur, we have sulfuris and sulphuric acid formed which will etch and destroy tin. It will do the same thing with lead, but slower. Now the part

of that is this—when you get water through an insulation and onto the conductor you've destroyed your insulation anyway, and so you just want to keep water out. So any time that you operate a cable with water on the conductor and insulation over it, you've got a cable that's going to fail no matter what the insulation is. So this is purely an academic question.

[fol. 5642] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 353

L. H. Hemeter
Pittsburgh Office

February 20, 1956

District Managers—Asst. Managers
Branch Managers—Cable Salesmen
Field Advisors—Product Managers

Sub-Committee on Electrical Conductor

R. V. Davies	J. L. Patterson
F. L. Magee	H. L. Hall
D. Wilmot	N. M. Kehew
R. B. McKee	B. S. Henderson
J. P. Haight	J. W. Hood
A. P. Hall	R. L. Phifer

Massena

J. H. DeKlyn	D. Paro
L. M. Arbegast	J. R. Ibach
H. D. Lockhart	H. S. Marando
D. L. Mayne	C. Weegar
P. H. S. Chapman	Wm. Hall
T. L. Gilbert	C. B. Travis

J. C. Yedlicka

Vancouver

E. D. Mairs	J. P. Lamoureux
J. T. Barclay	D. Barney

H. E. Young

R. C. Kasser	H. H. Gnuse
New Kensington	Franklin

Electrical Conductor Division Newsletter

The aluminum weight of bare cable produced in January was greater than for any previous month since last August and was 10% above the weight for December of last year.

New orders for bare cable received in January showed an increase of 39% in aluminum weight over the previous month. Although the January total was considerably below

what we would have liked to receive, January was the best month since last September.

Orders for 100,000 pounds or more aluminum weight were as follows:

Customer	Aluminum Weight Pounds
Consumers Power Company	1,000,536
Graybar Electric Company	177,574
Indiana Power & Light Company	220,431
Pennsylvania Electric Company	200,634
Priester Supply Company	130,652
Savannah Electric & Power Company	175,923
Toledo Edison Company	101,134
Westinghouse Electric Supply Company	108,961

[fol. 5643] The aluminum weight of covered conductors for January was down when compared to December of last year. New orders were down 10%, bookings were off 15%, and shipments were down 19%. However, when compared with January of last year, bookings showed an increase of 140% and shipments, an increase of 30%.

Competition, like death and taxes, can never be avoided; but through the years it does change. Before World War II our conductor competition was with copper whereas today it is with other manufacturers of aluminum. To sell a transmission line years ago our peddlers, and we had some good ones, often were faced with a lower copper price per mile than the price for equivalent ACSR; and as a result they had to show that the cost per mile of completed line would be less with ACSR than with copper. They had to consider the cost of supports, hardware, and stringing as well as the cost of conductor. To prove that copper is a has-been for bare transmission lines, consider a 138 KV, 100 mile, three phase line on steel towers, using 556,500 cm ACSR 26/7 or 350,000 cm copper as the conductor. One of our tower designer friends tells us that based on a tension of 40% of the ultimate under heavy loading conditions the approximate average span for 556,500 cm ACSR would be 1000′ and for 350,000 copper, 750′. This would mean an average of 1.77 more towers per mile for the copper than for the ACSR resulting in an addition of 20 tons of steel per mile at $.15 per pound and $100.00 per ton for erection costs. It is assumed that stringing costs would be about the same for both conductors. The net result would be that the copper cable plus extras for steel costs, erection, and insulators

would total $1,646,577.80 as compared with $395,503.20 for the ACSR; the cost of copper cable alone would be 209.91% of the cost of ACSR.

[fol. 5644] We recently completed tests on compression dead ends, similar to the Cat. 900 series, on 5/16" and 3/8" stranded steel conductors, using both a Model B and a Model 12-A compressor for making the compressions. The same dies were used as are required for the Cat. 1070 series compression joints for these ground wire sizes.

At the time tests were made only one customer was involved; but if any of you peddlers know of anyone interested in these dead ends, test results, design information, and prices can be obtained from F. R. Dallye. If the demand justifies it, these dead ends will be shown in our catalog data at a later date. Incidentally, the efficiency of the dead ends was comparable to that of the compression joints.

At the recent sales meeting in Chicago several of you made inquiries about information required to evaluate a competitor's accessories and to design new ones of our own. Larry Flaugher has suggested the following procedure.

When you forward or inquire about a competitor's accessories, we can best assist you by knowing to what service the customer intends to put the accessory. Include with your inquiry the cable sizes involved, state which of our clamps will suffer if the customer starts using the competitive item, and tell what the customer can do with the new accessory that can't be done with one of our existing designs. To design new accessories, we would like to know (1) what accessory is needed, (2) what service is required of the accessory, (3) on what conductor sizes it should be used, (4) why none of our present accessories are satisfactory for the job, and (5) what competitor's accessories will work.

Please forward your information or sample accessories to F. R. Dallye.

[fol. 5645] One of our customers was recently caught between a rock and a hard place when trying to use dies for a figure eight-cable joint in an H compressor to compress tubular joints on Merlin. This combination has never worked in the past and will not in the future, but it was recommended by a "Service Engineer" not a Field Advisor. Perhaps the name "Service Engineer" rates above Field Advi-

sor, but at least our boys know their onions and would probably agree with the late Will Rogers that "Some people say eat that ain't et."

As soon as our present supply of cut thread U-bolt, used in our Cat. 280 series of parallel groove clamps, is exhausted and Lancaster can complete their tooling changes, rolled threads will be supplied. Rolled threads are superior to cut threads, and we want to use the best bolts available.

Until comparatively recent times very few, if any, transmission or distribution lines were strung under tension because equipment was not available to permit a good job to be done. Braking the cable reels so as to develop any real tension in the cable was not desirable and bull wheels around which to pass the cable were only used for special jobs such as difficult river crossings. Two or three contractors constructed some tensioning equipment to be used for stringing super-high voltage lines; but in general, lines were built the same way as in the past except that the cable was pulled out by cats or winches rather than by horses or mules.

Some of our customers are now stringing lines under tension using Pengo wire tension stringing machines and we have received reports that these machines do a good job. The November, 1955, issue of "Electrical West" contains an article "Greased ACSR Is Tension Strung" which describes the stringing of a 220 KV 1,033,500 cm ACSR line of Southern California Edison Company using the Pengo machine.

[fol. 5646] Sales for 1955 of electrical conductors and accessories from consigned stocks amounted to $4,121,600.00, a gratifying increase of 79% over 1954. Agency sales totalled $4,117,100.00, also up 81% over 1954. Graybar had 48 stock locations at the end of the year and turned in sales from consigned stocks of $1,527,900.00, agency sales of $2,064,400.00, the total being up a comfortable 69% over 1954. We now have 9 Gesco stock locations, with consigned stock sales of $349,900.00 and nationwide agency sales of $424,200.00, totalling up a whopping increase of 188% over 1954. Wesco still had only 3 stock locations at year-end, but in January came through with a new one for Win Dow in Burlington, Vermont. Wesco consigned stock sales in 1955 were only $69,900.00 but as agents the nationwide take was $495,-

100.00 for an overall increase of 47% over 1954. An annual turnover ratio of 3.7 for all consigned stock distributors set a mark that will be hard to beat.

In the national sweepstakes for individual honors, the irrepressible Mr. Beck's Priester Supply Company of Dallas again wins in a walkaway with consigned stock sales of $785,300.00 and agency sales of $98,700.00, up 58% over 1954. Tom Tate's Line Material Company at Miami was a good second, C. D. Blair's Stuart C. Irby Company of Jackson, Mississippi, third and Mr. Beck tries to monopolize the winner's circle by bringing in Nelson Electric Supply Company at Tulsa a comfortable fourth. With a few exceptions, all of our distributors and agents are to be congratulated for their fine 1955 showing in a highly competitive market.

Distributor training course nominations are again in order for groups starting from New York on April 8, May 6 and June 3. You send us some good men and we will send them back well-equipped to sell Alcoa products for you.

LHH/elj

L. H. Hemeter

CC: PTC, HHR, FRD, DL, LTG, GHP, DHS, REL, LLF, JWA, RRM.

[fol. 5647] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 354

Rome Cable
Corporation

Rome, N.Y.

April 6, 1956.

F. S. Marks
Sales Manager

To Our Bare, Weatherproof and Magnet Customers:

For many months the prime copper market has been in a state of confusion. Instead of a single domestic price, to which we had been accustomed for years, producers and smelters prices have differed as much as 8 to 10¢ per pound

during this period. The foreign price has consistently been higher than our domestic market.

To meet our Country's needs for copper, the United States is dependent upon sizable tonnages from foreign sources. Since last August producers' prices have climbed from 36 to 46¢ per pound. We, as an independent fabricator, are only able to get a portion of our needs to meet your demands at producer prices. The rest, and it is a sizable proportion, has to be bought at premium prices.

Until March 20th our prices for sales of copper Bare, Weatherproof and Magnet Wire products were based on producer prices. On that date one of the large American producers of Chilean copper announced that their Chilean copper sold in the United States would be priced at London Metal Exchange prices. We have actually been buying copper in the last several months on eight different sets of terms and the American Metal Market in their editorial of April 3rd said ten different pricing methods are possible.

In an effort to get some recovery of our costs, we increased our base prices 3¢ a pound on March 20th. The effect of the Chilean contracts with Anaconda and Kennecott has brought the foreign price down approximately to the 50¢ level, but near term copper from other than producers is costing more than that figure.

Because of this downward price movement, effective today, we are reducing our base prices on copper Bare, Weatherproof and Magnet Wire to 47½¢ copper level, despite the fact that we feel there are still many variables in the method of buying copper.

We appreciate the many problems this changing market has presented to all of us and it is our hope that there will be less fluctuation and more stability in the future. We will do our best to continue to serve you with quality products at a fair price and we will try to keep you advised of significant changes in the market.

Yours very truly, Rome Cable Corporation,
F. S. Marks, Sales Manager.

FSM:hc

[fol. 5648] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 355

Rome Cable Corporation

1957 Sales Conference

J. H. Dyett—Materials, Money . . . What They Mean to You

It's a pleasure to be talking to you on a subject that Dwight picked out, but last year he made me talk on "Confounding the Experts" which I found rather difficult. This year, as you will see from your program, it is "Materials, Money and What They Mean to You". Well, yesterday Ross said that this group owned one-third of the shares of the company. Well, that means that that subject means a great deal to most of you. Now if you have studied the Annual Reports you have seen that a year ago the materials cost 67½ cents of the sales dollar and in the year just passed by April you show 61½ cents. Now you can say, well materials don't cost as much anymore, but remember we have had increasing costs other places. Payrolls in the last four years have gone up 3 cents on the sales dollar and other services 2 cents, so we still have a very narrow spread when it comes down to the profit items. Even with the diversification which we have been attempting to get in Torrance and in Collegeville, we find that copper last year amounted to 42 cents of the sales dollar while steel was 5 cents, aluminum was slightly over 2 cents, Neoprene was nearly 2 cents and Polyethylene 1½ cents. So keep that 42 cents in mind. It is so important that we can spend a great deal of time in studying the situation. The copper cost 10 times as much as the final profit to the company and at the current rate of profit we are realizing in the Rome plant it would be about 20 times, so those are very impressive figures. If we buy less copper and sell the same amount of goods, meaning that we get better turnover, naturally we are going to show better profits and since you are interested in profits it shows that you can be of great help to us.

Now, where are our inventories of copper? Probably driving down you saw hundreds of wirebars and you think,

—Good Lord, Rome Cable is really stocking up on copper. Well all that copper belongs to other people. It is here on toll. At the present time we operate on no wirebars. In fact, sometimes we go into the red but we always have copper in transit so we can replace that copper. Some day we are going to get back to the situation where we are going to have to have a stock of wirebars. In the old days we felt as though we needed at least a week. We didn't have all the toll copper. Situations seems to come back to us so some day we will have to provide money for a wirebar inventory. We have in scrap both here and at the refinery about 7 per cent of our total inventory. That is lower than it usually is, so with different situations perhaps that percentage would raise. In process we have 33 per cent. In Rome finished stock we have approximately 20 per cent. Now, that is at practically an all-time high of about 2,700,000 lbs. That means we can give you men in the field better service at the present time than I think has been our history in the past. Now in warehouse and consigned we have been averaging recently about 40 per cent of our total stock. So you add that 40 per cent to the 20 per cent odd in finished stock in Rome and it goes to make up a total of nearly two-thirds of our total inventory in finished stock in order to serve you and your customers. That is by far the largest segment of our inventory and you have that, to a certain extent, under your control. Now several of you men have had discussions with Dick Poole and myself on the subject of consignments, and I don't think since we've had them there has ever been a time that we in Rome haven't crabbed about them. After the meeting a year ago in June we were very disturbed here because we seemed to get no place so at my recommendation we hired Ernst & Ernst to make a study of the situation. I will not go into the details of that, but it was at considerable cost to us—in fact the study cost more than we earned in the Rome plant in the month of July. So you can see we are not talking about pennies. The main thing that they brought out was that the responsibility for the size of the consigned stock has to rest in the field. Therefore, all you gentlemen are responsible for that. We thought we had set up certain tools which would help you. Well those tools were not tools that you wanted, because

they were not used by the ones which we had given them to. We did not feel that everyone needed them because in certain areas they were getting good turnover. As a matter of policy here in Rome—and I hope I am speaking for every-[fol. 5649]one here—we don't care whether you get your turnover by Ouija board. The only thing is that we want to insist upon is that you get that turnover and you realize how important it is. If we cannot get the turnover we may have to insist that you try to follow the Ernst & Ernst system, or we discontinue consignments. I don't think we can go merrily along on this subject the way we have in years past. For instance, you may say, "Why get all upset about the consigned inventories?". Well, they value on a market basis about $1,900,000; on book value about $1,400,000. Now keep those figures in mind when you think of the additional loan we took out in August. We took out $2,000,000 in additional funds, so a great percentage of that is invested in consigned stocks. And remember we took that out at an increase in interest rate. It is now 4¾ per cent, and we admit that is low in comparison with what some people are borrowing, but it still is something to conjure with. We continue to beg for your cooperation in this matter. We know it can be done because one territory year after year is able to get 4 times turnover, and I am sure in that territory they run into the same conditions of competition. Maybe one month it isn't as bad as maybe some other territory, but year in and year out they must face the same type of competition and we certainly have the same policy of selling there as we do in the other districts. If we can control this inventory situation it means we have dollars for other things. We have countless meetings in Rome trying to control inventories. But what has the total inventory picture been? In September of '55 we had $5,200,000 in inventory, in May '56 we had $7,800,000, on July 31st of this year we had $8,900,000. In other words, it's been up 70 percent. And I think we all will agree that sales haven't been quite as good as they were in those other prior periods. Now, we believe we can use the tight money to much better advantage than to have the inventory in dead storage and I think you would be doing your customer a service by indicating to him that he doesn't need this inventory, that when he has it it costs him money. Even space costs money today.

Now, the warehouse stocks are in nowhere near as bad condition as the consigned, but even here we could have better control. In the first five months we averaged 300,000 lbs. more than in the first five months of last year, and our shipments out of warehouse averaged 200,000 lbs. less, so you can see we are getting considerably less turnover there than we did in the same period a year ago. Perhaps it is hard for you to see the connection with the risk we run on the inventory thing, but remember again nearly two-thirds of the inventory is in finished stock. We would like to have those finished stocks to service you but we would like to have them at economical levels.

How could you have helped Rome Cable and the Profit picture in the past year? On July 10, 1956—copper dropped 6 cents a pound, and it went from a total of 46 cents within a year to 29½ and now, as you know, it is 27 cents, the producers price. Remember that during most of last year everybody said, "Well, there's a magic figure of 30—when copper hits 30, why that's about it." Well that isn't true. During a little over a year copper has dropped 19 cents a pound. That is a severe drop when you consider that during the last war copper was priced at 12 cents, during the Korean war it was 24½ cents and in 1949 it was 16 cents. We have had a drop overall, when you consider the price of outside copper, of about 55 per cent. Now based on the average sale out of consignment for 1956 we had 750,000 lbs. a month. If we had had 4 times turnover we could have saved a quarter of a million dollars by postponing our purchase of copper for a year. That is impressive money and you could add to that if you consider the warehouse stocks.

To show what conditions we have been under this last year, copper has not held. For years we went along and we'd think copper would be pretty stable for quite a few months—even a year. It went to 40, then it held there for three months; it went to 36, lasted for three months; then it dropped to 34, one month. It was four months at 32 and [fol. 5650] one month at 29¼; one month at 28½ and, as you know, now it is 27. We still feel, even although copper may seem fairly low, that we should confine our purchasing to what we absolutely need. We have taken, or you have taken, 600,000 lbs. out of our consigned stocks. That is a

good trend, but we should have at least 600,000 lbs. more out of those consigned stocks. A good many of you in discussions have said, "Well, we seem to be the only company that wants to control the consigned stocks." Freddie Marks told me that the other night he had discussions with some General Cable men at the Rome Club and that they are really putting on the heat on that subject. We have heard that Anaconda is very disturbed. We know that Simplex has cut down its inventories of bare wire, or are trying to, from six weeks to three weeks. We know what Westinghouse, what General Electric, what Allis-Chalmers have done in respect to inventories. This is just not a Rome Cable problem. Maybe some of the men out in the field that you meet from other companies don't realize the situation. Maybe it hasn't seeped through to them, but we feel as though it will eventually. Now, a large inventory—and this has been a matter of record in the newspapers—has kept many companies from continuing with their expansion plans because they just plain didn't have the money. That in turn affects our business. Also when we have our money tied up in high inventories we can't afford to give Charlie certain of the equipment which he might request, which in turn would mean more profits, better service, better profits to you. Now, when we have more material in the field we have to have less in Rome. Therefore, you begin to complain about deliveries from here, but remember we have to be controlled by certain things just the same way you do. If we find that we have to reduce our inventories to meet a necessary LIFO position at March 31st and you don't get your inventories down in the field, we can't do it in Rome. That disrupts our plant both at the time we are cutting down and at the time we are gearing up again, so perhaps even this year when we have plenty of copper if you don't do your job next February you will begin to get poorer service and that poorer service might continue through until June. So five months out of twelve you might be very seriously affected.

Copper, as you know, has been very shaky and you may very well ask the reasons for that. Now, I have had photostated an article from Business Week which I think covers it in very good shape and it will save you from listening to more from me. Among the things which they give as

reasons were the rising of refiners inventories, the production increases throughout the world, the lower deliveries to fabricators, poor consumers demand, and the unsteadying influence of the London Metal Exchange. As you probably know, the London Metal Exchange has constantly for many months been considerably under the price in this country. Why do we look at that has been explained by one of the copper men as follows: "The United States sells at prices producers set, except for the 15 to 20 per cent of the custom smelter or outside copper, while the London Metal Exchange is the one great exchange, although the total copper that is moved there is relatively small, that follows the laws of supply and demand." But in addition to the reasons given in those articles I would like to list a few others. We have had an unusual period of labor peace in this country in copper. Chile is willing to sell at the London Metal Exchange which sank as low as 22¾ cents, although in 1954 they held 100,000 tons at the price of 30 cents over the market until the United States bailed them out. You will remember that, perhaps. And the Minister of Mines at that time said the country could not sell the copper at under that figure because it would ruin the economy. This Minister of Mines, although he announced recently a cut-back in production there of some small mines, said that Chile would have to continue the same production and they preferred to increase the production of Anaconda's and Kennecott's mine in Chile, even at present low prices. They have switched around on that from what they felt in 1954. The big producers in this country have been very slow to cut. The primary production for the first eight months of this year is slightly above the average for 1956. They have largely given lip service [fol. 5651] to cuts. The new production has more or less balanced the cutbacks. In the paper this week Phelps Dodge announced that they were going to cut an additional 5 per cent which means that those mines are only going to operate 22 days a month. Now that is hardly a very serious cut and we have yet to hear from Kennecott. Last month one of the big producers sold a considerable tonnage to Spain at a foreign low price. That same big producer has been actively soliciting throughout 1957 business from customers in Europe for electrolytic copper; a thing that that

company has never done in its history before. They have been highly successful in selling over there to these new customers but the price is based on the London Metal Exchange. Well, when that London Metal Exchange price gives that company, when you consider freight and all other costs, 4 cents or more or less than they are getting in the domestic field, it certainly gives the consumer a great deal of doubt as to what the low of the market is going to be in this country. If that company is willing to sell, say, at 23 cents return to them in Europe why are they not willing to sell at the same price in this country? Last month England had 27,000 tons which they announced they were going to sell in the open market. That has just been rescinded. Any consumer has known in the past months that they could get immediate deliveries so what was the sense of buying ahead, and we are still liquidating inventory here.

You all no doubt know what has been happening this last week in the copper market, but I don't think any of us should get disturbed either one way or the other about it. If you were disturbed you wouldn't know whether to smile or cry when you came into the office in the morning because what has happened is this. On the 9th of September the price of copper on the London Metal Exchange was the equivalent of 22-3/4 cents here. On the 12th, it went up to 23-7/8 cents. On the 13th, it went up to 25-1/2. In other words, it was up 13 per cent in four days. Now we were not stampeded into buying. It is true I bought a little bit at 25 cents here and I bought less at 25-1/2. Well, on the 16th—the next day—in London it went down to 24 cents. The next day it started going up a little again and now it is 25-1/2 cents. Now another thing we shouldn't do is to rely on the experts. I will read you what some experts said a year ago. In June, the 28th, 1956, Elliott Janeway wrote as follows (and just keep in mind the price of copper dropped 6 cents a pound on the 10th of July, or two weeks after this); "Copper prices will be vigorously strong over near to intermediate term as British and West European buying zooms following inventory cut-backs and if orders by automobile manufacturers come back in strength. Automobile industry will come back hard in 1957 model year and will not be caught again in squeeze of two-year model car. Any attack on the present domestic producers price of 46 cents a pound

puts pressure on Chile. Chile will probably withhold production if price drops below 46 cents. Outside copper market, London market and custom smelters will go over 50 cents a pound again in relatively short time." About the same time McGill Commodity Service made quite a different projection. "Briefly summarizing the three important facts to consider are these: First, will the demand for copper improve? Our answer is, not materially during the third quarter. In fact, demand will decline. Second, will production be cut back? The answer here is, yes, either through reduced overtime or by a strike. Third, will foreign copper be a stronger threat to the domestic price levels? The facts show the answer to be yes." Well, McGill hit it much more on the nose than Janeway, Lord knows, but even they were wrong on the matter of cut-backs and we are still waiting for cut-backs and here it is 15 months later. We shouldn't believe too much in newspaper headlines. For instance, on September 14th here's what a headline was: "London quotation soars". Well it droped the next day. "Chile to reduce output by 35,000 tons". Well, at the same time in another newspaper it was quoted that the Minister of Mines was urging Kennicott and Anaconda to keep their production up or increase it. "Scrap up 1 cent." It was down on the next Monday, and on the next Tuesday. We believe in a situation such as this that our customers are going to be [fol. 5652] the weathervane as to what happens to the copper price. You can be of great help to us in letting us have information on that. Remember, there is a plethora of supply today, and it is only through a resumption of actually buying that this thing can be stabilized, in my opinion.

Now, how have we faired by staying close to shore and not buying any more copper than we had to. Well, so far this year we have made a very slight profit on copper which is in comparison to last year losing approximately 30 cents a share on our copper and 45 cents a share in the prior year, at a time when copper was going up, so it is a topsy-turvy thing. When copper goes up—a year and more ago we lost money—now it's going down we are making out all right. Now why are we making out all right? The situation can change, of course, because copper pricing is all over the map and it may go back to a former condition. But the

reasons are that we at the present time have several advantageous contracts and we have all our contracts—and that amounts to 50 per cent of our copper approximately—on an average price for the month. Now in the old days we used to have to buy firm weeks ahead. Now what we receive in the month of September, most of it is priced on the average for the month of September. Also we defer our purchasing as late as we possibly can. Our fabricator accounts are getting the benefit of our average at the present time which is running now at under the Engineering & Mining Journal average. They are not getting the benefit of the low customer smelter prices because we do not feel either for their sake or for our sake we can change our general pattern of purchasing, because if we go into the outside market and the customer smelter market exclusively and buy this 25, 25-1/2, 26 cent copper, we will at a time when copper becomes scarce again—and it always goes through these various periods—we will be sitting out on the street corner. Now what are the encouraging signs in copper? As far as Rome Cable is concerned our orders in here on warehouse and consigned are running so far this month under your sales. At least that was true for the first two weeks. Our rubber covered backlog is not slipping, it may be a little bit lower now, but it is not slipping from what it has been in spite of competition and no incentive to buy. Our rubber covered sales April through July were within a thousand pounds of our rubber covered sales for those same months last year. That shows that the rubber covered business has not flown out the window, as many people have indicated. If you include the August, for both years there were artificial circumstances in this month, it means that we had a decrease in the first five months of 6 per cent. Now on consigned, for five months our average was 693,000 lbs. one year and 687,000 lbs. the next year, so to all extents and purposes our consignment sales in the first five months are as large as they were a year ago.

The industry, and we must always keep in mind what Rudy said yesterday, that it was the dynamic electrical industry—it has its ups and downs, yes, but it's always going ahead on the long term. In 1956 it was estimated that copper production would come out at a cost of 25 cents or over on 360,000 tons, or one-third of the production. There-

fore, if you get the price too low those mines producing one-third will shut up if that price is maintained for very long. Now you can read in the paper that Kennecott can produce for 14 cents, and you will read in that article you have down there that some of Phelps Dodge mines can produce copper at 10 cents a pound, but what some of you may overlook is that emphasis that should be put on the word "some". You've got Chile producing an estimated 12 cents a pound, but never forget that the Chilean government charges a tax of 60 to 75 per cent on profits from there; so they are not going to want the price to get too low. Africa, production is estimated between 17 and 20 cents. Another encouraging thing is that a little flurry means buying. We found that out last week in custom smelter purchases.

[fol. 5653] The first reduction in world refined stocks since April occurred last month when it went down 6,000 tons to a total of 424,000 tons which we admit is large. World deliveries to fabricators, and remember that it's world deliveries, have been extremely good. In fact, in 1957 so far their daily average is at an all time high of 7846 tons a day compared with last year's average of 7740 and 1955 of 7519 tons. So the world is consuming more, or buying more. Now the decrease in the United States was approximately 10 per cent. We are also getting to a busy time of year. Standard & Poor's says that there are faint signs of improvement. I learned from a man just coming back from Detroit that the automobile people are not discouraged and are basing sales for this next year at an increase of about 3 per cent. Construction for the first half of this year was 5 per cent over the same period last year and there has been a sudden spurt in orders for the steel-type prefab house. Retail sales have been going up. People have money. We have had automatic wages increases at a time of full employment. The copper industry has for many months been behind the parade, so to speak. For instance, since April 1956 the net domestic consumption of copper has been below its historical relationship to the Federal Reserve Board index of production for seventeen months. Now in the 1953-54 slow down that was true for 15 months. In 1949, another period that wasn't so hot for us, five months. And remember that the Federal Reserve Board is running at an all time high for the past eleven months. So, in my opinion,

with a high economic level in this country we may be pulling out of this sooner than some of us realize, and the final thing is that people may if they study all these different signs begin to realize that the wire industry is one that persuades itself into recession and talks itself into low profits.

Now turning away from copper, aluminum, as you all know, has been in plenty. The aluminum companies evidently have a very funny idea as far as materials and money are concerned. They can increase their prices of the pig product and reduce their prices of the wire and cable products at the same time—go up a cent—down 3, 4 or 5 cents. We have a supply situation there. You've got imports that the U. S. companies have purchased entering into U. S. surplus deals. Certain copper is now going to be released from those so that the aluminum companies will sell it rather than deliver it to the government. You've got a new competitor coming in the form of Oremet at a time when there is plenty of aluminum. Now I would say that you will all agree that Stan Williams has given you your money's worth as far as buying materials for this company. We feel as though that department is very important. Jim McCann has certainly always given a very good account of himself and we have recently bolstered it by having Freddie Marks, Jr. go in there.

Traffic also costs you money. In 1951 we had a bill of $1,200,000. Last year it went up over $1,600,000, or an increase of one-third. This year we may be faced with more. We have had two increases in tariff rates and we may have another. It might go up to $1,800,000. When you figure that with what our earnings were last year you can see how important traffic is. Frank McKevitt, who keeps a very close tab on all these things, had one request which was that you all take advantage of the lowest rates out of your warehouses by combining orders.

We get down to another place that we have had encouragement and that is in the Torrance consigned stock deal. As you all know, those have been discontinued and Ted Lewis deserves a whale of a lot of credit for his part in NEMA and in the persuasion of other companies to discontinue those stocks. We also should say that the Torrance boys have done a wonderful job as far as getting out very large shipments which produced good sales and good profits.

We admit we have one material and money problem out there, and that is at the present time we have very large stocks of raw steel. It totals about three months. In the case of raw steel though we did this on purpose in order [fol. 5654] to get steel in before the price increase, but we are very conscious of the money invested there and Torrence, I am sure, is going to do everything to bring that inventory down within a very few months to 1½ months.

We have not had a chance to discuss many inventory problems at Cope but I am sure that the new members of the family at Cope, whom we are very happy to have with us, will agree that if they are going to get certain equipment needs there, we have to provide money for them and we can provide money in controlling inventory.

In closing I would like to read what Republic Steel put out in a very fine booklet as to their policy. It said, "Republic Steel feels obligated to be a cooperative customer, a reasonable customer, it wants no special favors, no bargains that will cost a supplier to lose money. Republic believes that when other companies make money and grow, it too will make money and grow." Now the only thing I want to leave with you—Why the Hell don't we sell Republic or somebody else like them?

Thank you.

[fol. 5655] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 356

Potential Uses of Aluminum in Insulated Wires & Cables

In order to give a carefully reviewed summary as to the potential uses of aluminum as a conductor in various types of insulated wire and cable the question of economics cannot be ignored and in many cases it may well be the deciding factor. If we consider only the suitability of aluminum from a technical basis we get a decidedly different picture.

For the past three years one of the integrated aluminum producers has been conducting an extensive drive to get aluminum used in many applications. The prices quoted have been in most instances very unrealistic and it is hard

to believe that they would continue to do this for an indefinite period of time.

If we make this analysis at the present time we have no choice except to consider the prices currently being quoted for the aluminum conductor and compare it with the competing copper product. Please keep in mind that I am not referring to special competitive prices that are prevalent in both copper and aluminum wire but to the published prices [fol. 5656] for the respective products.

There is a second factor which is exceedingly important in this type of comparison. We must make some assumption as to the size of conductor which is to be used when aluminum is being compared to copper. For purposes of this study we are assuming that the aluminum conductor is being supplied with the same resistance as the copper conductor.

With the above assumptions as a premise we can now give a general outline of the various types of wire and cable which can be technically and economically justified with aluminum conductor.

I. We are starting with the accepted fact that aluminum conductors both bare and covered is decidedly superior to copper in most instances for overhead transmission and distribution purposes.

II. Magnet Wire. It is doubtful if aluminum will prove to [fol. 5657] be generally suitable or economical in film coated magnet wire.

Aluminum has proven to be technically suitable in fibrous covered magnet wire in the square and rectangular sizes for use in dry core transformers but it has not proven to be economical. These studies were made at a time when copper was selling at prices in the neighborhood of 40¢ per pound. With current price of 29¢ for copper this would make a considerable difference in favor of copper.

III. Flexible cords and cables. It is doubtful if aluminum will prove suitable from a technical standpoint for products subjected to frequent or constant flexing. It is being used by one manufacturer for welding cable but has not gained general acceptance.

IV. Telephone Cable.

a) paper insulated.
b) plastic insulated.

Aluminum has proven suitable for paper insulated cable and would be equally suitable for the plastic insulated cable. The question here is largely a determi-
[fol. 5658] nation of conductor size that would be required. If the aluminum conductor may be of the same size as the copper conductor for use in telephone work it would prove to be economical, but if a larger size would be required it is doubtful if any economy would result.

V. Construction Materials.

We usually consider five different wire and cable products as being in the class of construction materials. We will treat each of these as separate items.

a) Building Wire (Braided)—Rubber Insulation Aluminum has proven to be suitable and economical for the type of wire in sizes #6 AWG and larger. We question either its suitability or economy in the size smaller than #6.

b) Building Wire—Thermoplastic. (Type TW)
Same as Rubber type.

[fol. 5659] c) Service Entrance Cable.
Alminum conductor has already proven itself for this class of cable.

d) Non Metallic Sheath Cable.
It is doubtful that aluminum will prove suitable in this type of cable.

e) Rubber-Neoprene Building Wire.
Same as Rubber Insulated (Braided)

VI. Electronic Wires & Cables.

It is doubtful if aluminum will prove either suitable or economical for these products. They usually involve small size conductors and in many cases are stranded from small sizes of wire.

VII. Power Cable.

In the general category of power cables either for overhead or underground use aluminum has proven to be a

suitable conductor and fairly sizeable quantities have been used with entire success.

[fol. 5660] The economics of the various types and voltages is pretty difficult to cover except by reviewing a whole series of voltages and various types of insulation such as rubber, paper and varnished cambric.

I think a general statement can be made that in most cases for voltages of 5000 and less that aluminum will be found to be economical. For voltages over 5000 it is necessary to analyze each particular situation and study the type of construction, insulation, duct space, etc.

[fol. 5661] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 357

January 12, 1959.

Potential Uses of Aluminum in Insulated Wires & Cables

I have reviewed the report which I prepared for you approximately one year ago and have made certain changes that reflect developments which have taken place during the past year.

I. General.

It would appear that the integrated producer referred to in the previous report (Kaiser) has decided to continue the unrealistic prices which were previously used because they have now published price lists which will be referred to in appropriate sections of this report.

Another development which is about to take place is that they are bringing out new conductor tables involving special sizes of conductor that are smaller in cross section than is required to give equal conductor resistance.

[fol. 5662] II. We are starting with the assumption which is already accepted that aluminum conductor (or ACSR) either bare or covered is superior to copper in most instances for overhead transmission or distribution purposes.

III. Magnet Wire.

Our previous summary expressed the feeling that aluminum would not become much of a factor in magnet wire. This previous statement was based on a careful analysis of costs of manufacture. During the past year there have been two public announcements and published prices which might change this picture.

a) The Aluminum Co. has made arrangements with the Rea Magnet Wire Co. to produce film coated aluminum wire in sizes 17 to 24 AWG. We do not produce this type of wire but I am told that the prices are not realistic in relation to costs.
b) Kaiser has published prices on square and rectangular aluminum conductor with paper covering and glass coverings. These prices are from 35 to 40¢ per pound under our prices. If they are prepared to furnish a satisfactory product at these [fol. 5663] prices it will materially affect the thinking of the transformer manufacturers.

Another interesting development of the past year is the announcement of the General Electric Co. that they have produced a 25000 KVA high voltage power transformer using aluminum foil winding and Maloney has produced a distribution transformer also using an aluminum foil winding. The successful performance of these two pieces of equipment may materially affect the use of copper in transformers.

IV. Flexible cords and cables. We have not seen any further developments of fine sizes of aluminum wire being used in cords or cables subject to frequent or constant flexing. It is doubtful if this will prove to be a market for aluminum wire of any consequence.

V. Telephone Cable.

a) Paper insulated.
b) Plastic insulated.

[fol. 5664] Aluminum has proven suitable for paper insulated cable and would be equally suitable for the plastic insulated cable. The question here is largely a determination of conductor size that would be required. If the alumi-

num conductor may be of the same size as the copper conductor for use on telephone work it would prove to be economical, but if a larger size is required it is doubtful if any economy would result.

The A.T.&T. and Western Electric Co. have made comprehensive studies on this subject and with copper priced in the range of 29 to 30¢ per pound it is doubtful that aluminum will be used to any great extent.

VI. Construction Materials.

The following sections give direct comparison of costs of various wire and cable products. These figures show the direct savings which result in aluminum conductor.

Two point should be kept in mind in analyzing these figures.

We believe that the copper prices for 600 volt RR [fol. 5665] and TW are depressed due to competitive conditions and are basically lower than they should be when related to costs. On the other hand we also feel that the published prices of Kaiser are unrealistic with relation to cost.

In order to make a direct comparison of the various classes of products in the construction material field we have selected certain sizes of copper and aluminum conductor and indicated the current prices for the two different products.

In it is important to note that we have selected the appropriate size of aluminum conductor to give equal conductor resistance whereas the new plan of Kaiser would indicate a smaller size thereby showing a still more favorable price comparison for aluminum.

1—Building Wire—Type TW

We believe that this class of product in sizes smaller than #6 AWG with aluminum conductor will not prove either popular or economical consequently our comparisons are based on sizes larger than #6 AWG.

[fol. 5666]

	Type TW		
	Copper		Alum.
$ 6AWG	56.77	$ 4AWG	37.39
4 "	82.84	2 "	54.94
1/0 "	186.20	3/0 "	126.16
4/0 "	337.44	350MCM	267.52
500MCM	766.84	750MCM	503.88

2—Service Entrance Cable—Type SE—Style U

Comparison of the popular sizes of copper and aluminum are shown below:

Copper		Alum.	
# 6/3 cond.	207.48	4/3 cond.	162.64
3/3 cond.	345.80	# 2/3 cond.	209.00
1/0/3 cond.	816.24	2/0/3 cond.	359.48

3—Non Metallic Sheathed Cable.

It is doubtful if aluminum will prove either acceptable or economical in this class of product.

4—Rubber-Neoprene—600 Volt Type RR

Note comparison of prices of copper and aluminum shown below. We feel that the aluminum prices are particularly unrealistic in relation to cost.

[fol. 5667]

Copper		Alum.	
# 6—	90.44	# 4—	59.81
4—	119.32	2—	79.80
1/0—	235.60	3/0—	161.12
4/0—	429.40	350M	358.72
500MCM—	948.48	750M	627.00

VII. Electronic Wires & Cables

It is doubtful of aluminum will prove either suitable or economical for those products. Some work is being done to produce an aluminum conductor with a thin copper coating but this has not progressed to the point where it can be properly evaluated at this time.

VIII. Power Cable (Rubber and thermosplastic insulated)

Aluminum has been found to be a suitable conductor for these applications and the following comparisons show the economies which can be effected by the use of aluminum conductor.

I wish to point out that in the case of the power cable that we feel that prices for copper cable are realistic in relation to cost whereas the aluminum prices (Kaiser) are completely unrealistic.

[fol. 5668]

Power Cable

5KV-Shielded				15KV-Sh.-Grounded			
Copper		Alum.		Copper		Alum.	
# 6	475.95	# 4	366.70	#1/0	1508.60	3/0	1166.00
1/0	921.50	3/0	712.50	4/0	1862.00	350M	1564.00
4/0	1280.60	350	1133.35	500M	2951.00	750M	2292.00
500	2318.00	750	1800.25				

IX. Control Cable

We doubt if aluminum will prove suitable or economical for control cable because they are usually made from small sizes of wire going into stranded conductor.

[fol. 5669] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 359

CC: D. H. THAYER

To: G. E. Rolston
From: J. R. Woods
Date: May 11, 1959
Subject: Aluminum

Dear Glenn:

The purpose of this memo is to express some thoughts and observations on the insulated aluminum market. It is hoped that this information will serve as a basis for evolving sales policies which will promote the use of aluminum and assure Rome Cable a dominant position in the insulated aluminum field.

It is the opinion of the writer that aluminum will eventually gain acceptance as an insulated conductor and entirely supplant copper for many applications. There has been a natural reluctance on the part of contractors and journeymen to accept aluminum because of lack of availability and connector problems, most of which are imaginary. While the trend has been slow, it is growing as evidenced by almost universal acceptance of aluminum SE and aluminum building wire on so-called "monumental jobs". It is recalled that aluminum secondaries became popular almost overnight in spite of violent objections on the part of many utility engineers. These engineers used the same arguments, connector trouble and not available. Aluminum for this application was initially accepted as a matter of necessity, but its acceptance was sustained by cost savings and satisfactory performance of the light metal. It is felt

that a similar, if not so spectacular, transition in the insulated wire field is eminent and will be precipitated by the volatile price and uncertain supply of copper. Once this change starts, the inertia will be in the opposite direction and the market will grow firm in favor of aluminum.

We have a very substantial interest and investment in the copper wire business. It is difficult not to instinctively protect this market. On the other hand we have an overriding obligation to Alcoa to do everything possible to promote the sale of aluminum. It is an unfortunate choice to make but it seems that the only kind of choices the wire industry ever presents are unfortunate. We should certainly make every effort to protect our copper business but it is likely that much of it will be lost by attrition. Aluminum, on the other hand, is growing. If we enter the aluminum field aggressively we can exert a great deal of influence and emerge as the leader in the insulated aluminum conductor market. Profitless aluminum prices discourage active participation in this market but we cannot afford to let Kaiser make us an also ran in the transition to aluminum. Any plans we make will be greatly influenced by our competitors' principles and policies, so I have attempted to analyze them in an effort to forecast their marketing programs. The conclusions I have drawn are based on past competitive practices, informal conversations, and to a great extent conjecture.

Reynolds—Although they are second only to Alcoa in the primary production of aluminum, they have not been very successful in the sale of aluminum conductors. Their sale of overhead conductors may be substantial but their over-[fol. 5670] all market position is weak. Their limited success is based partly on the REA agreements which have hurt them with utilities and partly on cut prices that utilities could not resist. They do not have production facilities for other than bare and covered conductor and in spite of rumors to the contrary, I am led to believe that they do not plan on entering the insulated conductor field in the near future. They do not have a field sales force capable of promoting insulated aluminum conductors nor do they have distributor relationships essential to marketing this product. I am told by their manager of electrical markets sales that Reynolds management cannot justify entering the insu-

lated conductor market unless they can show a profit. This is, in their opinion, impossible in view of published prices. It would be dangerous to assume that they will not change their minds and purchase a going concern particularly if some of the independents find it expedient to sell at a bargain price in face of the depressed copper prices and impossible aluminum prices. For the time being Reynolds feels that they can best serve the interests of aluminum by educational promotion and then supporting independent fabricators by establishing sales policies and prices that will enable a fabricator to process aluminum at the same profit margins as he has had on copper. While this philosophy is admirable, it has little chance of success. Either rods would have to be reduced to a price below pig or the price of the insulated aluminum would have to be adjusted to reflect the true inherent savings in the light metal. The first is impossible and Kaiser shows no inclination to recognize the second. Reynolds must be considered as having little influence unless they purchase a going concern in which case they will have decided to compete with Kaiser and will have to be evaluated accordingly.

Kaiser Aluminum & Chemical Sales—Trying to rationalize this competitor's behavior is one of my favorite and most fruitless pastimes. They must certainly be conscious of profits but everything they do seems to refute this. I am reduced to measuring their success in terms of market acceptance and on this score they have shown outstanding results. They have an imaginative and aggressive sales department, backed up by a competent engineering staff and oustanding sales promotion people. They are in short a tough competitor. They attained their stature in the overhead conductor field with a combination of cut prices and good salesmanship. They have now assumed leadership in this field and are exercising that leadership to enforce price stability that should make the copper industry envious. While this stability is not at a desirable price level, it is nonetheless a significant accomplishment.

Their present unrealistic pricing policies on insulated aluminum can only be justified on the assumption that they plan to overcome resistance to aluminum at the expense of immediate profits in anticipation of creating a market [fol. 5671] at which they will be a dominant factor and then

adopting realistic price structures. The fallacy we see in this approach is, of course, the fact that the non-integrated producers cannot compete and therefore, will do everything possible to retard the trend to aluminum. Kaiser must realize that their production capability cannot support a mass conversion to aluminum and they must have the cooperation of other producers, particularly in the building wire field. This analysis is based on irrefutable economic facts and should prove that Kaiser is following a path that leads up a dead end street. However, I have too much respect for their merchandising capability to think they have not carefully considered all the angles and decided upon this approach as the only sure way of promoting aluminum in insulated products. Has Kaiser discounted the argument that the independent fabricator will resist the trend to aluminum at promotional prices. Have they reasoned that an independent will produce anything at any price as long as there is a demand for it in the market place and concentrated their efforts on creating that demand. A review of their successful promotion of covered line wire and triplex would give them ample precedent to justify this course of action.

Ten years ago we and the industry would have justifiably argued for a copper substitution method of pricing aluminum covered and triplex and our assumption that the industry would not contribute to the promotion of aluminum at ruinous prices would have been just as valid as the same arguments for a similar procedure on insulated aluminum are today. As valid as these arguments were and are, the fact remains that a demand was created in the market and the wire industry couldn't resist filling that demand. Witness the fact that today we are falling all over each other to manufacture aluminum line wire and triplex at 50 to 60 percent of prices we should get on a copper substitution method. Is it not reasonable to assume that Kaiser is following a sales tack that has already proved effective. I suggest the following as their marketing strategy on insulated aluminum conductors.

1. Establish promotional prices that are so low in relation to copper that they must be considered, especially on large building jobs.

2. Concentrate on so-called monumental jobs with little concern for the fact that aluminum is not generally available from wholesaler's stock. This has two desirable effects—

(a) it gives the builder and contractor a taste of the economies (even though they are false) of aluminum.
[fol. 5672] (b) it trains journeymen in the use of aluminum and dispells their fear of termination problems.

3. Builders and contractors having used aluminum successfully and economically on a monumental job, take a close look at in on their next job. It takes only one contractor getting one job based on the economies of aluminum to make his competitors acutely aware of the necessity of competing on an equal basis. On the next job all the contractors will be looking for aluminum prices. This builds back pressure on the manufacturer through the distributors to manufacture aluminum at competitive prices. There is ample evidence that the wire industry will do anything to stay in business and keep their distributors. It seems logical for Kaiser to assume that the industry will adopt a "you can't do that to me" attitude and satisfy the distributors' demand for insulated aluminum even at a loss. The actions of G. E., Paranite and Narragansett would certainly reassure Kaiser that the rest of the industry would fall in line.

4. Wholesalers' stocking of aluminum is the next logical step. While non-integrated manufacturers might reluctantly go along at a loss on jobs, the figures I see would not permit them to maintain stocks for more than a short time. Having established partial acceptance of aluminum and built up a demand in the market place, is Kaiser's next step to sweeten the price a little to encourage manufacturers to enter the field with both feet. If independent manufacturers will nibble at the market at current prices, wouldn't they go after it aggressively with another 10 to 15 percent on the price. The very low price of aluminum is only necessary to overcome inertia. When the demand is created they can move up a little closer to copper and still capture the market.

Much of the above is, of course, conjecture but many of the elements of such a plan have already fallen into place.

Based upon what has taken place and reviewing their successful tactics in promoting line wire and triplex, it seems reasonable to extrapolate such a policy.

Southern Electrical—This is the only other integrated fabricator of aluminum insulated conductor. They do not have established distributors or an effective sales force and their production capacity is quite limited. Their activity in insulated aluminum is too limited to evaluate. They will certainly be looking for a place to sell metal and building wire presents a perfect opportunity. I would expect to see them actively in the insulated aluminum conductor field, particularly building wire.

Kennecott—They are worthy of mention in view of their 13 percent interest in Kaiser and their announced eagerness to increase their holdings. They are primarily com- [fol. 5673] mitted to the copper industry and unless their stock certificates get them a discount on aluminum, they have no reason to promote aluminum conductor. It would appear that the only influence they would have on the market would be to protect their interest in Kaiser and the copper industry by encouraging realistic aluminum pricing. If Kaiser's sales policies produce sales and profit, it is doubtful that Kennecott's council would be heeded.

Anaconda Wire & Cable—While not a primary producer, they are considered to be one because not everyone in the trade is aware of their corporate structure. Most people consider them a 60,000 ton producer of aluminum and they billed themselves as a prime producer when seeking utility business. Anaconda has always jealously guarded their enviable position with distributors and will have a hard time resisting pressure to furnish aluminum at competitive prices. It is my opinion that they will lose about two distributors to Kaiser before they go after their share of the insulated aluminum market.

All other factors in the insulated wire business, not specifically mentioned above, have no interest in the sale of metal but are only interested in insulating at a profit. If insulated aluminum takes over a substantial part of the market they cannot continue to exist on a shrinking copper market which is already plagued with over production. They will be confronted with the dilemma of closing down or selling aluminum. When faced with this choice in copper,

they have continued to operate even at a loss. There is no reason to believe that the color of the metal will change their habits.

No treatment of this subject is complete without a look at the Kaiser organization which as previously mentioned is very effective. I get the impression from personal competition with them in the field and conversations with their sales management people that they think they are ordained to lead the wire industry to aluminum on their terms. They have elevated some very young men to responsible sales positions and although they may be brash and misguided, they have extremely high morale and consequently they are effective in building sales volume. They are imbued with the idea that aluminum is the best conductor for all applications. They have absolutely no respect for copper wire pricing methods, in fact the best reason they offer for not adhering to copper methods is because it is a copper method. As unpalatable as this may be to the wire industry, it does enhance their reputation with the consumer who, after all, they are trying to sell. Their attitude can best be illustrated by relating a conversation I recently had with their manager of magnet wire sales, a young man who has spent two years in the wire industry. He told me that they [fol. 5674] were very pleased with the price structure of aluminum magnet wire and implied that they were satisfied with the profits they were showing on this product. He justified the lower price by saying that the metal was cheaper, copper wire prices were unjustifiably high, and aluminum permitted higher running speeds. He even thought that the covering speeds on fibrous covered aluminum magnet wire would be faster. I talked him out of this but he still claimed that there were economies in running aluminum film coating and these economies were reflected in the selling price. While there might be some obscure savings in film coating aluminum, I am certain that they do not justify the difference in price and even a cursory analysis of the two prices would prove this. While these arguments can be shot full of holes the fact remains that they have a telling impact on the customer. They have backed up their pricing and selling of magnet wire with descriptive data that the copper industry could have published 20 years ago, but didn't. Their booklet on aluminum magnet

wire is one of the most informative and imaginative presentations I have ever seen. This combination is hard to beat. They thrive on the copper industry's attitude of "don't do anything to disturb the status quo" and counter with "let's do something, even if it's wrong". Our plans to compete with them must certainly reckon with these characteristics.

I would like to recommend a sales policy that would encourage our competitors to actively promote or at least passively accept a transition to aluminum. Such a policy would consist of realistic prices for rods and the finished product, leaving room in between for a fair fabricator profit. This approach would take longer but it would be far less destructive than the Kaiser policy which borders on ruthlessness. Under this policy aluminum would gain on its own merits and everyone would be selling. Unfortunately, Kaiser does not concur with this thinking and unless fabricator pressure, poor operating statements and/or Kennecott's influence can change their philosophy, we have no choice but to beat them at their own game.

If my analysis of Kaisers' sales technique is substantially correct and if the effect is as predicted, they will not only lead the way to aluminum conversion but in the process will become the leading producer of insulated aluminum conductor. We will certainly be expected to encourage the transition but I do not feel that we should resign ourselves to a secondary role in market stature. We have many things in our favor, including the Alcoa-Rome name, size and know how. We can take the lead from Kaiser if the necessary decisions and plans are made now.

Very truly yours, Jack

JRW:reh

[fol. 5675]

IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 360

January 18, 1961

A. D. R. Fraser
Rome
Mr. L. E. Hickman
Pittsburgh

As you know last week because Bob Williamson was in Pittsburgh, and after checking with your secretary, I asked him to attend the Economics Coordinating Committee meeting, which he very much enjoyed.

When he got back he gave me the statistical data which he received, which included the Economics Coordinating Committee forecast. Under EC Wire & Cable the figures are somewhat at variance from the budget which the Rome Division put together covering aluminum content of wire and cable. Not knowing the person or department who compiled the data I am sending two copies of this letter to you.

The total figures for EC Wire & Cable at 70,000,000 pounds closely approximates our budget on Bare and AC-SR for the year which was, 67,600,000 pounds. We have budgeted a total of 11,500,000 pounds of covered wire which brings the total included under that group to 79,100,000.

Accessories are approximately the same. We had 2,-500,000 pounds vs 2,400,000 on the Committee report. I do not know where aluminum conduit and bus are included, but we had 15,000,000 pounds for conduit and 1,400,000 pounds for bus, bringing the Division total to 98,000,000 pounds.

I am attaching two copies of the break-down of this budget by quarters. If you feel it advisable to pass one along. We have not given you anything on our copper or steel data on this compilation as it would not be revelent or desirable to combine them.

A. D. R. Fraser

[fol. 5676]

1961 Rome Division (Except Cope) Quarterly Budget By Class of Product

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
Bare & ACSR	16,700	18,500	17,000	15,400	67,600
Covd. Wire	2,500	2,600	3,400	3,000	11,500
	19,200	21,100	20,400	18,400	79,100
Accessories	600	600	700	600	2,500
Conduit	3,100	3,900	4,300	3,700	15,000
Bus	300	300	400	400	1,400
Total	23,200	25,900	25,800	23,100	98,000

[fol. 5677] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 363

A. D. R. Fraser

J. R. Woods

September 3, 1957

PRICING
Copper Vs. Aluminum

cc: G. E. Ralston

The following information is submitted per Glenn's request of August 30th.

Column 1: Current list prices of Aluminum constructions shown.

Column 2: List prices required to yield the same net return for covering Aluminum conductors that we receive for covering the same construction in Copper.

Product Description	List Prices Dollars per Mft.		
	Column 1	Column 2	Column 3
#4 Strand Polyethylene Triplex	$127.00	$126.89	$ 103.50
#2 Strand Polyethylene Triplex	171.00	165.00	139.50
#4 Strand RePrene Triplex	138.00	135.96	112.50
#2 Strand RePrene Triplex	181.00	174.06	147.60
#4 Polyethylene Line Wire	42.50	40.51	34.65
#1/0 " " "	85.00	100.83	69.30
#4/0 " " "	168.00	169.79	136.80
#4 RePrene Line Wire	43.00	40.35	35.10
#1/0 " " "	86.00	100.60	70.20
#4/0 " " "	170.00	169.36	138.60

The above calculations do not take freight into consideration. In the case of triplex which is sold F.O.B. Mill with freight allowed, we would gain slightly because of the lighter weight of Aluminum. On Weatherproof, we would gain slightly on Copper by picking up Hawkins Freight.

Column 3: Indicating today's competitive net price level added at your request.

[fol. 5678]

CONDUCTOR & CONDUIT COST

Copper Vs. Aluminum on Equal Conductive Basis 3/C in Conduit (RH-RW)

FIGURES IN PENCIL ARE BASED ON CONDUCTOR SUBSTITUTION METHOD. (38.5 Copper 26.5 Alum)

Conductor Size	Conductor Cost (3/C) MFT	Rigid Conduit Size 3/C	Conduit Cost MFT	Total Cost
#8 Cu.	$ 189.90	3/4	$ 206.90	$ 396.80
#6 Al.	192.00 247.62	1	296.90	488.90 544.52
#6 Cu.	309.00	1	296.90	605.90
#4 Al.	237.00 348.81	1-1/4	388.00	625.00 736.81
#4 Cu.	447.00	1-1/4	388.00	835.00
#2 Al.	309.00 470.58	1-1/4	388.00	697.00 858.58
#3 Cu.	549.00	1-1/4	388.00	937.00
#1 Al.	444.00 681.90	1-1/2	463.00	907.00 1144.90
#2 Cu.	624.00	1-1/4	388.00	1,012.00
#1/0 Al.	525.00 839.70	2	618.60	1,143.60 1,458.30
#1 Cu.	855.00	1-1/2	463.00	1,318.00
#2/0 Al.	633.00 768.13	2	618.60	1,251.60 1586.73
#1/0 Cu.	1,059.00	2	618.60	1,677.60
#3/0 Al.	750.00 1146.15	2	618.60	1,368.60 1764.75
#2/0 Cu.	1,254.00	2	618.60	1,872.60
#4/0 Al.	879.00 1504.83	2-1/2	960.30	1,839.30 2465.13
#3/0 Cu.	1,512.00	2	618.60	2,130.60
#300,000 Al.	1,317.00 2154.90	2-1/2	960.30	2,277.30 3115.20
#4/0 Cu.	1,977.00	2-1/2	960.30	2,937.30
#350,000 Al.	1,473.00 2406.81	3	1,256.20	2,729.20 3663.01
#250,000 Cu.	2,487.00	2-1/2	960.30	3,447.30
#400,000 Al.	1,611.00 2681.17	3	1,256.20	2,867.20 3942.37
#300,000 Cu.	2,899.00	2-1/2	960.30	3,819.30
#500,000 Al.	1,890.00 3323.33	3	1,256.20	3,146.20 4579.53
#350,000 Cu.	3,216 00	3	1,256.20	4,472.20
#600,000 Al.	2,22[illegible] 0 3706.77	3-1/2	1,636.10	3,869.10 5342.58
#400,000 Cu.	3,621.00	3	1,256.20	4,877.20
#650,000 Al.	2,403.00	3-1/2	1,636.10	4,039.10

[fol. 5679]

Conductor & Conduit Cost
Copper Vs. Aluminum
on
Equal Conductive Basis
3/C in Conduit (RM-RW)

Continued - page two.

Conductor Size	Conductor Cost (3/C) MFT		Rigid Conduit Size 3/C	Conduit Cost MFT	Total Cost	
#500,000 Cu.	$ 4,491.00		3	$ 1,256.20	$ 5,747.20	
#800,000 Al.	2,874.00	5255.16	4	1,936.60	4,810.60	7191.76
#600,000 Cu.	5,610.00		3-1/2	1,636.10	7,246.10	
#1,000,000 Al.	3,447.00	6501.42	4	1,936.60	5,383.60	8,438.02
#700,000 Cu.	6,315.00		3-1/2	1,636.10	7,951.10	
#1,200,000 Al.	4,170.00		5	3,043.00	7,213.00	
#800,000 Cu.	7,125.00		4	1,936.60	9,061.60	
#1,300,000 Al.	4,560.00		5	3,043.00	7,603.00	
#900,000 Cu.	7,923.00		4	1,936.60	9,859.60	
#1,500,000 Al.	5,199.00		5	3,043.00	8,242.00	
#1,000,000 Cu.	8,859.00		4	1,936.60	10,795.60	
#1,600,000 Al.	5,430.00		5	3,043.00	8,473.00	

NOTE: Based on Contractor's cost in effect August 2, 1937.

Aluminum - Rate List 8/1/57
Copper - Price List 2"C - 7/26/57

[fol. 5680]

CONDUCTOR & CONDUIT COST

Copper Vs. Aluminum
on
Equal Conductive Basis
3/C in Conduit (RH-RW)

Conductor Size	Conductor Cost (3/C) MFT	Rigid Conduit Size 3/C	Conduit Cost MFT	Total Cost M-FT
#8 Cu.	$ 189.90	3/4	$ 206.90	$ 396.80
#6 Al.	192.00	1	296.90	488.90
#6 Cu.	309.00	1	296.90	605.90
#4 Al.	237.00	1-1/4	388.00	625.00
#4 Cu.	447.00	1-1/4	388.00	835.00
#2 Al.	309.00	1-1/4	388.00	697.00
#3 Cu.	549.00	1-1/4	388.00	937.00
#1 Al.	444.00	1-1/2	463.00	907.00
#2 Cu.	624.00	1-1/4	388.00	1,012.00
#1/0 Al.	525.00	2	618.60	1,143.60
#1 Cu.	855.00	1-1/2	463.00	1,318.00
#2/0 Al.	633.00	2	618.60	1,251.60
#1/0 Cu.	1,059.00	2	618.60	1,677.60
#3/0 Al.	750.00	2	618.60	1,368.60
#2/0 Cu.	1,254.00	2	618.60	1,872.60
#4/0 Al.	879.00	2-1/2	960.30	1,839.30
#3/0 Cu.	1,512.00	2	618.60	2,130.60
#300,000 Al.	1,317.00	2-1/2	960.30	2,277.30
#4/0 Cu.	1,977.00	2-1/2	960.30	2,937.30
#350,000 Al.	1,473.00	3	1,256.20	2,729.20
#250,000 Cu.	2,487.00	2-1/2	960.30	3,447.30
#400,000 Al.	1,611.00	3	1,256.20	2,867.20
#300,000 Cu.	2,859.00	2-1/2	960.30	3,819.30
#500,000 Al.	1,890.00	3	1,256.20	3,146.20
#350,000 Cu.	3,216.00	3	1,256.20	4,472.20
#500,000 Al.	2,229.00	3-1/2	1,636.10	3,865.10
#400,000 Cu.	3,621.00	3	1,256.20	4,877.20
#650,000 Al.	2,403.00	3-1/2	1,636.10	4,039.10

[fol. 3681]

Conductor & Conduit Cost
Copper Vs. Aluminum
on
Equal Conductive Basis
3/C in Conduit (RH-RW)

Continued - page two.

Conductor Size	Conductor Cost (3/C) MFT	Rigid Conduit Size 3/C	Conduit Cost MFT	Total Cost M. FT
#500,000 Cu.	$ 4,491.00	3	$ 1,256.20	$ 5,747.20
#800,000 Al.	2,874.00	4	1,936.60	4,810.60
#600,000 Cu.	5,610.00	3-1/2	1,636.10	7,246.10
#1,000,000 Al.	3,447.00	4	1,936.60	5,383.60
#700,000 Cu.	6,315.00	3-1/2	1,636.10	7,951.10
#1,200,000 Al.	4,170.00	5	3,043.00	7,213.00
#800,000 Cu.	7,125.00	4	1,936.60	9,061.60
#1,300,000 Al.	4,560.00	5	3,043.00	7,603.00
#900,000 Cu.	7,923.00	4	1,936.60	9,859.60
#1,500,000 Al.	5,199.00	5	3,043.00	8,242.00
#1,000,000 Cu.	8,859.00	4	1,936.60	10,795.60
#1,600,000 Al.	5,430.00	5	3,043.00	8,473.00

NOTE: Based on Contractor's cost in effect August 2, 1957.

[fol. 5682] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 364

May 27, 1958

Mr. H. J. Zeck, Purchasing Agent,
Allis-Chalmers Manufacturing Company,
Columbus and Preble Avenues
Pittsburgh 33, Pennsylvania
Attention: Mr. P. A. Mihm

Aluminum Magnet Wire

Dear Sir:

We are pleased to outline the method used in pricing Aluminum Magnet Wire in line with your recent request. The price of the proper size and type copper magnet wire should be taken from the regular price sheet then the copper base is deducted, the resultant figure is multiplied by 3.3 and the present aluminum base is added to this figure which will give you the total price.

For example—100 x 350 Aluminum 1 Paper ¼ Lap

Similar material in copper	50.29
Less copper base	−25.00
	25.29
Multiply for aluminum	3.3
	83.45
Plus aluminum base	24.50
	107.95¢ lb.

The 3.3 multiplier is used inasmuch as this represents the difference in weight between copper and aluminum. In other words, there would be approximately 3.3 times as much footage in 1000 lbs. aluminum magnet wire as there would be in 1000 lbs. copper magnet wire.

We trust that this is the desired information and will enable you to complete your estimating.

Very truly yours,
Rome Cable Corporation,
Miss Margaret Jennings.

MLJennings/t

[fol. 5683] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 365

W. E. Michalke, San Francisco

Internal Correspondence

March 21, 1960

From: P. J. Lopushinsky
Rome Office

To: District Managers
Assistant District Managers
Rome Cable Division Managers
Rome Cable Division Product Managers
Rome Cable Division Salesmen
Rome Cable Division Agents
Administrators

Re: Distributorship Agreement

Inasmuch as our new Distributorship Agreement will be put into use immediately, we are attaching a copy for your information and review.

We would like to pass on a word of comment, particularly to the Rome Cable Division Managers, regarding the *present Rome consignments*. New agreements are now being prepared and will be mailed to you shortly. You will note that the supplement to the agreement shows four product categories and will indicate the products currently approved for each consignment. For example, a distributor may, at present, have approval to carry only copper wire and cable products on consignment. Before shipment of any of the other three products can be made to his consigned stock, approval must be obtained by submitting an Application For Consigned Stock Approval. The application should indicate the additional products desired and further, show all other information pertinent to the product as outlined in the application.

As mentioned above, the new agreements are being prepared for our present Rome Cable consignments. These will be forwarded to the Rome Cable Division Managers for fur-

ther distribution, either to the individual salesman handling the account, or forwarded to the distributor by mail. We have found in most cases salesmen have indicated a preference to deliver the agreement personally for signature. In areas where this is impractical, a letter of transmittal can be used. The original copy should be returned to Consigned Stock Department, Rome, N. Y. Upon its return the old agreement will be considered as cancelled.

[fol. 5684] As Alcoa consignments are transferred to Rome, we will forward to the Rome Cable Division Managers our new agreements. There will be more details on this part later.

P. J. Lopushinsky.

PJL:jc
Attachment

CC: Mr. G. E. Rolston, Rome, Mr. R. L. Williamson, Rome, Mr. F. S. Marks, Sr., Rome, Mr. J. B. Holloman, Rome.

[fol. 5685] Rome Cable Corporation

Rome, New York

Distributorship Agreement

This Agreement is made by and between Rome Cable Corporation, a Delaware corporation (operating as a division of Aluminum Company of America) having its principal office in Rome, New York (herein called "Rome"), and having an office in _____
(herein called "Distributor").

1. Delivery of Products to Distributor. Rome shall from time to time deliver to Distributor and Distributor shall receive at any of its warehouses, except such as may be excluded herefrom by Rome, such quantities of such products as shall be brought within the scope of this Agreement by subsequent writings signed by both parties (the same being herein called "Products"). The Products may be either the property of Rome or the property of Aluminum Company of America, a Pennsylvania corporation (herein

called "Alcoa"), it being recognized that Rome is acting as agent for Alcoa with respect to such of the Products as are the property of Alcoa. Notwithstanding the ownership of the Products, the transactions contemplated hereby shall be solely between Rome and the Distributor. Rome will deliver the Products, and will bear the cost of transportation for such delivery, to distributor's warehouse, in accordance with Rome's standard practices in connection with sales of the Products to other resellers.

2. Special Charges. If a Product is wound on reels for shipment, the returnable reels will be billed to the Distributor at the time of shipment to the Distributor on the basis of Rome's current reel price schedule. Reels returned in good condition, freight collect, to point of origin or such other point as shall be specified by Rome, will be credited at the prices originally billed to the Distributor. If, at the request of the Distributor, any service is performed with respect to any of the Products, such as, but not limited to, cutting, sawing or boxing, for which a special charge is normally made, Rome will invoice Distributor in the amount of such special charge at the time the Products are shipped to Distributor.

3. Title to, Storage of and Access to Products. Legal title to the Products prior to withdrawal pursuant to Distributor's exercise of its option hereinafter granted shall remain in Rome or Alcoa, as the case may be. Distributor shall take due and proper care of the Products, including the provision of safe, clean and dry storage facilities, and shall keep the Products available for convenient inspection and identification. Rome or its designated agent shall have the right during regular business hours to enter Distributor's premises to inspect or inventory the Products. Except as expressly provided herein, Distributor shall not remove any of the Products from the premises on which they are stored without first obtaining the written consent of Rome.

4. Risk of loss and Insurance. All risk of and responsibility for loss of or damage to the Products prior to withdrawal pursuant to the Distributor's exercise of its option hereinafter granted shall be in Distributor, except that the risk of loss of or damage to the same resulting from enemy attack, including any action taken by the military, naval or air forces of the United States in resisting enemy attack,

shall be in the owner (Rome or Alcoa); provided, however, that the foregoing exception shall not apply to loss or damage resulting from blackout, burglary, robbery, theft, larceny, pillage or looting, sabotage, vandalism, malicious mischief, acts done secretly by foreign enemy or agent of any government, or neglect of Distributor to use all reasonable means to save and preserve the Products after damage from enemy attack. Notwithstanding the foregoing, the owner shall insure the Product against loss or damage by theft, flood, fire, sprinkler leakage, wind, lightning, explosion, riot and civil commotion, aircraft and other vehicles, and smoke while the same are in the possession of Distributor. Such insurance shall be in the name of and for the benefit of the owner, and shall not cover any interest of Distributor. Distributor shall cooperate with the owner and with the insurance carriers with respect to inspections, safeguarding the Products and adjustment of losses. The owner shall be solely responsible for the sufficiency of such insurance and Distributor shall be relieved of all liability for loss or damage from any cause with respect to which such insurance is carried (except loss or damage from flood in excess of $150,000.00) and for default on the part of any insurance carrier. The maintenance of such insurance by the owner shall not, however, in any way relieve or limit the liability of Distributor, hereinbefore specified, for loss or damage from any cause other than those with respect to which such insurance is carried.

5. Taxes on Products. Distributor shall pay all local property taxes and all other municipal and governmental charges (other than taxes on or measured by income) which may be assessed against it, against the owner of the Products, against Rome as agent for Alcoa, or against the Products or any of them by reason of their storage and existence in the state in which Distributor's warehouse or place of business may be located. If Distributor shall fail or refuse to pay any such tax or charge, Alcoa or Rome may pay the same and Distributor shall reimburse Rome for the amount thereof.

6. Filing Requirements. If Rome so requests, the Distributor will file this Agreement or a copy hereof in the manner provided by law, and will do all other things necessary to make this Agreemnt legal and valid and to assure to

Rome and Alcoa their respective rights, reserved or recognized herein, under the laws of each state in which the Distributor operates.

7. Reports. Rome shall from time to time supply Distributor with report forms and instructions for completion of such forms. On the_____day of each month, Distributor shall report to Rome on such forms, in accordance with the instructions relating thereto, and as of the date specified in such forms or instructions. In addition, whenever Distributor is notified of a change in Rome's published prices, Distributor shall report to Rome on such forms as of the close of business on the day before such price change became effective.

[fol. 5686] 8. Distributor's Option to Purchase. Rome hereby grants to Distributor an option to purchase all or, from time to time, any part of the Products at Rome's price in effect at the time of exercise of such option, less such discount, if any, as Rome may from time to time establish. Exercise of the option with respect to any of the Products shall be by withdrawal thereof from the stock of Products. After such withdrawal Distributor shall not return any withdrawn Products to the stock of Products but shall keep the same properly segregated therefrom as its own property.

9. Invoicing and Payment. On receipt of each report made by Distributor pursuant to paragraph 7, Rome shall invoice Distributor for all products with respect to which Distributor exercised its option during the period covered by such report. Distributor shall remit to Rome for such Products in accordance with the regular terms and sales policy for such Products as of the time of sale, as contained in the published price sheets of Rome.

10. Sales by Distributor. All Products which Distributor purchases hereunder will be sold for its own account. No sales from stock shall be made by Distributor as agent for, or other representative of, Alcoa or Rome. No sales or contracts made by Distributor shall make or purport to make Alcoa or Rome a party, nor shall Alcoa or Rome incur any liability thereby or therefor.

11. Financial Statement. Distributor shall furnish a financial statement to Rome at such time or times as Rome shall request.

12. Slow Moving Products. Any Product which remains in Distributor's stock for six months may, upon the request of Rome, be returned to such destination as Rome shall designate, transportation charges to be prepaid and borne by Distributor. In the event that a Product is still in Distributor's stock at the end of eight months after Distributor's receipt thereof, Rome may invoice Distributor for such Product at Rome's price in effect at the time of invoicing. Upon receipt of such invoice Distributor shall exercise the option to purchase such Product and shall take it into its own stock.

13. Broken Packages. If Distributor shall break into any standard package full coil of electrical conductor, such breaking in shall constitute an exercise of the option to purchase the entire package and any remainder shall be taken by the Distributor into its own stock. Where covered or insulated electrical conductor is shipped to Distributor on reels, the Distributor will report the amount sold each month until there remains on the reel 200 feet or less, and at that time it shall exercise the option to purchase the balance and shall take it into its own stock.

14. Termination. Either of the parties may terminate this Agreement with or without cause, upon ninety days written notice delivered at the office of the other party or at such address as shall be supplied for the purpose of such notice. Notwithstanding the foregoing, if any proceeding in bankruptcy, receivership or insolvency, whether voluntary or involuntary, shall be instituted by or against Distributor, or if Distributor shall become insolvent or its corporate existence shall for any reason be terminated or its affairs wound up, or if Distributor shall make any assignment for the benefit of its creditors or commit any other act of bankruptcy, or if Rome should have reason to question the financial stability of Distributor, then and in any such event, Rome may terminate this Agreement immediately upon written notice to Distributor. In the event of termination of this Agreement, however caused:

(a) Distributor shall forthwith transmit to Rome a statement of the Products on hand and tsales made from the Products from the date of Distributor's last report to the effective date of termination, and

shall immediately remit to Rome for the Products so sold; and

(b) Distributor shall forthwith, and at the cost and expense of the party terminating the Agreement, ship to such point as Rome shall designate all Products then in the possession of Distributor.

15. Modification of Agreement. This Agreement shall, with respect to the subject matter hereof, constitute the entire contract between the parties and supersede all existing agreements between them, whether oral or written. There are no verbal understandings or undertakings of any kind with respect hereto not expressly set forth herein. No agent of Rome shall have authority to change or modify any of the terms of this Agreement, except with and to the extent of the written consent of Rome. Any such change or modification made with regard to any particular order or orders, or with respect to any particular term or condition of this Agreement, shall apply only to the particular order or orders or term or condition with respect to which such change or modification shall have been made, and shall not be construed as a general waiver or modification as to any other order or as to any other term or condition of this Agreement.

16. Assignment. This Agreement shall be binding upon and inure to the benefit of the parties, their successors and assigns, but Distributor shall have no right to assign this Agreement without first obtaining the written consent of Rome.

17. Governing Law. This Agreement shall be construed in accordance with the laws of New York.

The parties have executed this Agreement in duplicate this_____day of_____, 19____.

Rome Cable Corporation By____, ____.

[fol. 5687] Rome Cable Corporation

Rome, N. Y.

The Distributorship Agreement made between Rome Cable Corporation and _____ having an office in _____ on the _____ day of _____ 19____, is hereby supplemented as follows:

The word "Products" referred to in Paragraph 1 is hereby defined to include the following categories:

Copper Wire & Cable____
Aluminum Wire & Cable____
Aluminum Accessories____
Aluminum Conduit____

We have indicated above the products approved for this Agreement.

The parties have executed this supplement in duplicate this _____ day of _____ 19____.

Rome Cable Corporation, By____, ____.

[fol. 5688] We suggest that supplements or revisions of this agreement be attached to this page.

[fol. 5689] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 366

Internal Correspondence

June 23, 1960

From: Mr. J. R. Woods
To: Alcoa District Managers
Resident Representatives
Administrators
Managers Rome Cable Div. Sales
Rome Cable Div. Salesmen
Rome Cable Div. Agents
Rome General

Re: Aluminum Substitution

The attached paper was prepared as a discussion outline for presentation to the Rome Cable Division Field Sales Personnel during their training program here at Rome. We have received requests for copies from the salesmen who participated in the program and from several field locations since their return. In view of this interest, we are sending copies to all personnel interested in the sales of Insulated Aluminum Conductor.

John R. Woods.

JRW:ac
Attach: 1

cc: H. E. House—Massena, T. L. Gilbert—Massena.

[fol. 5690] Discussion Outline for Alcoa Sales Personnel

Economics of Aluminum Substitution Facts and Fallacies

I'm rather amused when I hear the margarine interests refer to "the high priced spread" rather than coming right out and saying "butter". This doesn't make much sense to me but I respect the judgement of professional advertising people, so at least during the initial stages of this discussion I'll refer to aluminum versus the high priced metal.

Now I am going to pose a question to each of you and I want you to give me an honest answer. I don't want the fact that you are a guest in the "Copper City" to influence your answer and I want you to forget, if possible, that your pay check comes from Alcoa. I'm going to give you some facts and I want you to put yourself in the buyer's position and tell me which metal you would specify for your insulated electrical conductor.

First, there is the high priced metal. It has nearly twice the conductivity of aluminum; it has a scrap metal value nearly as high as its original cost; it is ductile; it is easy to terminate; it is so easy to refine and fabricate that even the ancient Aztecs used it for utensils and jewelry; for equal ampacity and voltage drop it is smaller than aluminum; it takes less space and requires less insulation; it is not adversely affected by soil acids and alkalies and it is extremely easy to join and solder.

Now, let's take a look at aluminum. It has less conductivity; it uses more space and insulation per ampere; it requires special handling, special terminations and special techniques. Of course, it is lighter, has a lower more stable price and is in more plentiful supply.

[fol. 5691] Now, as a purchaser with these facts, tell me honestly, would you really buy aluminum or would you go the easy route and choose the high priced metal?

Those of you who are inclined to confess that you would choose the high priced metal didn't ask how high is "high priced". If you had asked this question, you could never have had any doubt in your mind because the high priced metal I was describing in such glowing terms was not copper but silver. It is doubtful that very many people would specify a silver conductor even though it does have all of

the desirable characteristics I outlined. I resorted to this subterfuge to bring home the point that silver, copper and aluminum are all good conductors, but the cost, availability and to some extent habit are the factors that determine which metal will be used. Aluminum will be specified over copper only because it has a lower price tag and is more plentiful and then only when a good selling job is done. How quickly and how completely aluminum displaces copper will depend entirely upon the relative cost and availability of these two metals, and how good a job we do of reminding the customer that silver and copper are superior conductors, but relatively expensive.

Let's look at the true facts that determine the economic advantage of aluminum over copper in both bare and insulated wire.

There are some basic facts that are as irrefutable as Ohm's Law. Let's analyze aluminum versus copper in the light of these facts first, so that we will all understand exactly where we stand. It may, at times, be to our advantage to distort these facts, but as good salesmen and good businessmen let's start with a basic understanding of true economy. Then, we can consider the commercial aspects that might influence us to go beyond true economy to prove in aluminum.

Here are some facts that are worth remembering when talking about aluminum versus copper.

[fol. 5692] Copper has a resistivity of 10.37 ohms per circular mils foot
Aluminum is next best with 17.0 ohms per circular mils foot
Copper has a specific gravity of 8.89
Aluminum has a specific gravity of 2.70

You can work out a ratio on this and come up with the fact that one pound of aluminum will do the work electrically of two pounds of copper. That is, an aluminum conductor will offer the same resistance and result in the same losses as a copper conductor weighing twice as much. You can come up with this fact by remembering that aluminum weighs .3 times as much as copper. Physically, three tenths of a lb. of aluminum will do the job of 1 lb. of copper. However,

aluminum has only 62% conductivity, so electrically you must divide by .62, which results in the figure .50 or ½ lb. of aluminum is the electrical equivalent of 1 lb. of copper. Don't forget and don't let your customers forget that they must buy 2 lbs. of copper at 33¢ to do the job of 1 lb. of aluminum at 26¢.

Now let's apply this rule of thumb to the wire business and see how we make out. You are all familiar with the fact that #4 aluminum is roughly the equivalent of #6 copper. Let's assume for the sake of this discussion that it costs us the same amount of money to reduce the aluminum pig to a #4 solid as it does to reduce a wire bar to #6 solid. While there is certainly some room for argument on this, it is a reasonable assumption and it will not have any significant effect on our analysis. It is undoubtedly a little cheaper to reduce the aluminum but let's save the difference and increase Alcoa's earnings from $2.52 to $2.53 per share. If you will go along with me on this assumption, we will go back to #4 aluminum versus #6 copper.

1,000 ft. #6 copper weighs 79 lbs. and at 33¢ per lb. the metal costs $26.07
1,000 ft. #4 aluminum weighs 38 lbs. and at 26¢ per lb. the metal costs $9.88

[fol. 5693] Note that the 1 lb. of aluminum is more than doing the work of 2 lbs. of copper and going back to our assumption that it costs about the same to get both into wire form, we find that our customer can save about $16.00 per thousand feet by using aluminum. This is a true metal savings and when coupled with your superior salesmanship, it has made a lot of copper available to the costume jewelry trade that used to go into transmission and distribution conductors.

$16.00 per thousand feet is a pretty healthy advantage for aluminum and it assures our position in the overhead conductor business. It is unfortunate that some irresponsible price cutting has widened this gap to $20.00. That extra $4.00 is coming out of our hide, when, as a matter of fact, we don't even need a $16.00 advantage to sell aluminum.

Bearing in mind that we are still talking about the true economics of aluminum over copper, let's see what happens

to this $16.00 savings when we start putting insulation on the conductor. We will start with a simple polyethylene line wire and then progress to more complicated constructions to illustrate the point.

If we apply 1/32" polyethylene over #6 solid, it requires 8 lbs. of compound. To apply 1/32" polyethylene over the larger #4 aluminum, requires 10 lbs. of compound. This additional two lbs. of material at about 35¢ per lb. means we must deduct 70¢ per thousand feet from the $16.00 saving to arrive at our true savings. In addition to increased material costs, there are increased labor costs. If the extruder has a capacity of 160 lbs. per hour, we can insulate 20,000 ft. of #6 solid per hour, but only 16,000 ft. #4 solid. Our labor costs and all other costs that are tied to production capacity have increased 25%. It is evident that the $16.00 savings is no longer valid. We have got to deduct the increased material and labor costs incurred and pass the [fol. 5694] balance along to the customer as an incentive to buy aluminum. Let's say this saving is now only $14.00 per thousand feet, still a healthy advantage and more copper for the costume jewelry trade.

Now let's go a little further and see what happens to our $16.00 metal savings when we decide to make a more complicated cable. If we were to apply 12/64" insulation, we'd find that it takes 85 lbs. for the #6 copper and 95 lbs. for the #4 aluminum. This means that the material cost is up $3.50, as a consequence of using aluminum. As in the case of the 1/32" polyethylene, there is an increased labor cost. So, our true savings on this more complicated construction is say $10.00 versus $14.00 on the simpler construction. If we were then to shield this wire, it would cost $4.50 more for the shielding tape to cover the larger diameter and our metal savings would be reduced to $5.50. It is obvious that by extrapolation we can arrive at a point where the metal savings are overcome by the increased costs of processing a larger diameter conductor. How soon, if ever, we arrive at this point, depends entirely upon the amount and the cost of the covering material.

I have tried to lead you down the path of so-called metal substitution pricing. Simply stated, this method merely means that to price an aluminum cable we subtract the copper metal cost from the copper cable selling price and add

back in the aluminum metal cost in its place. The validity of this method is based upon the assumption that it costs the same amount of money to reduce an aluminum pig and a copper wire bar to a finished conductor and that the price of the copper cable was based on a correct cost versus selling price ratio in the first place. There is a great deal of room for argument on both of these assumptions and, as a matter of fact, we know they are not entirely correct. However, metal substitution is a reasonably accu- [fol. 5695] rate reflection of the true economy of aluminum over copper and, more important, it is the only real yardstick we have for measuring an Insulating Plant's profit performance. The copper wire and cable business is not a high profit industry. If we can make 4% on sales we are doing extremely well. Every time we sell insulated aluminum at a price lower than the metal substitution formula, we are taking the difference out of our potential profit and there can be absolutely no argument about that fact.

So much for the economic facts of aluminum substitution. We should all know and be guided by these facts but selling is an art and not a science, and unfortunately facts do not always prevail in the market place. We are all anxious to sell aluminum. We are even more anxious to sell Alcoa aluminum. But, I, for one, dislike working for a non-profit organization. If it comes to that, I will get a great deal more satisfaction as a member of the Salvation Army. We may find it expedient to distort the facts a little to give a bigger edge than the metal savings will justify. If we do this in the form of meeting competition to maintain our position, or to introduce and promote aluminum on the assumption that we can raise the price a little after the customer finds out that he really likes it—O. K. If, on the other hand, we try to prove in aluminum where there is no real savings, we are in trouble. To give you an example of this, imagine the spot you would be in if you reduced the price of insulated aluminum cable way below cost just to get the customer to switch over. After he had redesigned and retooled for aluminum, you come back and want to raise the price to a profitable level. If there was no real savings in the first place, you must either raise the price above an equivalent copper cable or go without profit—

you can't win. You end up with an irate customer or a profitless organization. The point I am trying to make is, [fol. 5696] we should strive to sell aluminum on the basis of its true economic advantages. We may have to settle for a temporary narrow margin to get aluminum accepted, but in the long run aluminum should stand on its own two feet if our gains are to be permanent.

Up until now we have talked about the economics of aluminum in the finished electrical cable only. The customer is obviously interested in installed cost rather than conductor cost. So, let's see what happens when we start using an aluminum cable versus a copper cable.

When we started this discussion, we found that the maximum savings on a #4 aluminum was $16.00. We then started to peck away at this until the savings were down to $5.50 per thousand feet. When we install this cable, it takes more space and enclosed space costs money, so the savings to the customer may be further reduced. If, after taking this last factor into consideration, there is still something left of the $16.00, and there usually is, then installed aluminum cable is cheaper than installed copper cable.

Now that I have beat down your $16.00 to the point where aluminum doesn't look as good as it did, I'm going to build you up again by pointing out that aluminum can, in many cases, do the job of copper without an appreciable increase in size. When conditions permit the substitution of aluminum for copper on a current carrying capacity basis, we practically have a license to steal. We learned earlier that based on voltage drop, a lb. of aluminum would do the same electrical job as two lbs. of copper. On a current carrying capacity basis, that same lb. of aluminum will do the job of about 2½ lbs. of copper. Service entrance cable is a good example of permissible substitution of aluminum for copper on an ampacity basis. The run is short, the voltage drop is of little consequence, so a #2 aluminum can be substituted for a #3 copper for 100 ampere service. The [fol. 5697] #2 aluminum weighs 61 lbs., versus 162 lbs. for copper. There are many other cases where aluminum can be substituted for copper without increasing either the conductor size or the conduit size. For instance, there are 16—440 volt 3-phase motor sizes between ½ and 100 h.p. 62% of these motors can be fed with aluminum cable with-

out an increase in conductor size. 75% of the circuits can be run with aluminum conductor without increasing the conduit size. To take advantage of sustituting on an ampacity basis requires engineering and selling in the design stages of the electrical system. Without complete knowledge of the system demands, we must take a conservative approach and substitute on a voltage drop basis.

It is beyond the scope of this discussion to cover all of the intricacies of aluminum substitution. We are ready to help you on jobs as they come up and you will be given a great deal more ammunition along these lines in the near future.

I would like to sum up this discussion by repeating some salient facts.

1. We are willing and anxious to substitute aluminum for copper in insulated cable.
2. It is generally economical to substitute aluminum for copper.
3. It is to everyone's benefit to prove in aluminum on actual rather than artificial savings. It is a good metal and can stand on its own two feet.
4. Copper is, has been and always will be a better conductor than aluminum. Don't weaken your position by trying to deny it. Silver is also a good conductor, but who can afford it.
5. The strong points of aluminum are adequate conductivity, plentiful supply, light weight and a low stable price.

In closing I would like to invite your attention to two very important figures that I just happened to run across the other day. They were 858,460,213 and 2.52. You may recognize them as our company's 1959 net sales and earnings per share. You, your fellow salesmen and everyone here in [fol. 5698] Rome Headquarters Sales have an opportunity to add a digit to the first number above. If we do it, it will be very gratifying. If, however, we contribute the added digit without making a corresponding contribution to the 2.52, we haven't accomplished a thing. In other words, sell something. Preferably sell aluminum. Sell copper, sell steel, sell Rome Cable Manuals, sell anything, but sell it at a profit.

J. R. Woods.

JRW:ac

[fol. 5699] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 367

Internal Correspondence

September 6, 1960.

From: J. B. Holloman, Rome Cable Div., Rome
To: See Distribution List

Electrical Conductor Distributor Memorandum No. 3
Sale of Overhead T&D Conductors Through Distributors

The purpose of this letter is to outline our policy regarding the sale of bare and weatherproof aluminum conductors through electrical distributors. So that there will be no misunderstanding about the products involved, they are listed below:

Bare ACSR and Bare all-aluminum conductor
Weather-resistant aluminum line conductors
Aluminum self-supporting secondary and service drop cables
Rome Trimline Primary Distribution Systems

The greater volume of these products continues to be sold direct to the user. Any distributor sales program we follow must recognize this fact. If our selected distributors are willing to provide a service under these circumstances, it is our intention to support their efforts in every reasonable way.

It is apparent that we now have too many distributors for these products. We cannot expect full cooperation from our stocking distributors if we continue to sell through those who do business with us only as a matter of convenience. The program by which we expect to arrive at more restricted distribution will be developed in the following specific steps:

1. Consigned Stock Distributors. Rome Division distributors who have consigned stocks of these conductors now number in the hundreds. The consignment method of dis-
[fol. 5700] tribution has certain advantages, particularly

where the manufacturer also sells direct to the user. As we have elected to do business through consigned stocks, we must reduce our variety of selling methods to gain the maximum cooperation from our consignment distributors.

2. Purchased Stock Distributors. Except in a very few locations, the distributor who buys conductors into his stock is not compatible with the consignment distributor. It is difficult to control the type and quantities of material that move through purchased stocks. Accordingly, the purchase of these conductors into stock is eliminated. This applies also to the consignment distributor who obtains orders for conductors he does not carry in his stock. We will in such cases require the item to be shipped directly to the user.

3. Agency Sale of Overhead Conductors. Attached is a copy of the Agency Agreement similar to that which has been used by Alcoa for a number of years. This agreement provides a valuable service to our distribution program by permitting the Agent to sell only at prices authorized by the Rome Division. In addition to a number of individual agreements, we have national Agency arrangements with the following organizations:

Graybar Electric Co.
General Electric Supply Co.
Westinghouse Electric Supply Co.
Line Material Co.

All distributors who stock these products have signed or will be asked to sign Agency Agreements. The discounted drop shipment of overhead conductors is now eliminated, and future shipments direct to the user will be made only as an Agency Sale. Administration of Agency orders will not be discussed here, as Alcoa sales offices should be familiar with the entry procedure.

[fol. 5701] 4. Designation of Agency. You will from time to time receive orders for these products from approved Rome Cable Division distributors who do not have stocks or who are not signed agents. These orders may, at your option, be returned to the distributor or entered on the so-called "one-shot Agency basis".

We have attached a copy of the "Designation of Agent"

form and also, in part, a copy of Mr. Dixon Lewis's memorandum No. 43 dated January 21, 1955, which explains the procedure under which it is used. Our present policy limits the use of the Designation of Agent Form to approved Rome distributors. Supplies of this form are being mailed to all district, branch, and resident offices. They should be put into use immediately.

5. Discounts & Commissions. For your convenience, we have listed on the attached sheet the Agency commissions for sales of these products, as well as the discounts that apply to sales out of consigned stocks.

6. Control of Quantities Shipped into Stock. The 4.25% stocking and handling fee is allowed to distributors only on conductor actually shipped into stock. Wherever it comes to your attention that these products are being diverted and are not going into the distributor's warehouse, the allowance should be withdrawn. This should be clearly understood by the distributor handling our products. We expect the distributor to carry adequate stocks of the items which he normally sells. Requirements for non-stock items or large quantities of stock items must be justified for shipment to the distributor or shipped direct to the user on the agency basis.

These steps have been taken to provide a more orderly method of doing business through distributors. In view of competitive practices common in today's market, such a [fol. 5702] course of action places additional responsibilities on the sales department. However, any compromise of the distributor function prevents its proper balance with direct selling. This balance must be maintained if we are to promote a sound distributor program.

J. B. Holloman.

JBH:jb

Attachments

Distribution List: Rome Cable Division Sales Managers, Rome Cable Division Salesmen, Alcoa District Managers, Alcoa Assistant District Managers, Alcoa Branch Managers, Resident Representatives, Alcoa District Administrative Managers, Alcoa Assistant Administrative Man-

agers, Administrators, Salesmen—Rome Cable Division Agents.

Rome, A. D. R. Fraser, G. E. Rolston, R. L. Williamson, F. S. Marks, D. H. Thayer, J. R. Woods, W. W. Knapp, R. A. Lewis, H. C. Carrier, G. A. Brodock, P. J. Lopushinsky.

Pittsburgh, F. R. Dallye, H. H. Rodee, Dixon Lewis, G. B. D. Peterson, W. T. Mitman, A. F. Gronning, J. V. Kohler.

[fol. 5703] Attachment

Gentlemen:

We hereby engage_____, to act as Agent under the terms specified herein, in the sale of our electrical conductor and accessories for direct shipment to customers located in the_____.

Your representatives will normally obtain the selling prices which they are authorized to quote from our district or branch office having responsibility in the area where the business is done.

The orders which you obtain on our behalf must be transmitted through such office and are subject to acceptance by us in Rome. Such office may also designate certain customers which are excluded from your agency.

This arrangement is non-exclusive in both directions, i.e., we are free to engage other Agents for the same purpose and you are not bound to sell bare and covered aluminum and copper overhead conductors and accessories on our behalf only and we are free to solicit and accept orders directly from these customers. Commission will apply only to orders actually secured by you.

As a matter of convenience, we will expect, in each case, to receive instructions from you as to material specified, and the terms and conditions of the customer's order. The [fol. 5704] memorandum of sale received by us from you should contain the following notation:

"This order covers merchandise sold through us as your agent, and we assume responsibility for payment. Invoice should be rendered directly to us."

After having shipped in accordance with your instructions, we will look to you for payment since you are assuming full responsibility for such accounts, including collection and payment to the taxing authority of sales or use taxes when applicable. In rendering our invoices to you, allowance will be made for your selling commission.

For these specific services we will pay you the following commissions on orders secured by you as Agent and accepted by us for direct shipment by us to customers:

Aluminum

Bare ACSR and bare all-aluminum conductor
(a) Sizes #6 AWG through 336,400 cm, any quantity 3%
(b) Sizes larger than 336,400 cm, any quantity 2%
Weather-resistant line conductors.....4%
Self-supporting secondary and service drop cables 4%
Accessories 5%

Copper

Bare solid and stranded copper overhead conductors $.005/#
Weatherproof solid and stranded overhead conductors $.0075/#
Rome Trimline Primary Distribution Systems.....5%

You shall absolve us from all responsibility for any claims where such claims exceed our limits of responsibility as set forth under "Terms and Conditions" printed on the back of our regular "Acknowledgment of Order". There are no [fol. 5705] reasons to expect that selling of our electrical conductor and accessories will involve you in any patent suits but it is understood that we take the responsibility of protecting you in this respect.

We think the above paragraphs describe the arrangement completely but it may be well to call attention to the fact that your Agency arrangement does not include orders from you for shipment to your own stores for resale, or to any other reselling stores.

Naturally, there may be reasons for review occasionally, and we shall each feel free to call on the other for that purpose. Also, it is agreed that this letter is effective as of _____and may be cancelled by either party upon three months' notice.

Will you please signify your agreement by signing, dating, and returning the attached duplicate signed copy of this letter.

Very truly yours, Rome Cable Corporation.

JBH:jb

[fol. 5706] Rome Cable Division of Alcoa

Rome, New York

Name
Address

Designation of Agent

We have taken the liberty of acknowledging your order No._____dated _____(subject to acceptance at our home office in Rome) as a sale by us to the customer designated as the consignee therein, through you as our agent. The attached acknowledgment of your order as an agency transaction is subject to the following understanding:

1. This is not a sale to you for resale.

2. You are hereby designated our agent with respect to the single transaction represented by the attached acknowledgment of our Sales Order No._____, dated_____, with authority, as an undisclosed agent for us, to sell such material to the consignee named therein under the terms stated on such acknowledgment.

3. You shall assume responsibility for payment and as a matter of convenience the invoice or invoices for such material will be rendered directly to you.

4. If state or local sales or use taxes are applicable to this transaction, you shall assume responsibility for collection of such taxes from the customer and for remitting the same to the taxing authorities.

5. For your services in connection with this transaction we will pay you a commission of_____% of the gross price of the material shown on the invoice. The commission will be deducted from the invoice which will be rendered to you.

We appreciate the opportunity to serve you and hope that you will accept this designation of agency. We shall assume that you have accepted the above conditions unless we hear from you to the contrary within five days.

Very truly yours, Rome Cable Corporation.

[fol. 5707] Attachment

Electrical Conductor Memorandum No. 43
by Dixon Lewis, Pittsburgh—January 21, 1955

(Quoted in Part)

We are concerned with two types of orders from resellers of electrical supplies and equipment, and both types can be converted into agency transactions. The first type is the order from a supply house for direct shipment to a customer who is named on the order as the consignee. By attaching a "Designation of Agent" form to the acknowledgment copy of the sales order, such an order can be entered immediately by the sales office as an electrical conductor agency order, showing proper commission deductions in the pricing column and carrying the usual agency responsibility and sales or use tax notations as outlined in Electrical Conductor Memorandum No. 31 and No. 39. In addition, the following acknowledgment note should be added on the sales order form: "Designation of Agent Form Attached to Acknowledgment".

The "Designation of Agent" form should be prepared in triplicate and the original attached to the acknowledgment copy of the order which is mailed to the supply house. The duplicate copy will remain with the sales office copy of the order, and the triplicate will be mailed to the Product Manager's office in Pittsburgh.

[fol. 5708] Note that the supply house has five days in which they can refuse to accept the agency designation. In this event it will be necessary for the sales office to cancel the order as we have no other arrangement for selling to a supply house for resale.

The second type of order is one in which the supply house ordering the material is also named in the order as the consignee. Since this material is obviously for resale, such an order must be rejected unless it can be converted into an agency order by obtaining the name of the ultimate customer as the consignee. One way to do this is to telephone the supply house, explain our agency arrangement, and ask them to give the name of their customer to be inserted, in the order. Another way is to use the attached suggested form letter to "X-Y-Z Electrical Supply Company", accom-

panied by a blank "Designation of Agent" form. If upon receipt of this letter the supply house elects to return the order with their customer's name, then the "Designation of Agent" form will be prepared in triplicate and the original attached to the acknowledgment copy of the sales order when it is entered, in accordance with the procedure outlined above.

It is immaterial whether actual shipment is made direct to the customer or sent to the customer in care of the agent's warehouse or shipping dock; the essential point in the agency order is that the ultimate customer be named in the order as the consignee. Note that the "End Use" in all agency orders is the use by the ultimate customer and [fol. 5709] not by the agent, and that the customer must be the actual user of the material such as a power company, cooperative or contractor.

The foregoing procedure is not only a protection to everyone concerned but we believe it is fair to our established agents and distributors. The sales office always has the option of refusing to accept an order from a supply house because of policy reasons. Special situations should be discussed with the Product Manager's office.

[fol. 5710] Rate of Commissions for Agency Sales

Aluminum

Bare ACSR and bare all-aluminum conductor

(a) Sizes #6 AWG through 336,400 cm, any quantity 3%
(b) Sizes larger than 336,400 cm, any quantity.. 2%

Weather-resistant line conductors 4%
Self-supporting secondary and service drop cables. 4%
Accessories 5%

Copper

Although bare and weatherproof copper are included in the revised Agency Agreements, there is no present intention to change the existing method of sales for these products. Both discounted drop shipments and purchasing into distributors' stocks are to be continued.

Rome Trimline Primary Distribution Systems..... 5%

Discounts for Sales From Distributors' Consigned Stocks

Aluminum

Bare ACSR and bare all-aluminum conductor

(a) Sizes #6 AWG through 336,400 cm, any quantity 3%
(b) Sizes larger than 336,400 cm, any quantity.. 2%
Weather-resistant line conductors..... 4%
Self-supporting secondary and service drop cables.. 4%

(A stocking and handling allowance of 4.25% will be applied to net value of invoices against reported sales of above items from consigned stocks.)

Rome Trimline Primary Distribution Systems..... Not Consignable

jb

[fol. 5711] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 369

Internal Correspondence

January 9, 1961.

From: J. B. Holloman Rome Cable Div., Rome
To: A. K. Buckenmaier, Detroit

Re: Fitzpatrick Electric Supply Co.

Attached is a photostat copy of the signed Agency Agreement between the Rome Cable Division and the above distributor. This Agreement superseded the original Alcoa Agency Agreement and was sent directly to the distributor for signature. Attached also is a letter of amendment dated January 9 which reflects the change in commissions on certain conductor sizes.

We suggest you keep these Agreements and letters of amendment as a part of your permanent file.

J. B. Holloman.

JBH:jb
Attachments

Copy sent to C. C. Crompton—Jackson 1-12-61.

[fol. 5712] January 9, 1961.

Fitzpatrick Electric Supply Company
444 Irwin Avenue
Muskegon, Michigan

Gentlemen:

Please refer to our Agency Agreement dated September 1, 1960, covering sales of our products by you for direct shipment to customers. This is to advise that effective for orders dated on and after December 14, 1960, the scale of commissions paid you on sales of Alcoa electrical conductors and accessories will be as follows:

Aluminum	
Bare ACSR and bare all-aluminum conductor	
(a) Sizes #6 AWG through 336,400 cm, except ACSR stranded conductors, 8/1, 12/7, and 16/19	3%
(b) Sizes larger than 336,400 cm	$.005/#
(c) ACSR stranded conductors, 8/1, 12/7, and 16/19	$.005/#
Weather-resistant line conductors	4%
Self-supporting secondary and service drop cables	4%
Accessories	5%
Copper	
Bare solid and stranded copper overhead conductors	$.005/#
Weatherproof solid and stranded overhead conductors	$.0075/#
Rome Trimline Primary Distribution Systems	5%

[fol. 5713] The change from previous commission rates of 2% to $.005 per pound effects only the bare ACSR and bare all-aluminum conductor in sizes larger than 336.4 MCM and in the following ACSR strandings: 8/1, 12/7, and 16/19.

We shall appreciate acknowledgment of your understand-

ing of this amendment by signing, dating and returning the attached duplicate copy of this letter. Our district and branch offices have been advised of this revision.

Very truly yours, Rome Cable Division of Alcoa, James G. Holloman. Fitzpatrick Electric Supply Co., By ——, ——.

Date: ——

JBH:jb

[fol. 5714] September 1, 1960.

Fitzpatrick Electric Supply Co.
444 Irwin Avenue
Muskegon, Michigan

Gentlemen:

We hereby engage Fitzpatrick Electric Supply Co. to act as Agent under the terms specified herein, in the sale of our electrical conductor and accessories for direct shipment to customers located in the following territory:

Michigan: Counties of Antrim, Benzie, Charlevoix, Cheboygan, Emmet, Grand Traverse, Kalkaska, Lake, Leelanau, Manistee, Mason, Mecosta, Missaukee, Montcalm, Muskegan, Newaygo, Oceana, Osceola, Ottawa and Wexford.

Your representatives will normally obtain the selling prices which they are authorized to quote from our branch office in Jackson, Michigan. The orders which you obtain on our behalf must be transmitted through such office and are subject to acceptance by us in Rome. Such office may also designate certain customers which are excluded from your agency.

This arrangement is non-exclusive in both directions, i.e., we are free to engage other Agents for the same purpose and you are not bound to sell bare and covered aluminum and copper overhead conductors and accessories on our behalf only and we are free to solicit and accept orders directly from these customers. Commission will apply only to orders actually secured by you.

As a matter of convenience, we will expect, in each case, to receive instructions from you as to material specified, and the terms and conditions of the customer's order. The [fol. 5715] memorandum of sale received by us from you should contain the following notation:

> "This order covers merchandise sold through us as your agent, and we assume responsibility for payment. Invoice should be rendered directly to us."

After having shipped in accordance with your instructions, we will look to you for payment since you are assuming full responsibility for such accounts, including collection and payment to the taxing authority of sales or use

taxes when applicable. In rendering our invoices to you, allowance will be made for your selling commission.

For these specific services we will pay you the following commissions on orders secured by you as Agent and accepted by us for direct shipment by us to customers:

Aluminum	
Bare ACSR and bare all-aluminum conductor	
(a) Sizes #6 AWG through 336,400 cm, any quantity	3%
(b) Sizes larger than 336,400 cm, any quantity	2%
Weather-resistant line conductors	4%
Self-supporting secondary and service drop cables	4%
Accessories	5%
Copper	
Bare solid and stranded copper overhead conductors	$.005/#
Weatherproof solid and stranded overhead conductors	$.0075/#
Rome Trimline Primary Distribution Systems	5%

You shall absolve us from all responsibility for any claims where such claims exceed our limits of responsibility as set forth under "Terms and Conditions" printed on the back of our regular "Acknowledgment of Order". There are no [fol. 5716] reasons to expect that selling of our electrical conductor and accessories will involve you in any patent suits but it is understood that we take the responsibility of protecting you in this respect.

We think the above paragraphs describe the arrangement completely but it may be well to call attention to the fact that your Agency arrangement does not include orders from you for shipment to your own stores for resale, or to any other reselling stores.

Naturally, there may be reasons for review occasionally, and we shall each feel free to call on the other for that purpose. Also, it is agreed that this letter is effective as of September 1, 1960, and may be cancelled by either party upon three months' notice.

Will you please signify your agreement by signing, dating and returning the attached duplicate signed copy of this letter.

Very truly yours, Rome Cable Corporation, F. S. Marks, Vice President, Manager of Distribution. Fitzpatrick Electric Supply Company, By George Anacher.

Date Sept. 15, 1960.

JBH:jb

[fol. 5717] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 370

Internal Correspondence

January 23, 1961.

From: J. B. Holloman, Rome Cable Div., Rome
To: Rome Cable Div. Managers

Re: Approved Distributor List

All Alcoa consigned stocks and agency agreements have now been transferred to the Rome Cable Division. It is our intention to immediately prepare an approved distributor list which will identify Rome Cable Division's recognized distributors and the products which we expect to sell through each of these distributors. We ask your help in providing names of those distributors with which you are presently working and the Rome Division products they sell.

The attached sample sheet will indicate how we would like to have these lists prepared. If the distributor account is located within the district sales office jurisdiction, it should be so indicated. If it falls within a branch office territory, then both the district and the branch should be shown on these listings.

The code used should be self-explanatory. It is recognized that many of your distributors handle only insulated copper conductors, while others are primarily concerned with our

overhead aluminum products. All of the national chain houses, such as Graybar, Gesco, etc., sell aluminum conductors and accessories under Headquarters Agency Agreements, and the designation "A" should appear after their individual houses in these last two columns. Where there are consigned stocks of these products, the letter "C" should also appear. We have, in addition, signed Agency Agreements with certain independent supply houses, and these also should be identified by the letter "A".

[fol. 5718] We recognize that these lists may take some time to prepare; however, we would appreciate your giving this your immediate attention so that we may have them not later than February 10.

J. B. Holloman.

JBH:jb
Attachment

[fol. 5719] Approved Distributor List

District__
Branch__

	Copper Insulated	Steel Conduit	Aluminum Conduit	Overhead Aluminum Conductors	Accessories
ABC Electric Supply Co. Greenville, Texas	C	D	C	A	A
Graybar Electric Co. Lubbock, Texas	D	D	C	A-C	A-C
Industrial Electric Supply Big Spring, Texas	D	D	D	D	A

C—Consigned Stock.
D—Distributor, Subject to Product Policies.
A—Agent.

[fol. 5726] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 371

Pipe Line Application of Wire and Cable

Cable insulations of many types are now available; uses depend on wiring location, special conditions

R. C. GRAHAM

THE basic needs regarding cable insulations and wiring are much the same in the pipe line as in any other industry—lower costs, reduced dimensions, easier installation, improved performance, and longer life. The ways and means in achieving these needs, however, sometimes presents an entirely different problem than for other industries. Most cable manufacturers agree that pipe line service conditions are one of the severest of all cable applications. This situation requires unusually careful attention and selection of cable materials, properties, and design.

A brief consideration of the purpose of the cable insulation and its nonmetallic coverings may be helpful. The main function of the insulation or dielectric is to provide safe and durable electrical insulating value. The words "safe" and "durable" mean that it should possess adequate resistance to any deteriorating influences on its electrical insulating value that it may be exposed to during its normal life. Factors such as resistance to water and heat aging are highly desirable insulation characteristics if electrical stability is to be maintained. The resistance to other external influences such as weathering or sunlight, flame, oils, acids, alkalis, solvents and the like, may be, and usually are, provided by the insulation covering unless the inherent properties of the insulation itself preclude the need for further protection.

Primary function of the insulation covering is to provide the necessary degree of chemical or physical protection not already provided by the insulation. The insulation covering is also intended to protect the insulation from mechanical abuses incidental to operation and, principally, installation. Such coverings may be in the form of braids or sheaths (jackets), although the use of cotton braided cable coverings with their subsequent deterioration and rotting should now be a thing of the past with the modern synthetic sheathing and fibre materials available.

The Author

R. C. Graham is chief engineer for Rome Cable Corporation, Rome, New York. Since his graduation as an electrical engineer from Union College, Schenectady, New York, Graham has been associated with the wire and cable industry for more than 20 years in various technical capacities involving production, research, and product engineering and application. In his present capacity, he has been in daily contact with cable installations and problems—particularly those associated with the pipe line, petroleum and chemical industries. Graham has been a member of several government and industry committees including AIEE, IRE, PESA, IPCEA, IAEI and others. He is the author of many technical papers pertaining to wire and cable design, development, and application.

Insulating and sheathing materials to be reviewed may be classified as either thermosetting or thermoplastic. First to be considered is the thermosetting group, of which rubber or its synthetic counterpart, is probably the most familiar material.

Thermosetting Materials

Insofar as pipe line wiring jobs are concerned there are now relatively few insulating compounds that would be of special significance in spite of a multitude of trade names. The first of these is a moderately low cost, general purpose compound developed since the wartime advent of Buna S synthetic rubber and possessing the dual feature of good resistance to both heat and water—it is suitable for 75 C temperature rating and for use in wet locations. It is sometimes referred to as a combined RH and RW insulation and when used under an appropriate covering, can be safely recommended for nearly any 600 v a-c power circuit wiring application. It is especially suitable for secondaries and underground services.

Another useful but slightly higher in cost rubber insulation is the so-called oil-base ozone-resistant type of compound whose dominant constituent is a vulcanized vegetable oil. This insulation also possesses excellent heat and moisture resistant properties and may be rated at 75 C. Long experience has indicated that this high dielectric strength and corona-resistant compound may be safely used as power cable insulation up through 15 kv and possibly higher.

Butyl synthetic rubber has within recent years been introduced as cable insulation but long time performance records are not yet available. Indications are, however, that it may be recommended for similar ozone-resistant rubber compound applications. Industry specifications for such a compound recently have been established.

Performance of these rubber insulations in most applications would be short-lived if they were not protected adequately against the various exposed elements and reagents. The best known non-metallic sheathing material, Polychloroprene (Neoprene) is now almost universally accepted for this important application since it conveniently provides the desired functions of a sheath. Electrically, most Neoprene compounds are relatively poor, but their genuine toughness and resistance to abuse plus good heat, flame, and sunlight resistance, qualify their use as non-metallic protective sheaths. Neoprene is also resistant to low concentrations of chemical reagents at normal temperatures. However, principal dependence for moisture resistance must be placed on the insulation proper. Neither does Neoprene possess adequate resistance to severe gasoline or oil conditions, since it may be permeated by these fluids and associated vapors. For most general purpose wiring jobs, inside, underground or over-

Reprinted from THE PETROLEUM ENGINEER, February, 1954

[fol. 5721]

head, this material makes a good protective sheath for the rubber insulation.

The newest and, right now, the most expensive thermosetting insulation, is so-called "Silastic" or silicone rubber. This recently developed material possesses many interesting properties that will undoubtedly find certain applications in the petroleum and pipe line industry where excessive heat is a problem. Its chief virtue is its ability to operate over a very wide temperature range from —55 C to +150 C. A problem exists in finding some tough non-metallic protective covering other than a glass fiber or asbestos braid that will be able to perform over a similar temperature range. Of course, a lead sheath provides a suitable metallic covering.

Thermoplastic Materials

The best known and most widely used thermoplastic material is Polyvinyl Chloride or its copolymer with vinylacetate—let us call it PVC. This is the material that has been used as insulation on Types T and TW building wires and, so far, has consisted of a compound mixture of resin, liquid monomeric plasticizers, fillers, and pigments. PVC has so many virtues that it may serve as a combined insulation and sheath, in itself—this means simplicity, low cost, small dimensions, easy installation, etc. PVC has reasonably good electrical characteristics but its use as power cable insulation is generally limited to 600 v a-c.

It lends itself particularly well to pipe line and refinery wiring because of its inherent resistance to flame, sunlight and weather, inorganic acids, oils, and many chemical reagents—even excelling Polychloroprene in these latter respects. Many manufacturers add a factory applied surface lubricant that greatly reduces pulling tensions. Such insulated cables may be used for almost any type of indoor or conduit wiring and a few types of outdoor wiring. It is being successfully used directly in the earth by several utilities for street lighting and other applications.

A recent development in PVC compounds has been accomplished in which poly-ester type plasticizers have been substituted for the usual monomeric plasticizers, resulting in certain performance improvements of special interest to your industries, since it will mean added resistance to oil, gasoline, and other chemicals, plus increased resistance to heat and deformation.

The next thermoplastic material in popularity is Polyethylene, which is now substantially equivalent in cost to PVC. Polyethylene, a pure hydrocarbon resin (not a compound), has many advantages to qualify it for cable insulation or sheaths for the oil industry. Its electrical properties, resistance to moisture, and cold temperature characteristics are superior to any other now regularly available, non-metallic cable covering.

Being thermoplastic it is subject to appreciable heat deformation at or above its melting point of 105 C. However, there is practically no heat deformation up to 90 C, and is superior to PVC in this respect. If the circuit is to be subjected to frequent or heavy uncontrollable overloads, Polyethylene should not be used, although it is entirely satisfactory in this respect at its rated maximum temperature (75 C) or lower. Polyethylene is resistant to weather, most oils up to temperatures of 50 C and most solvents (not aromatics). Because of its remarkable moisture resistance and low permeability constant, it is an excellent choice for any d-c circuit insulation where moisture may be present.

Results of a research under way in Rome Cable Laboratory show Polyethylene to be outstanding over all other insulations when subjected to d-c moisture test. Conventional Polyethylene burns readily—but no more so than any ordinary rubber compound, so that this characteristic may or may not be objectionable. Flame-resistant Polyethylene compounds have been recently developed which will correct this property. Polyethylene is considered satisfactory for installation indoors, overhead, or in the earth. Industry specifications for Polyethylene insulated cables are now available.

Nylon thermoplastic is used either as

Pipe Line Applications of Wire and Cable
Brief suggestions for cost savings and special applications

Pumping Stations

Motors requiring a distribution voltage of 1200 are frequently required. Although not generally listed in manufacturers' catalogs, there is an IPCEA-ASTM rating classification of 2000v that would be appropriate for such wiring. Therefore, a 2000-volt rated cable consisting of ozone-resistant insulation with an outer Neoprene sheath — either as single or multiple conductor assembly is suggested.

Cathodic Protection

For underground cable connections between the electrodes and pipe line, a satisfactory and economical solution is heavy wall TW. A satisfactory alternate type is so-called type RH underground cable rated at 600 v. Either may be buried directly in the ground.

Pipe Line Telephone

A most economical and satisfactory multi-paired cable design utilizing thin walls of Polyethylene, shielding, and overall synthetic sheath has been developed for either overhead or underground application.

Pulling Compounds

For Neoprene sheathed cables a lubricant consisting of soap flakes and water has been found very effective. For TW type insulations a surface lubricant is ordinarily applied at the factory. However, paraffin or "Albany" compound serves where further lubrication may be needed. Polyethylene is practically self-lubricating — ordinary water should provide adequate lubrication for most jobs.

Direct Buried Cables

Install at least 18 in. below the ground. If unshielded, keep cables spaced a few inches in the trench and a bare counterpoise wire installed in the same trench will provide some lightning protection.

Shielded Power Cables

Where expense is considered too great, consider either conventional lead sheathed or thermoplastic jackets (instead of Neoprene) over the shield.

Large Conductors

Wherever space permits, the paralleling of conductors in good engineering and economical. One large company has reported they try to limit any maximum conductor size to 500 MCM. For example, substitution of paralleled 500 MCM Type RH conductors will provide the same current-carrying capacity as single conductor 1000 MCM type RH — at a cost saving (cable) of 25 per cent and a further substantial saving of copper.

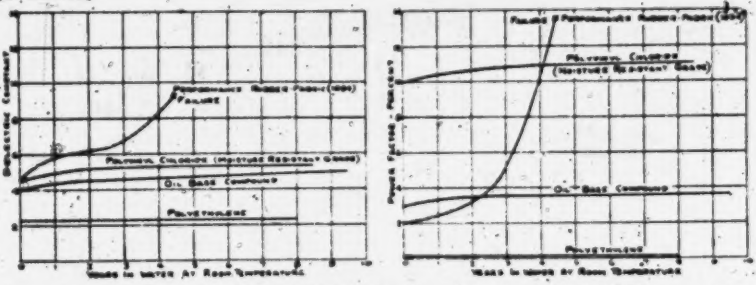
Multi versus Single Conductor Power Cable

Wherever terminal and raceway space permits, three single conductor power cables have certain technical and economic advantages over a three conductor cable. On most 600 volt sizes this means at least a 30 per cent saving in cable cost plus easier splicing, repairing, fault location, etc., for the single conductor cable which, incidentally, also incorporates full sheath protection throughout the circuit length.

Cable Specifications

Wherever possible it is recommended that standard industry specifications be followed to. Special requirements or "trick" tests usually means increased costs, restricted supply, and delivery delays.

[fol. 5722]



FIGS. 1 AND 2. LONG time electrical data describing moisture resistance of cable insulation.

an extruded sheathing material or as a fabric for braid coverings. It is relatively high in cost and its proposed end uses should be carefully reviewed before deciding upon its application. Its primary feature as a cable covering is its unusually high resistance to mechanical abrasion and crushing. So far, Nylon has not been used for primary insulation due to inherent poor electrical properties and moisture resistance.

Polytetrafluorethylene (Teflon) and flourinated ethylene (Flourothene and Kel-F) are under development as cable insulations. Although present costs are prohibitive, the anticipated advantages of these materials will undoubtedly find many applications in the future. Their almost complete resistance to all solvents, chemicals, flame, water, etc., added to their excellent electrical and heat characteristics certainly present an attractive picture for hazardous wiring jobs.

One of the major enemies of cable insulation in the past has been water and this problem has undoubtedly precluded use in many underground or wet applications. Figs. 1 and 2, however, present data on long-time tests that illustrate the progress that has been made in making our modern insulations substantially waterproof so that we can now confidently select a proper insulation without a lead sheath for wet locations.

Laboratory Testing

Our knowledge and best uses for these materials are mainly obtained from intelligent testing and development of the right kind of tests has been a problem in itself. Insofar as nonmetallic sheathed cable is concerned it has been found that resistance to moisture is probably the greatest determining factor for a successful service life. Accordingly, a large part of laboratory research over the past 15 years has been devoted to development of a suitable test to prove whether or not a cable should be used in a wet location.

It has been long since determined that it is not necessarily a question of how much water is absorbed, but of much greater significance is the location of the absorbed water in the insulation, and this can only be established by electrical test methods. A test has now been developed to determine the electrical stability of insulations in water and, recently, has been adopted as a Standard by ASTM and IPCEA.

Another somewhat new and highly useful test for cables rated at 3000 v and higher is called the corona-level test. This test serves as a vital control of quality by measuring the start of internal ionization within the cable. Since lochs insulation or shields, voids, abnormal porosity, etc., might cause destructive ionization discharge at the operating voltage, it is the object of the corona-level test to detect this condition and thus reduce another failure hazard.

Cable Design and Selection

Probably the best known design utilizes a combination having about 15 years experience and consisting of a good rubber insulation with an overall Neoprene sheath. The features of such a cable as compared for instance, with a lead sheathed cable are simplicity which aids in splicing, freedom from electrolysis, light weight, low cost, and a general-purpose end use either over-

Suggested safe practice for pipe line wiring.

Location of wiring	General purpose specifications					Special conditions present			
	0-600 Volts a.c. power	Over 600 volts a.c. power	Direct current	Direct signal	Direct control circuits	Direct communication circuits except telephone	Gas	Gasoline or organic solvents except kerosene	Low temperature, Polyethylene unsatisfactory
Condo/overhead open wiring	Neoprene or polyethylene weatherproof cable.	Neoprene or polyethylene line wire.							
Cable threaded conduit open wiring	Rubber neoprene	Oil base rubber and neoprene or polyethylene	Polyethylene or oil base rubber and neoprene	Polyethylene or oil base rubber and neoprene	Polyethylene PVC or rubber and neoprene	PVC or rubber and neoprene	Lead sheath PVC jacket	Lead sheath polyethylene PVC jacket	Polyethylene natural rubber jacket
Inside conduit exposed outside duct or duct	PVC or rubber and neoprene polyethylene	Oil base rubber and neoprene or polyethylene	Polyethylene or oil base rubber and neoprene	Polyethylene or oil base rubber and neoprene	Polyethylene rubber and neoprene	PVC or rubber and neoprene	PVC lead sheath or jacket	Lead sheath polyethylene or rubber and neoprene PVC	Polyethylene natural rubber jacket
Underground ducts	PVC or rubber and neoprene	Oil base rubber and neoprene or polyethylene	Polyethylene or oil base rubber and neoprene	Polyethylene or oil base rubber and neoprene	Polyethylene rubber and neoprene	PVC or rubber and neoprene	PVC or lead sheath	Lead sheath polyethylene or rubber and neoprene	Polyethylene natural rubber jacket
Open bushed	Rubber and neoprene or polyethylene	Oil base rubber and neoprene or polyethylene	Polyethylene or oil base rubber and neoprene	Polyethylene or oil base rubber and neoprene	Polyethylene rubber and neoprene	Rubber and neoprene	Lead or several thicknesses of sheath	Lead sheath polyethylene or rubber and neoprene	Polyethylene natural rubber jacket

[fol. 5723]

FIG. 3.

FIG. 4.

FIG. 5.

FIG. 3. 15 KV rated cable, ozone resistant insulation, metallic shielding, thermoplastic sheath.

FIG. 4. CONTROL cable — Polyethylene insulated, thermoplastic sheathed.

FIG. 5. AERIAL telemetering cable with factory applied messenger.

head, underground, or indoors. With modern grades of insulation such a cable is almost foolproof for most 600 v power applications. Experience has shown, however, that for certain installations involving severe oil or chemical exposure that a conventional lead sheathed or suitable thermoplastic design may be preferable.

When circuit voltages over 3000 are encountered it may be desirable to incorporate a metallic shield between the insulation and sheath for protection to personnel or to eliminate failure possibility from sheath leakage and discharge or from voltage surges. Where a shielded cable (Fig. 3) is advisable for electrical reasons and where there may be considerable exposure to oil or chemicals a more economical thermoplastic sheath instead of Neoprene is suggested. This would be especially true for buried installations near or exposed to the pipe line conditions.

For many 600 v applications especially lighting, machine wiring, branch circuits, etc., a TW or PVC insulated conductor has provided satisfactory and economical service—especially for the petrolrum and chemical industries. Recent trends indicate that slightly heavier than standard TW walls of a special heat-resistant PVC compound are being successfully used in many locations including direct earth burial. Such PVC insulated conductors are not generally recommended for power circuit applications in excess of 600 v.

Polyethylene as insulation or sheath is gaining prominence rapidly and is already being used in the chemical industry for power cable insulation on cables rated up to 15 kv. The material is also ideal for low voltage d-c control circuit wiring as illustrated in Fig. 4. It is about the only satisfactory material available for high-frequency and telephone cable insulation on non-leaded designs. In fact, multi-paired telephone cables using Polyethylene have been manufactured for installation directly in the trench with the pipe line itself. Such cables are specially constructed or custom-built for the job. Similar telephone cables can be designed for overhead use.

Overhead cable versus open-wire construction is rapidly gaining in popularity mainly because of substantially improved appearance and protection from storm outages. Aerial cable construction initially costs somewhat more than open-wire, depending upon the operating voltage, but compared with underground construction costs considerably less and offers similar advantages. Almost any type of power, control, or communication cable can be so constructed as to be adaptable for aerial construction by incorporation of built-on messengers (Fig. 5) at the cable factory or by the use of field assembled messengers.

For primary voltages up to 15 kv, aerial cable design generally consists of ozone-resistant rubber insulation with an overall corrosion-resistant shielding tape—or unshielded Neoprene jacketed designs for voltages up to 5000. For secondary 600 v construction, a simple cable design consisting either of Neoprene or Polyethylene insulated conductors wrapped around a bare neutral-messenger provides a simple, low cost arrangement. Standard hardware is available for any of these overhead designs.

Underground cable types generally utilize shielded, Neoprene or Thermoplastic sheathed, ozone-resistant rubber insulated conductors for voltages over 3000 (Fig. 3)—and either special thermoplastic or rubber insulated Neoprene jacketed type RR cable for 600 v applications. Any of these cables may be utilized directly buried in the earth.

Aluminum Conductors

The subject of aluminum conductors has been "on and off" for the past several years, depending upon metal availability and economics. For overhead applications involving weatherproof line wire or low voltage secondary distribution cables, the light weight and economic advantages of aluminum present such an attractive picture that its continued and extended use for such purposes seems assured. The only real problem has been the development of satisfactory connectors where good progress is rapidly being made.

For underground and other insulated cable applications the future of aluminum is somewhat doubtful. There are practically no technical advantages and the economics are deceiving. For example, the electrical equivalent in aluminum which is two AWG sizes larger than its copper equivalent means that where insulated cable is concerned an increased volume of insulation and coverings must be used. This added expense coupled with the necessity of larger raceways, more expensive connections, etc., may easily offset any apparent original savings in conductor metal particularly for voltages in excess of 600. Wherever space considerations are of importance, the use of aluminum may be almost prohibitive due to increased size.

Aluminum to copper connections in small branch circuit sizes of insulated conductors require special devices and skill that if not closely adhered to, might cause difficulty. The use of suitable compression type connectors on the larger feeder sizes has been satisfactorily established.

* * *

[fol. 5724] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 372

January 4, 1955.

A. D. R. Fraser
R. A. Schatzel

Aluminum vs. Copper

There are three areas where Aluminum and Copper may compete in wire manufacture:

a) Bare Transmission and Overhead insulated wire inland away from the sea coast. Here aluminum because of its cost, lighter weight and, when reinforced with steel, its strength has the advantage. Aluminum for many years has become the principal metal used in high-voltage transmission, and with the solution of some joining problems, is becoming increasingly important in lower voltage applications. Because of the number of taps and connections at low voltage the cost and reliability of these when aluminum is considered is still a hindrance.

Along the sea coast, because of corrosion by salt water, copper is still favored.

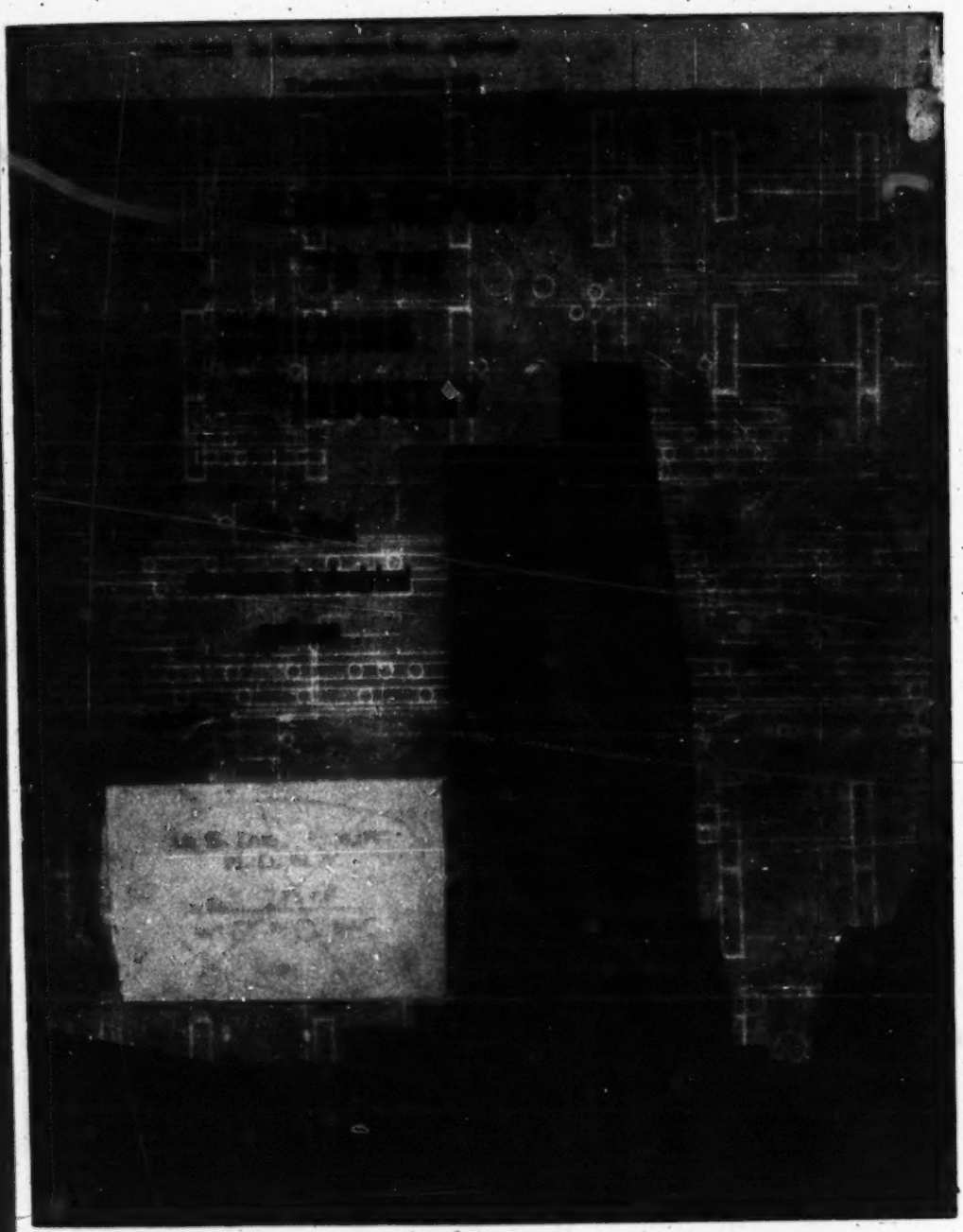
b) Areas where copper and aluminum may both be used, depending on cost. These include industrial uses as in coils, as a part of transformers in wiring of industrial buildings, and underground. These are all insulated conductors. Aluminum cables are larger and require more insulation. The cost of termination is greater and in some cases corrosion is a factor. The margin in cost when installation is considered, increased cost of conduit because of size, and the greater care in termination, is not so great and only when copper is in short supply will aluminum be favored. However, here is a field of challenge and competition. There is no reason to believe aluminum will make progress, but copper will continue to be favored when available at reasonable cost because of its superior properties and reliability.

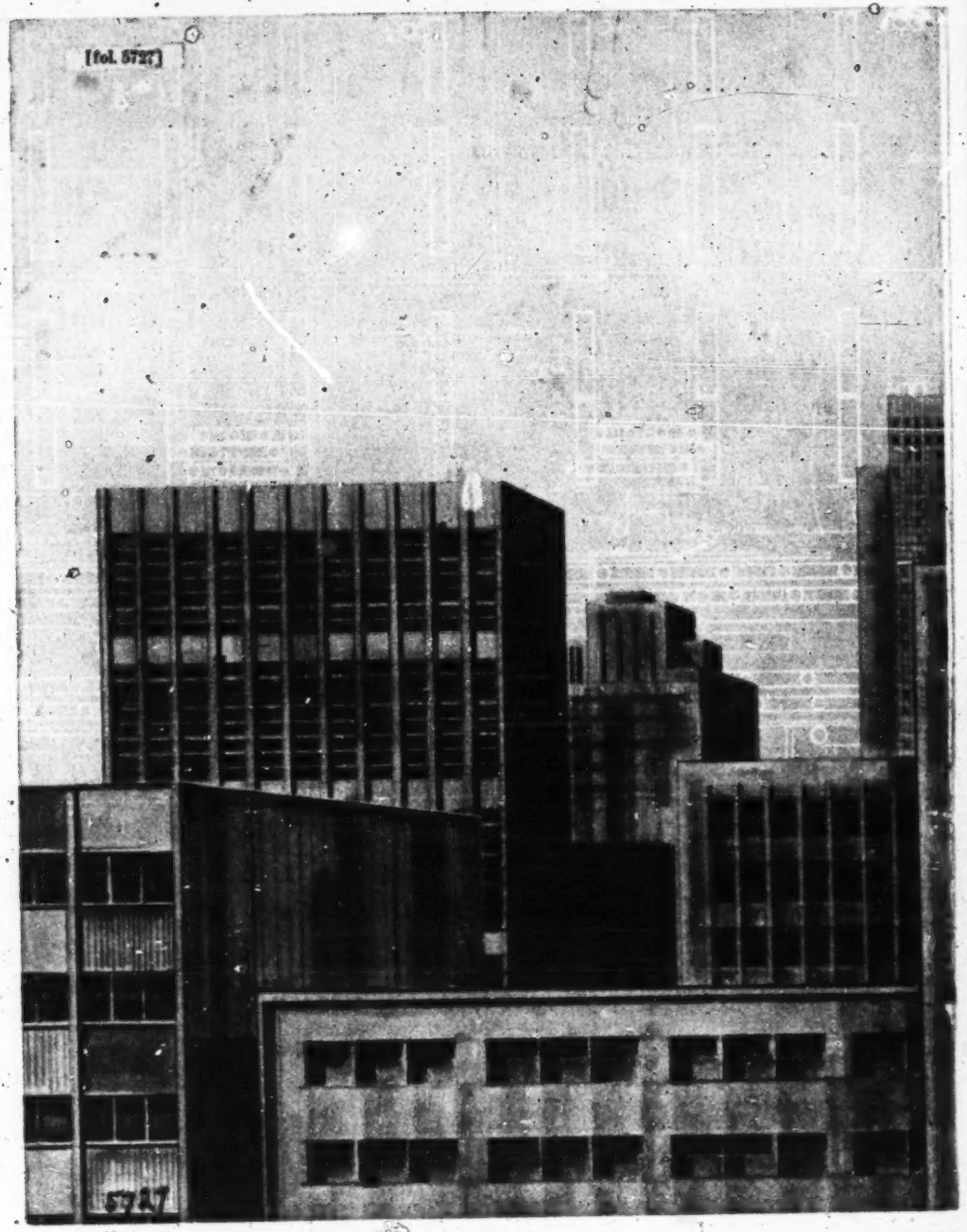
c) Areas where space is a predominate factor, and ease of working and flexibility are important. Here aluminum is at a disadvantage. The use of aluminum in a motor

requires a larger frame. Termination in a rotating machine introduces mechanical problems of major difficulty. The use of cable in city ducts for network supply of power to cities. Ducts are overcrowded and space at a premium. Aluminum would only apply in an emergency. The rewiring of commercial and public buildings. The cost of taking out old and installing new larger conduit is greater than the cost of wire. Some relief is possible with new insulations to install larger size of copper. Aluminum is not a solution. [fol. 5725] Aluminum is a supplement to copper. It will never supplant copper. Both are needed if in the next ten years we are to completely duplicate the entire electrical system of the country as it is now indicated we will.

R. A. Schatzel.

RAS P

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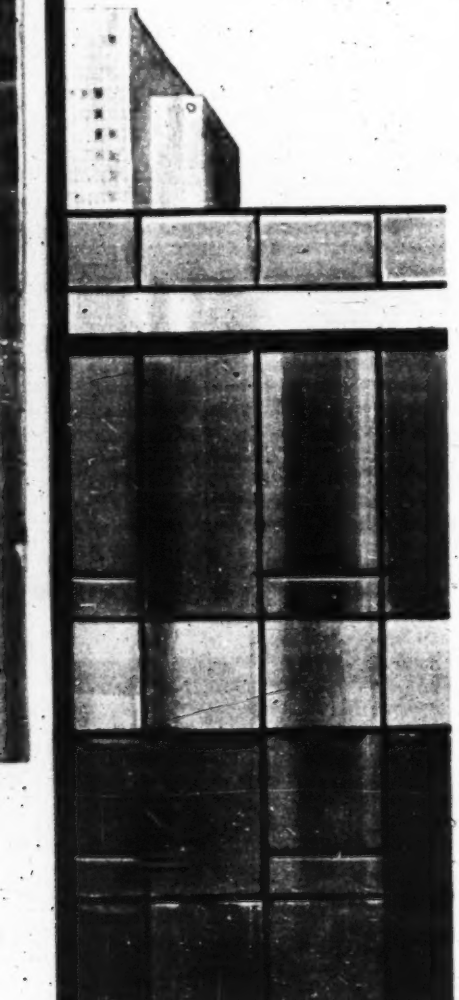

THE REASON FOR THIS REPORT

As aluminum is passing its 70th birthday, electrical applications of aluminum are moving down from overhead power lines into plants, offices, monumental buildings, and a host of utility structures. To determine how much knowledge of and interest in electrical uses of aluminum exists in the building industry—uses both for conductor and nonconductor applications—Alcoa retained the nationally known firm of Edward E. Ashley, consulting engineers. They were asked to survey current trends in aluminum utilization in the industry. This booklet is in large part based on the comprehensive report made to Alcoa by the Ashley organization.

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[fol. 5729]

BACKGROUND

Today's ascendency of aluminum for electrical applications, as well as many others, dates from the end of World War II. During World War II, aluminum was commandeered by the United States Government, as was copper, for the most critical war needs. Both metals were in demand for non-electrical uses—aircraft, shell cases, etc. As a result, silver was taken from government storage vaults and used for bus conductors and transformer windings. At the end of the war, the silver was remelted and returned, and the battle of aluminum vs copper was resumed.

A number of aluminum applications were introduced or reviewed, and today we see aluminum either predominant or running a close second to copper in such uses as overhead transmission, primary and secondary distribution, busway systems, substation conductors, and light and heavy industrial bus runs. Many of the applications, such as aluminum lamp bases, countless small parts in telephone sets and lighting fixtures, have become commonplace. Aluminum conduit, aluminum building wire and cable, aluminum cable trays and aluminum switchgear enclosures are less conspicuous, but have met with wide acceptance—all because of one outstanding common denominator: savings in hard money.

There are two specific reasons for aluminum's rapid emergence and dominance in certain electrical fields . . . price and availability. Fig. 2 illustrates aluminum's remarkable and continuing increase in production. Since 1946, aluminum production has quadrupled, while copper has yet to reattain its World War II peak. In 1964, aluminum production exceeded that of copper for the first time. It appears likely to continue its lead by ever greater margins.

Consider the following short but essentially accurate picture of copper vs aluminum during the past 60 years: The fluctuations in the supply and demand of copper, with correspondingly violent fluctuations in price, have plagued the copper supplier and consumer alike for the better part of the twentieth century. The supply and demand of aluminum, and corresponding prices on the other hand, have been essentially stable. The reasons? Rather simple.

Copper was a well-established metal with a heritage running through many centuries. It was produced by several competing interests. Technological advances were creditable. In recent years, long-time price trends appear to be ever upward—irrespective of inflation. This is due to diminishing supplies of high grade copper ores, mainly in the United States.

The aluminum picture differs greatly from that of copper. Aluminum was a "newcomer" to the metal industry and was considered an upstart by some. Aluminum is the most common metal in the earth's crust. The rise in the use of aluminum is due to maintenance of a stable price structure and to research and developmental programs. Today's user of aluminum sees a very clear picture of abundant supply and a stable market price. Fig. 3 shows that aluminum has maintained a fairly steady rate of price change, while other metals have shown price fluctuations of considerable magnitude.

Aluminum's progress may also be linked with its inherent physical, electrical, mechanical and nuclear properties. These properties are responsible for tipping the balance to aluminum in the face of stiff competition with copper and other materials.

The following sections of this report outline the areas where aluminum electrical products have been successfully applied. It is hoped that those responsible for the design, inspection and construction of buildings may find information here which can be applied to specific applications, and which will contribute to the improvement of electrical systems in all types of structures.

[fol. 5730]

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Fig. 1—Here is a view of the aluminum bus system at Alcoa's smelting plant No. 3, Niagara Falls, N. Y. The bus was installed in 1895 and gave continuous service until plant was dismantled in 1949.

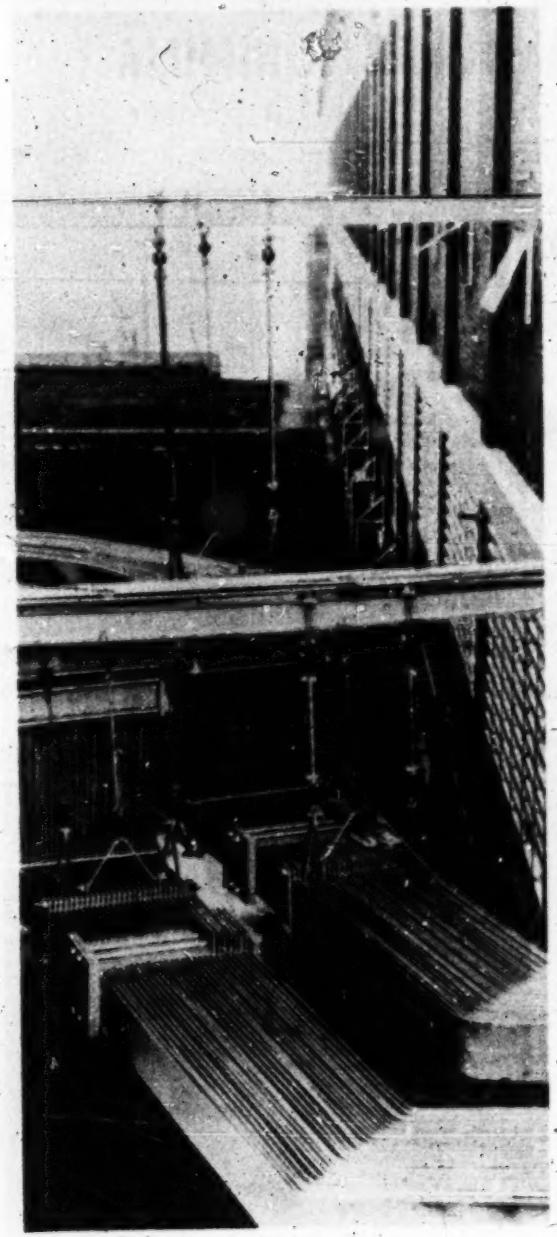
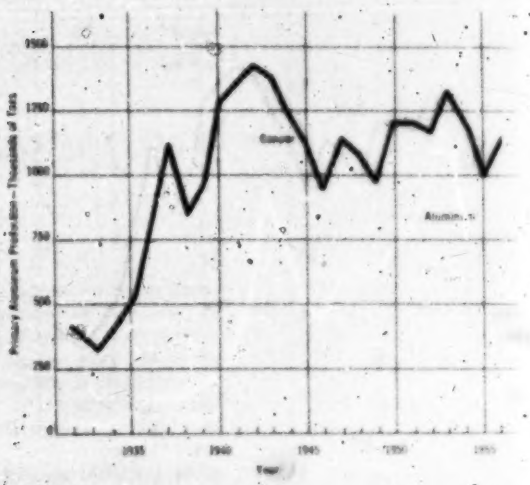
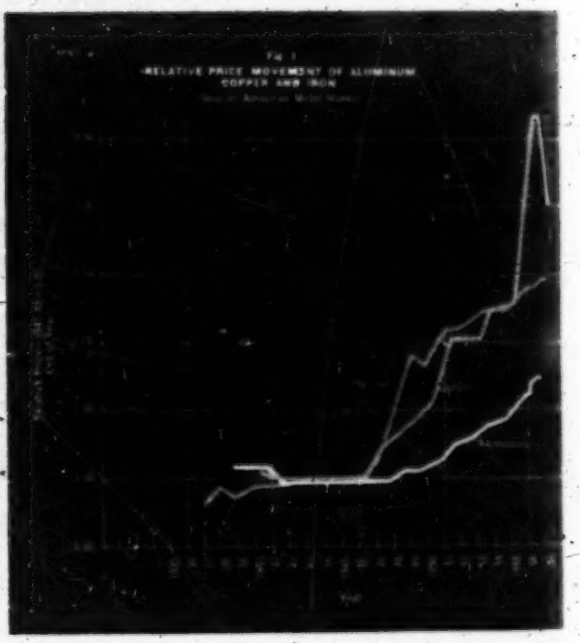


Fig. 2

PRODUCTION OF PRIMARY ALUMINUM AND COPPER IN THE UNITED STATES

Source: U.S. Bureau of Mines; American Metal Market





THE ALCOA BUILDING ... SHOWCASE FOR ALUMINUM ELECTRICAL PRODUCTS

During 1950, the eyes of the building industry were on Pittsburgh, where the Alcoa Building—an entirely new kind of skyscraper—was under construction. From its curtain wall skin to the electrical backbone of riser bus deep within its core, the Alcoa Building was an innovation in aluminum.

This metal was utilized in every practicable application here to show its versatility and to demonstrate its major role in commercial buildings.

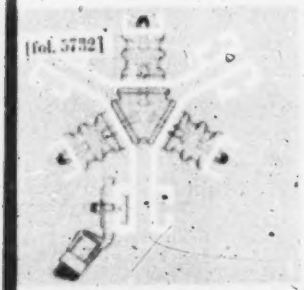
The Alcoa Building is a significant undertaking to all in the industry, especially to those associated with the design and installation of building electrical systems. The structure is a veritable showcase for aluminum in virtually every type of electrical component—and, a challenge to skeptics who questioned the extensive use of this metal in electrical systems.

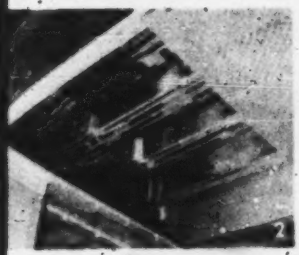
Today, there is probably no major commercial structure in the world that has used aluminum more effectively and economically in its electrical systems. The Alcoa Building was the first skyscraper to use aluminum wiring exclusively—first to use rigid aluminum conduit exclusively—and first to use all-aluminum lighting fixtures designed as an integral part of the ceiling heating and cooling system.

In spite of outside skepticism, Alcoa felt confident this aluminum electrical system would prove its success over the years . . . and it did.

Further reference to specific electrical components in this building will be made in the appropriate sections of this report. Meanwhile, let us explore other commercial and industrial structures where aluminum electrical products are being proved practical, efficient and economical.

[fol. 5732]





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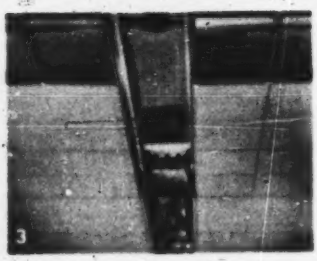

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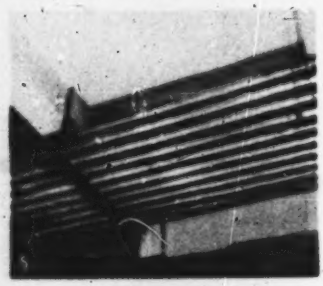

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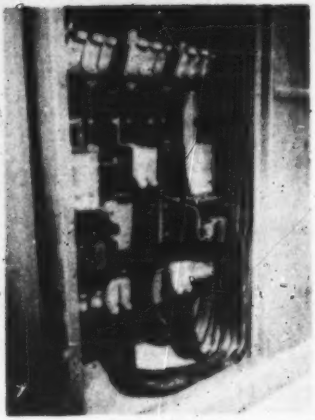

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1 Artist's drawing shows one side of outboard aluminum service bus in the Alcoa Building. Two of these low-reactance buses completely encircled central core and serve the building.

2 Overhead bus bar connecting transformers to switchgear.

3 Here is one of the many aluminum recessed fluorescent fixtures in the Alcoa Building. Housing is specially designed with slots that conduct the ceiling grid of aluminum pipe to carry away heat generated by the lights.

4 This main switchboard in the first basement controls the power supply for 11 floors, two basements. All panels are made of aluminum.

5 This run of 24 4-in. aluminum conduits feeds the branch circuits in the building.

6 Feed passing 750,000 cm aluminum cable routes to bus connection for connection to 2,000,000 cm aluminum ring bus.

7 Insulated aluminum cables and terminals of the supply power to a 650-hp refrigeration compressor located in the building's sub-basement.

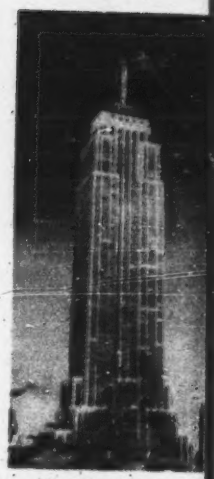
[fol. 5733]

ALUMINUM ELECTRICAL PRODUCTS AT WORK IN COMMERCIAL BUILDINGS

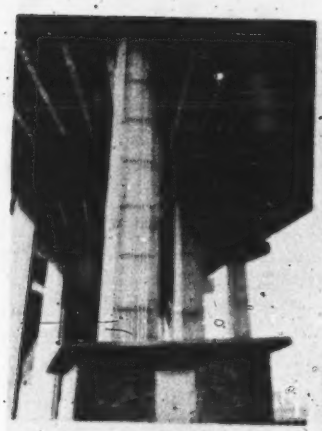
The group of buildings surveyed by the Ashley firm includes some of the nation's major commercial construction projects. In each, aluminum's lightness, easy-working properties, and electrical characteristics provided economical and efficient installations of busways, conduit and other electrical components.

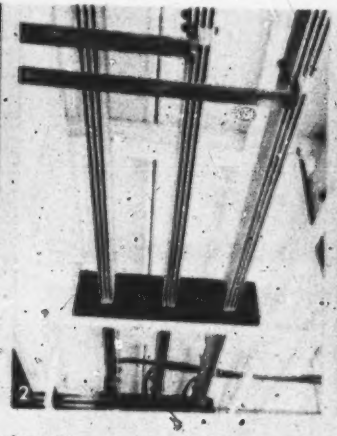
It is interesting to note that many of the buildings in this group are located in New York City, an area where commercial electrical codes are probably as stringent as any in the nation. Other buildings not shown here are listed separately. In many cases, more than one building of a particular company contains aluminum electrical products.

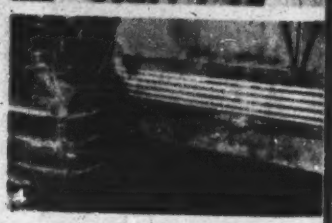
AMERICAN MACHINE & FOUNDRY COMPANY • BELL TELEPHONE COMPANY • CHRYSLER CORPORATION • DIPLOMAT HOTEL, MIAMI, FLA. • E. I. DU PONT DE NEMOURS • FORD MOTOR COMPANY GENERAL MOTORS CORPORATION • HALLMARK CARDS • ILLINOIS INST. OF TECHNOLOGY METALS RESEARCH BUILDING • JOY MANUFACTURING COMPANY • KENMAWR APARTMENTS, PITTSBURGH, PA. • MURCHISON TOWER BUILDING, DENVER, COLO. • NEW YORK CENTRAL RAILROAD • OWENS ILLINOIS GLASS COMPANY • PITTSBURGH PLATE GLASS COMPANY • REMINGTON RAND DIVISION, SPERRY RAND CORPORATION • SOCONY-MOBIL BUILDING, NEW YORK CITY • TIMKEN ROLLER BEARING COMPANY • UNION TRUST BUILDING, PITTSBURGH, PA. • WACHOVIA BANK BUILDING, CHARLOTTE, N. C. • L. A. YOUNG SPRING & WIRE COMPANY



Empire State Building, New York, N. Y.







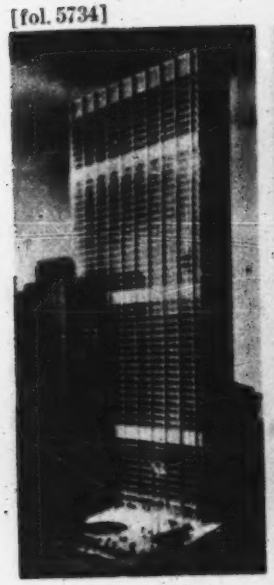
1. Walt Whitman Bridge, Philadelphia, Pa. The aluminum conduit here was used to save weight and to withstand all the abuses of an outside installation.

2. Penthouse Apartments, Pittsburgh, Pa. Electrical cooking and air conditioning almost doubled the load requirements originally contained for this building. Changing from conduit and cable to an aluminum busway system permitted this increased load without appreciably increasing the original estimated system cost.

3. The aluminum bus was installed in 1957 in the Waldorf Paper Products Company, St. Paul, Minn. Notice the copper tap-offs at the top of the photo which show effects of the corrosive atmosphere inherent in this industry.

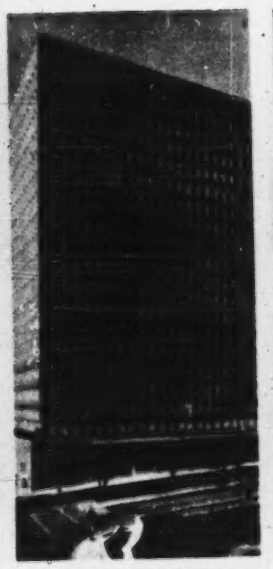
4. Aluminum conduit runs above a 16-in. sewage line in the Clavey Road Sewage Treatment Plant, Highland Park, Ill. Aluminum withstands the corrosive atmosphere common in this type of application.

[fol. 5734]

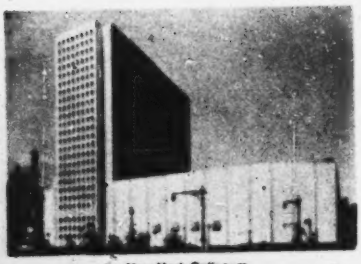


Chase Manhattan Bank,
New York, N. Y. (under construction)

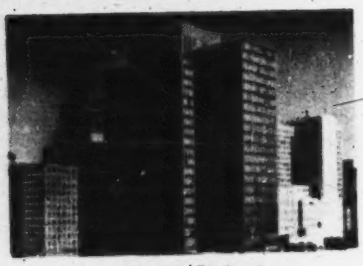
Socony-Mobil Building,
New York, N. Y.



Commercial Credit Building,
Baltimore, Md.



New York Coliseum,
New York, N. Y.



Bank of the Southwest,
Houston, Tex.

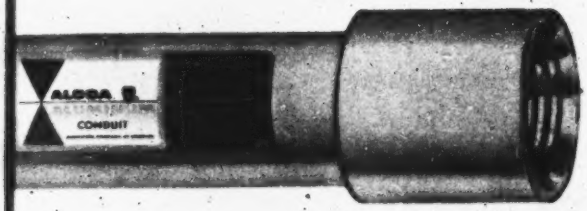
INDUSTRIAL BUILDINGS AND SPECIAL INSTALLATIONS

As a rule, construction materials for industrial buildings and other special structures are exposed to a greater degree of abuse than those found in commercial buildings. Many process industries and fabricating plants, for example, have atmospheres which are inherently corrosive, dusty or humid.

Most of the aluminum electrical products we know today grew up in such environments . . . areas where other metals might have failed. Aluminum resists corrosive acid fumes in chemical and sewage disposal plants, shrugs off the effects of steam and moisture in dairies and other areas of high humidity. And outside, on bridges, in substations . . . even on the undersides of buses and highway trailers . . . aluminum comes through in all types of weather like the proverbial postman. Small wonder, then, that aluminum electrical components were selected for the installations shown here and for those on the previous page.

Now that we have seen where aluminum electrical systems are at work, let us examine each component in the system more closely. Let's look at *facts*.

5735]



ALUMINUM CONDUIT

Alcoa aluminum has had approval of Underwriters' Laboratories, Inc., for use as rigid conduit since 1922. Development of new alloys over the years has permitted manufacture by an extrusion process, resulting in an improved product at lower cost, with ample strength for use as an electrical raceway.

Because of aluminum's lightness, conduit installation costs in many applications are less than those for steel. Size for size, a piece of steel conduit is nearly three times as heavy as a similar piece in aluminum. Lighter weight permits more rapid installation, helps reduce worker fatigue, and is a decided benefit in hazardous or difficult situations where very high ceilings or high vertical exterior risers are encountered. Fig. 1 shows the comparative weights of aluminum and steel conduit feeders.

For a large group of feeders in conduit, the number of required supports will generally be proportional to the weight. Here, very definite installation savings can accrue from an aluminum conduit installation. Fig. 2 compares the support requirements of large-size aluminum and steel conduits, showing that fewer supports are necessary with aluminum.

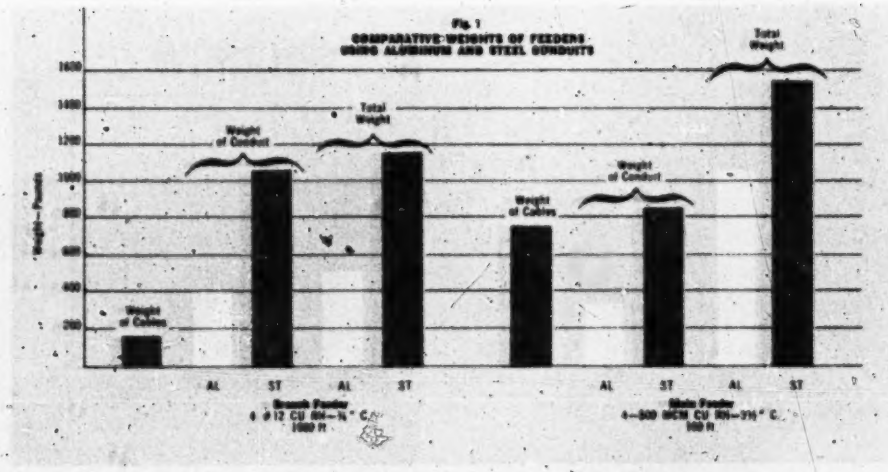
To compare the installation requirements of steel and aluminum conduit, a set of figures was secured representing average installation man-hours per 100 ft, in diameter sizes from ½ in. to 4 in. These figures are based on a typical project and were verified with several large electrical contractors before publication. The results can be seen in Fig. 3.

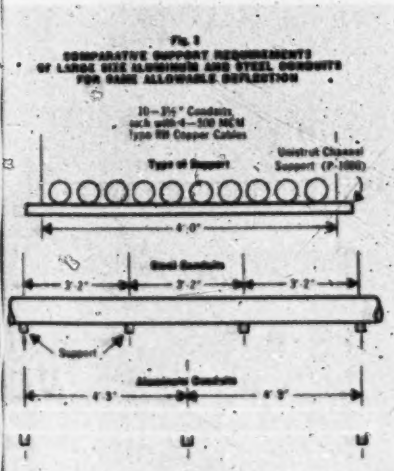
The "possible" line in this graph was derived from a poll of several hundred leading electrical contractors across the nation who felt that the installation time shown could be achieved by using experienced and knowledgeable mechanics. Most contractors polled, who had worked with aluminum conduit, stated they had realized appreciable installation savings. The average savings ran about 10 to 15 per cent, but some contractors indicated savings of as much as 20 to 40 per cent.

Aluminum wards off most corrosive elements that damage other types of metallic conduit. Ample proof of aluminum's resistance to corrosion has been cited in numerous exposure and laboratory tests, and by countless applications in the process industries.

Aluminum conduit can be safely installed in concrete. This is proved by the successful use of aluminum for handrails, grilles, structural elements, building facing, terrazzo strips and pipes. These can be completely buried in concrete or may be partially covered. The latter condition is more often subject to corrosive attack than the complete burial.

[fol. 3736]

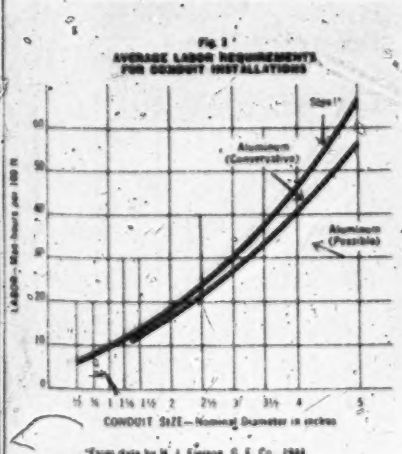


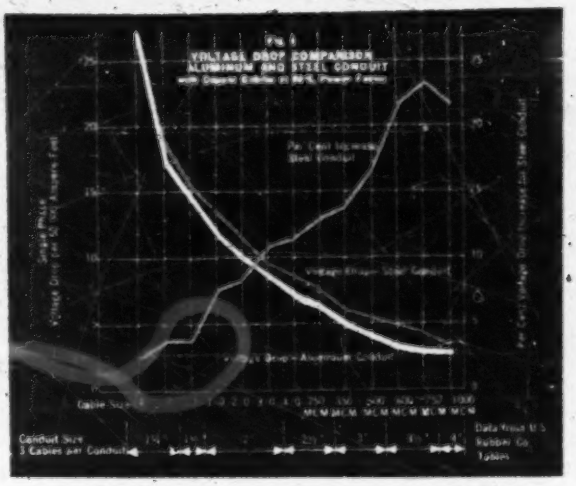


Extensive testing also leads to the general conclusion that aluminum is compatible with the common alkaline building materials. The chemical by-products and hydroxides of calcium, magnesium and ammonium in building products cause an initial mild surface attack which upon subsequent curing and aging develops into a self-limiting protective film, thus preventing further corrosive action.

Since aluminum is nonmagnetic, it is not subject to magnetically induced energy losses. Therefore, voltage drop is reduced, and each conductor in a single-phase or polyphase system can be enclosed in a separate conduit, regardless of the electrical load. Installation of electrical equipment with widely spread terminals is thus simplified. Fig. 4 compares voltage drop for the common range of copper cable sizes in aluminum and steel conduits. It can be seen here that feeders in aluminum conduit have a lower voltage drop throughout the entire range of cable sizes.

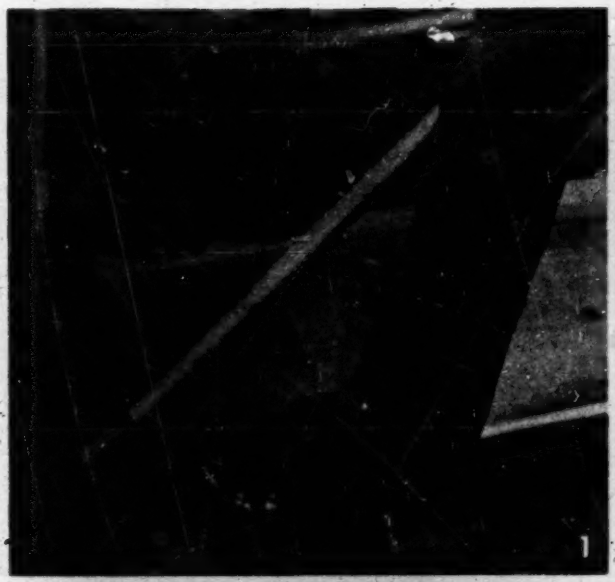
Other advantages of aluminum conduit over that of steel include a nonsparking property that is particularly important in explosive environments, and a handsome appearance that counts heavily in areas where a modern, clean-looking installation is desired.

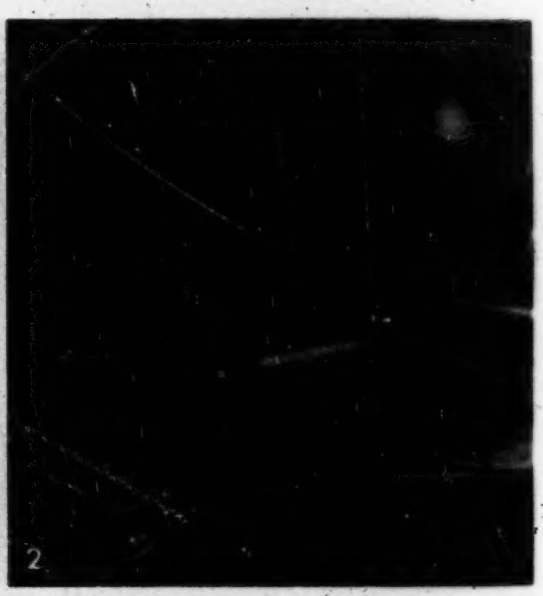




[fol. 5737]

WORKING PROPERTIES OF ALUMINUM CONDUIT





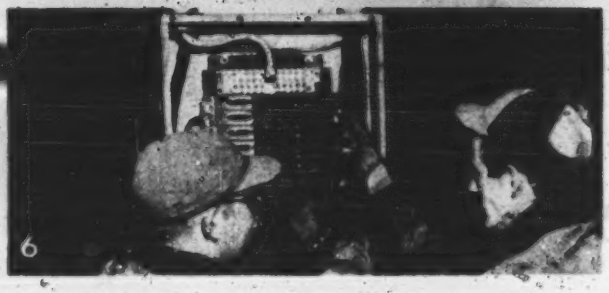
[fol. 5738]

1-2. BENDING

Aluminum conduit is far easier to bend than conventional conduit, as less force is required for a comparable bend. Bends can be made "on the nose," since there is no appreciable springiness, as in steel. Most contractors use the same bending tools for steel and aluminum conduit, with equally good results. EMT benders can be used for the smaller conduit sizes, while rigid conduit benders are excellent for the larger sizes.

3. CUTTING

Aluminum conduit is easier to cut than steel conduit. The smaller sizes are easily cut with a hacksaw, while modern power cut-off equipment can be used for the larger sizes.

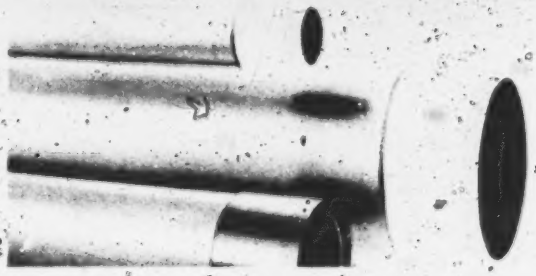


4. THREADING

Aluminum conduit is easily threaded if good conventional tools are used; but the use of dull tools or broken dies may cause serious difficulties. The use of sharp dies is good practice with aluminum as with any other metal. If desired, dies can be purchased with a rake of about 35 degrees to make them self-cleaning. Almost any conventional cutting oil can be used, although the better grade oils have a viscosity of approximately 150 ssu at 100 F and are fortified with sulfur and/or chlorine additives.

5. JOINING

Again, the same practices apply to aluminum as to steel. A typical thread lubricant consists of a mixture of zinc dust and petroleum jelly, or a heavy cup grease containing about 25 per cent graphite.



6. WIREPULLING

A special coating which is provided on the interior walls of Alcoa aluminum conduit makes wirepulling exceptionally easy. Terminal balls should be used on the ends of fish tapes to prevent sharp tape ends from digging into the conduit at bends, or catching on inadequately closed joints. If additional lubrication is required, as occasionally happens, talc or powdered soapstone is recommended. Some difficulties have been reported here and there because of failure to follow these practices.

7. STORING

Alcoa aluminum conduit is supplied with improved protective caps for threaded ends. Caps are color coded to provide fast size identification, simplifying conduit storage and handling.

[fol. 5739]

TYPICAL ALUMINUM CONDUIT INSTALLATIONS

THE ALCOA BUILDING, PITTSBURGH, PA.

It would seem appropriate that Alcoa's home headquarters should have made extensive use of aluminum. Yet, the selection of this metal reflected more than a manufacturer's natural preference for his own product. This is especially true of the aluminum conduit installation in the building, where aluminum was selected over steel because of installation and maintenance economies. The electrical contractor for the project reported installation savings were especially marked for conduit 1½ in. and up. He compares the aluminum conduit with steel as follows:

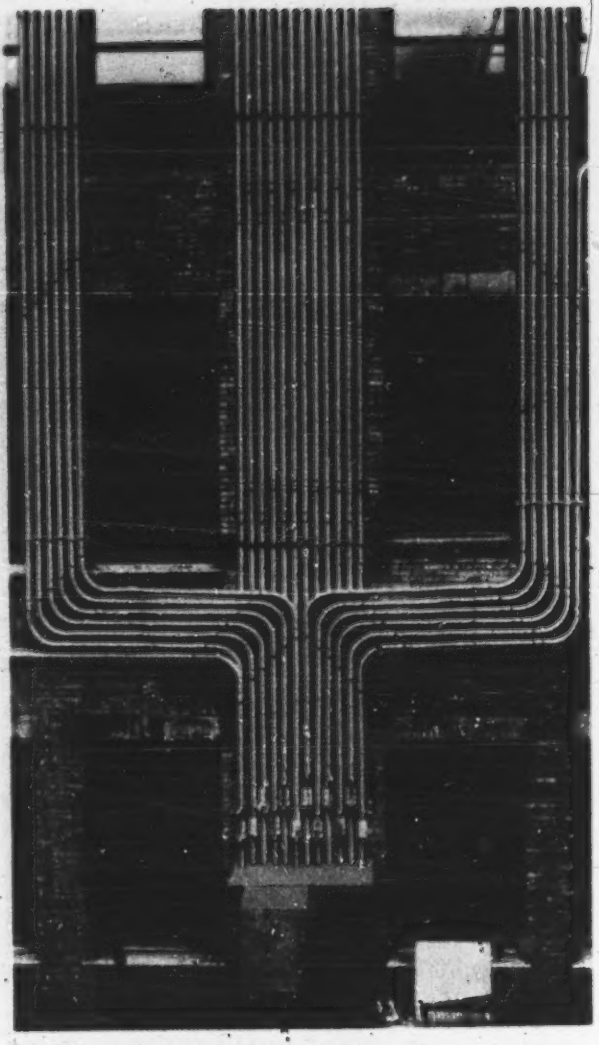
Cutting	"Same"	*Bending*	"Easier"
Threading	"Same"	*Installing*	"Tremendously easier"

[fol. 5749]

EBASCO SERVICES BUILDING, NEW YORK, N. Y.

Here's an interesting and instructive aluminum conduit installation erected early in 1955, and in full service today. It consists of several 2½-in. conduit risers running up the exterior wall of this 26-story building. Aluminum conduit was considered ideal for this project because it was desired to utilize existing shutter brackets as supports. Steel conduit would have been too heavy and too difficult to maintain.

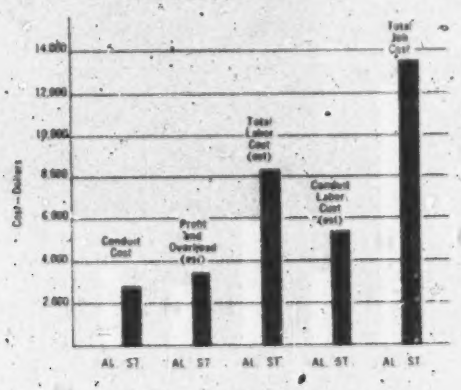
Even though this installation had to be made from two simultaneously rigged painter's scaffolds, the advantages offered by light weight, easy-handling aluminum sections made it possible for the contractor to make substantial savings.



The unqualified success of the initial job prompted the installation of additional 2½-in. risers two years later. The contractor prepared two estimates for the addition—$13,500 for steel, and $12,150 for aluminum conduit—or a 10 per cent saving with aluminum. Fig. 5 graphically shows these comparative estimates.

This particular project illustrates an excellent and economical way to increase the electrical capacity of large, inadequately wired older buildings, especially where inner shaft space is lacking, and where it is inconvenient and costly to break through multiple floor slabs. This situation is becoming more common with ever-increasing air-conditioning and lighting demands on major office buildings.

FIG. 5
COMPARATIVE COSTS OF A CONDUIT INSTALLATION
ALUMINUM CONDUIT vs STEEL CONDUIT



[fol. 5741]

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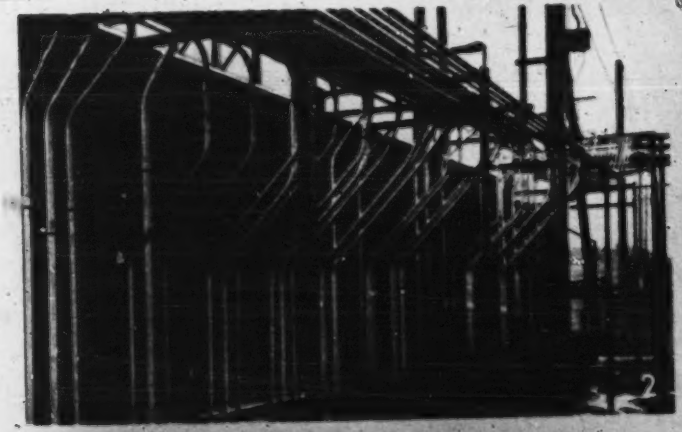
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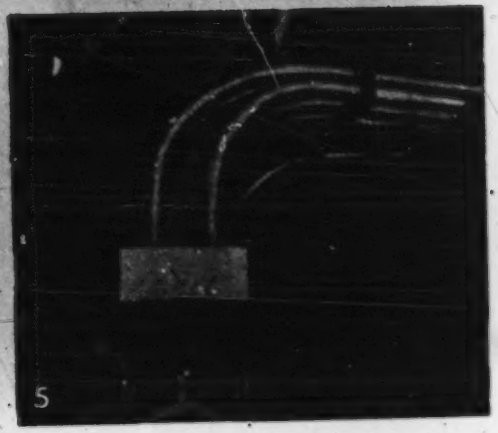
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PICAL ALUMINUM CONDUIT INSTALLATIONS

E MANHATTAN BANK BUILDING,
W YORK, N. Y.

competitive bidding, aluminum conduit was
d here for all major electrical raceways. Going
lower Manhattan, this new 60-story structure
prime example of the installation economies
an be obtained with aluminum conduit.

CER CHEMICAL CO., PITTSBURG, KAN.

inum conduit is usually specified for difficult
e conditions. Good examples are chemical
with their strongly corrosive environments.

A PLANT, DAVENPORT, IOWA

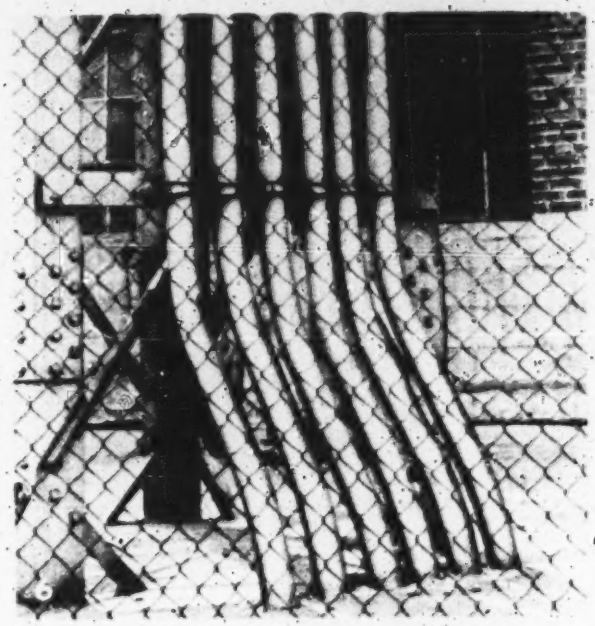
another aluminum conduit installation. The
agnetic features of aluminum conduit race-
provided lower reactance losses on heavy cur-
apacity circuits. Electricians on the job said
enjoyed working with aluminum. They re-
d that less exertion was required because the
num cable and conduit were easier to trans-
nd handle, especially on overhead work. Alu-
m was found easier to cut, bend and thread
steel. Standard pipe dies were used on the
r sizes of conduit; larger ones were reground
an increased "hook," or rake, to make them
eaning.

. PLANT

inum conduit is shown here in a steel plant
phase separation was necessary. Since alu-
m conduit is nonmagnetic, it was possible to
h phase wires in separate conduits.

STATION

substation, aluminum conduit is imbedded
concrete pad. This installation has been in
e since 1939.



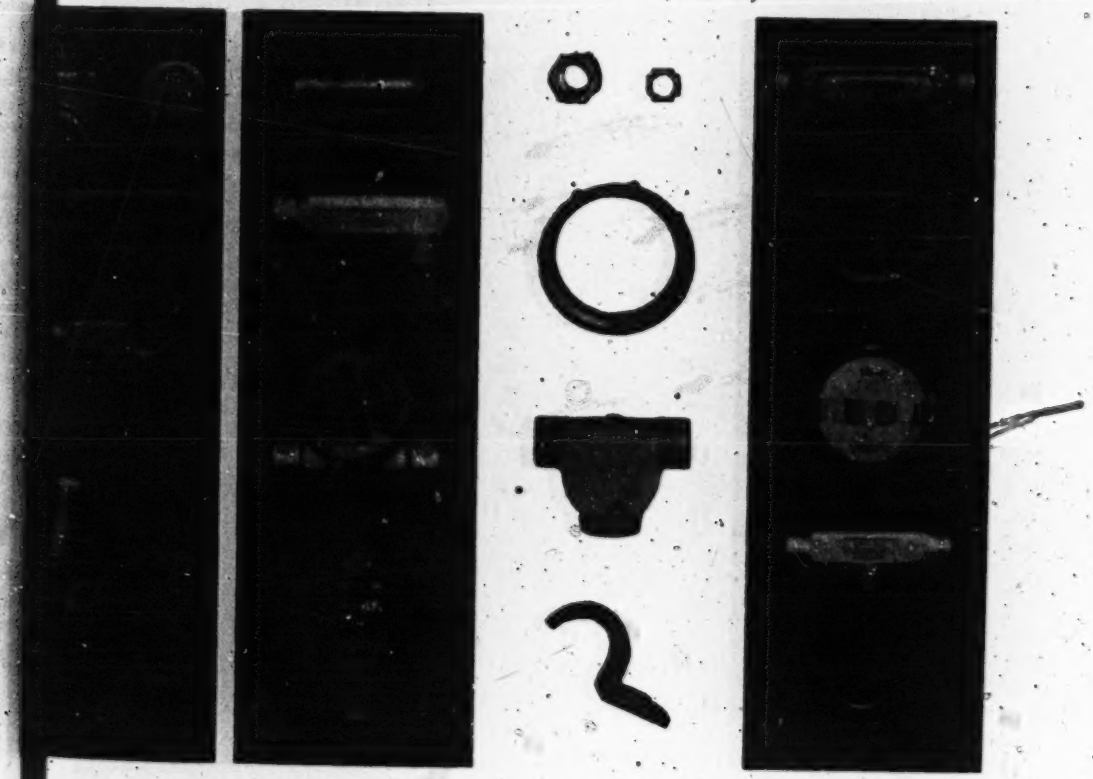
Aluminum conduit has given excellent performance in other installations of the following types:

- Airports
- Breweries
- Canneries
- Dairies
- Department Stores
- Distilleries
- Docks
- Electrical Generation Stations
- Floodlighting
- Ice Cream Plants
- Industrial Buildings
- Laundries
- Marine Field in General
- Meat Packing Plants
- Mines
- Petrochemical Plants
- Pulp and Paper Mills
- Railroads
- Refineries
- Rubber Processing Plants
- Seacoast Locations
- Sewage Treatment Plants
- Shore Resorts
- Soap Manufacturing Plants
- Steel Mills
- Subways
- Textile Mills
- Tunnels
- Underground Workings
- Water Purification Plants

[fol. 5743]

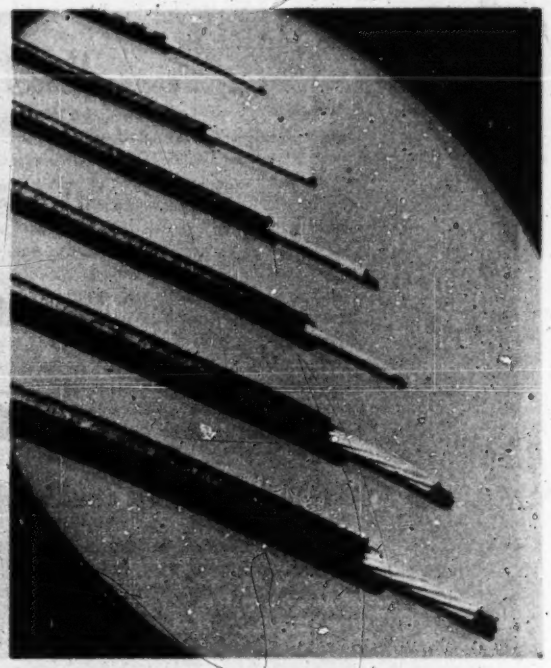
CONDUIT FITTINGS

Shown here is a selection of aluminum fittings made by several manufacturers. One major manufacturer now produces virtually every item in his catalog in aluminum as well as cast iron. Another produces his entire line of fittings, receptacles and fixtures in aluminum only. Moreover, in most cases, there is no premium for aluminum fittings.



[Vol. 5744]

ALUMINUM WIRE AND CABLE



Aluminum cable dates back to the turn of the century, when it was first used in transmission and distribution lines. There it proved its reliability under electrical, corrosive and mechanical conditions far more extreme than encountered in typical office or industrial installations.

In more recent years, insulated aluminum wire and cable have appeared in commercial and industrial buildings, where they again performed satisfactorily under all types of conditions. Aluminum branch wiring, for example, has been particularly applicable and economical in office buildings utilizing 277/480 volt distribution and lighting systems. Viewed on a historical basis, the increased use of these aluminum electrical conductors can be attributed to a favorable price situation.

A comparison of weight and current-carrying capacity of copper and aluminum cable in conduit is seen in Fig. 1. Here, a 3-cable feeder is plotted as a function of load in both aluminum and steel conduit.

For practical purposes, an aluminum wire is considered to have a rated current capacity approximately the same as a copper wire two gages smaller (that is, No. 8 aluminum is the same as No. 10 copper wire). Fig. 2 shows that the allowable current-carrying capacities recommended by the National Electrical Code are nearly a linear function of the conductor diameter.

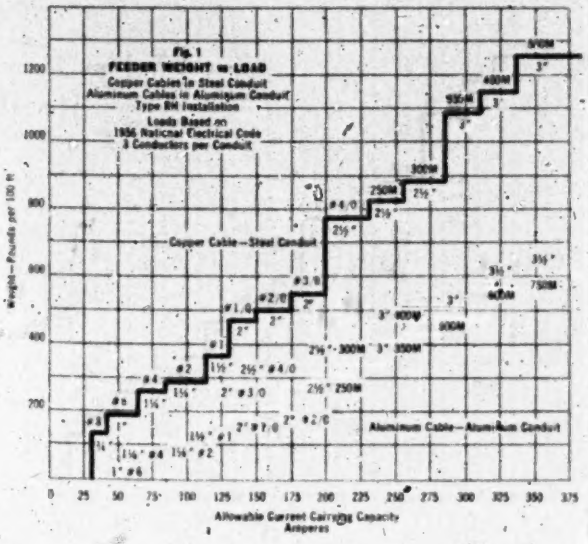


Fig. 2
Comparative Chart, 1956 National Electrical Code
ALLOWABLE CURRENT-CARRYING CAPACITIES OF INSULATED CONDUCTORS
Type RH Insulation 3 Conductors per Raceway

Size MCM or AWG	Amperes	Size MCM or AWG	Amperes, Per Cent of Same Size Copper Cable
750	445		
	420	1000	81.6
600			
	380	385	
500		750	81.1
	335	340	
400	315		80.9
		600	
350	285	330	81.4
		500	
300	258	270	80.6
		400	
250	230	250	79.4
		350	
4/0	200	300	80.7
3/0	175	250	80.4
		4/0	
2/0	150	135	78.1
		3/0	
1/0	130	120	77.5
		2/0	
1	115	100	77.1
		1/0	
2	85	90	80.0
		1	
4	65		78.2
		2	
6	50	4	76.5
	45	40	
		6	77.0
8	30		75.9
		8	
10	25	25	83.4
		10	
12	20	15.6	75.0
		12	
COPPER		ALUMINUM	

[fol. 5745]

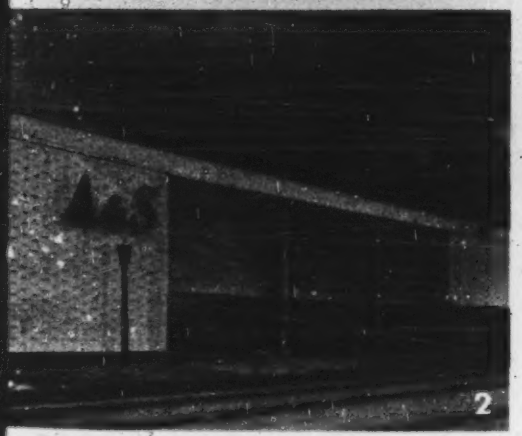
ALUMINUM WIRE AND CABLE INSTALLATIONS

1

1. ALCOA BUILDING, PITTSBURGH, PA.

At Alcoa's home headquarters can be found one of the most notable examples of aluminum branch circuit wiring installations in recent years.

There are several interesting features worth noting in this project. Branch wiring is in No. 12 aluminum connected to No. 16 copper fixture leads. The connectors are the *bare copper alloy* type. This type of installation proves conclusively that copper and aluminum can be successfully combined in a commercial installation, and that a simple connecting method is practicable. The building's chief maintenance engineer (a registered electrical engineer) indicates that this type of connection has fully justified itself in service, and that it is the present splicing method used when changes in the system are desired.



2

2. ABRAHAM & STRAUS DEPARTMENT STORE, LONG ISLAND, N. Y.

Here's another interesting installation . . . this time with aluminum cable in *steel* conduit. The electrical system had originally been designed for copper cables, but the shortage of copper during the Korean War forced the substitution of aluminum.

Although the conduit (specified for copper cables) had already been installed, it was found possible to switch to aluminum cable of nearly equivalent capacity. A small supply of copper cable was already on hand, and some feeders were installed with aluminum phase wires and copper neutrals, others with copper phase wires and aluminum neutrals. Connectors and terminal lugs are bolted types, made of plated, cast copper alloy. The maintenance engineers regard the electrical system with great satisfaction and a certain pride in its uniqueness.

46]

FORGING PLANT, CLEVELAND, OHIO

oice of aluminum wire and cable here was rictly on the basis of competitive bids. The m conductor quotation for the entire job ut 4 per cent lower than that for copper ors. Most of the large, low-voltage feeders n as open wiring in lightweight aluminum roughs. Installation was completed in 1953.

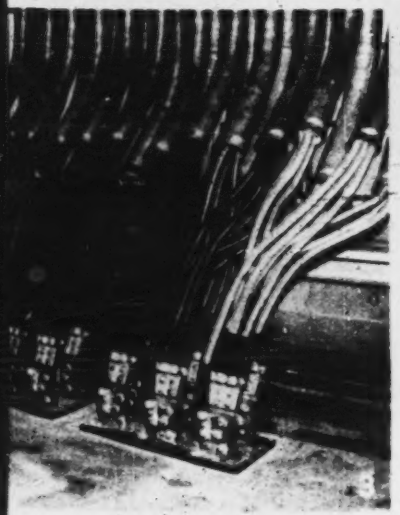
ROLLING MILL, DAVENPORT, IOWA

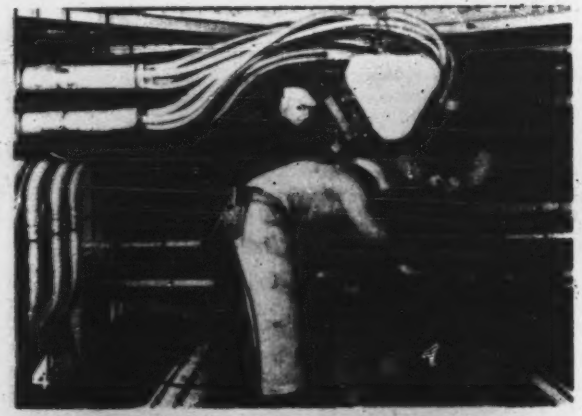
ge mill features one of the first all-aluminum tion systems in the nation. In addition to m bus, over 1,800 miles of aluminum wire ble was installed in sizes from No. 12 to cm.

l circuits from transformers consist of 1,000 d 1,250 mcm stranded aluminum cable with insulation and neoprene jacket. To avoid e due to earth settlement, the standard of using Transite ducts encased in concrete carded in favor of the use of aluminum

rs from the main bus to remote areas are ble (one or more 1,000 mcm aluminum Aluminum conduits with aluminum cables the motors, switchgear and generators to us. Typical crane feeders from the catwalk consist of aluminum cable in aluminum that pass through the catwalk floor.

he electrical contractor on the project, with aluminum was a new experience. How- reports his electricians found aluminum d cable easier to handle and to work with. pper.





[fol. 5747]

WORKING WITH ALUMINUM WIRE AND CABLE

Making a loop or hook on the end of an aluminum wire is easily accomplished by the use of round nose pliers.

Portable welding equipment is often used to attach aluminum cable to lugs and terminals. This type of termination ensures excellent physical and electrical contact.

Typical bolted and compression aluminum fittings.

PULLING THROUGH CONDUIT

A recent poll of electrical contractors with aluminum cable experience indicated that well over half considered it unnecessary to take additional precautions when pulling aluminum cables: Pulling tensions for the electrical installation in the Kitimat, British Columbia, power plant of Aluminum Company of Canada, Ltd., were 10,000 psi, the customary limit for copper. Wire temper was three-quarter hard.

SPLICING AND TERMINATING

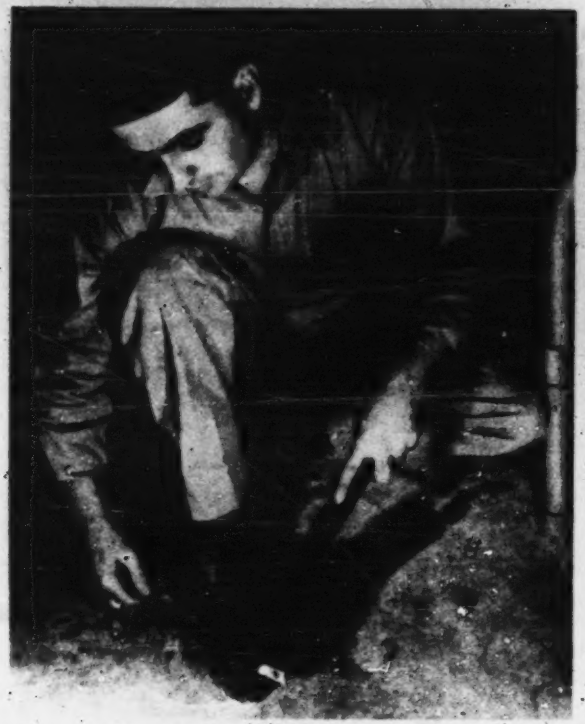
Insulation should be stripped from the ends of an aluminum wire or cable by "paring off," as shown here, instead of "ringing." Round nose pliers should be used whenever bending the end of the wire into a loop or hook.

Aluminum cables can be spliced or terminated by the use of compression fittings, mechanical fittings, welding or soldering, as shown here. For mechanical fittings, a coating of compound, such as Alcoa No. 2 Joint Compound, should be used to assist cleaning and to prevent oxide reformation on the abraded aluminum surface.

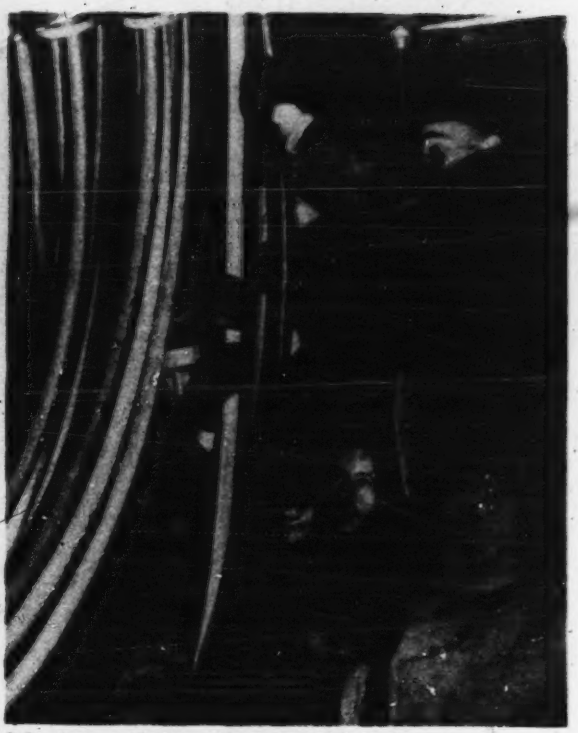
The results of extensive research and development work have shown that it is better to use fittings of aluminum on aluminum conductors than fittings of other metals. However, satisfactory test results have been obtained with some types of tin-plated copper alloy bolted fittings when tested either with aluminum cable with relatively soft strands or with a suitable joint compound properly applied, or both. A large variety of compression-type fittings of aluminum are available. They have shown very satisfactory service in industrial plants and commercial buildings. These fittings are of high conductivity metal, electrical conductor grade or similar, and of fully annealed temper.

[fol. 5748]

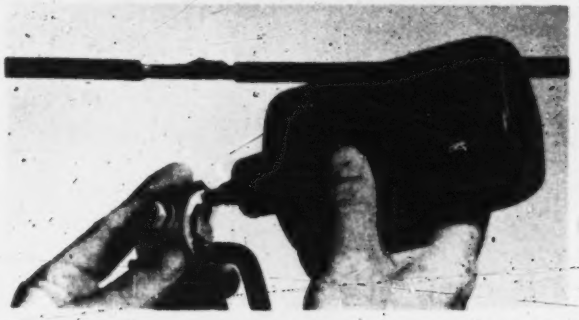
The proper method of removing insulation from aluminum cable is shown here. Insulation is pared off with a regular knife.



Compression fittings are one of the most popular methods of terminating aluminum cable. Physical and electrical contact is secure and positive.



Pulling aluminum cables through conduit is accomplished by the same methods as for other types of cable.



Use of Alcoa No. 2 Joint Compound assures good electrical contact. A long tip on the handy plastic squeeze bottle can be inserted inside mechanical fittings for fast, clean application.

[5749]

ALUMINUM BUS CONDUCTOR

Bus conductor was one of the first major uses of aluminum. The excellent physical and electrical properties of aluminum in this application were recognized from the very beginning.

In 1895, a large quantity of flat aluminum bar was used for a 20,000-amp installation at Alcoa's Niagara Falls, N. Y., smelting plant. Three years later this plant was remodeled and the bus bar remained in service until 1949, when the plant was retired. This type of conductor was standard, thereafter, in aluminum smelting plants for connecting dc conversion equipment and for pot-room feeders.

Later, aluminum bus came into use in chemical plants where corrosive attack was especially severe. It appeared in telephone exchanges during the 30's. It carried power in steel rolling mills even before then. A bus system installed in 1929 in the American Rolling Mill Company, Middletown, Ohio, is still in operation.

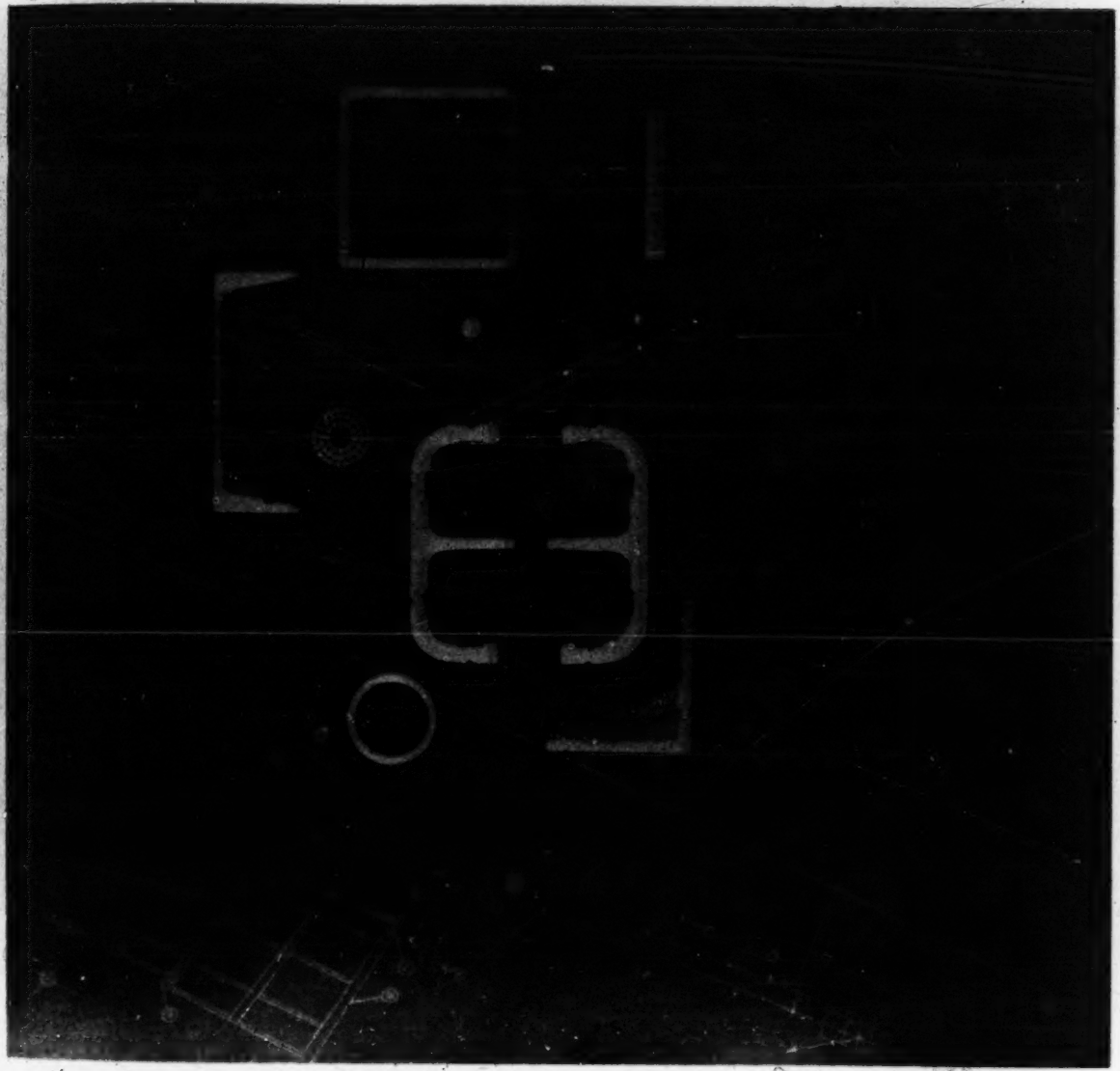
One of the first aluminum bus risers was put into service in 1930 to supply power to the Marshall Field Office Building in Chicago. It extended from the basement to the 45th floor and was fabricated from channels over 60 feet long.

An extruded aluminum sector bus serves as the vertical riser for the Alcoa Building in Pittsburgh. This same type, installed horizontally, provides a convenient power tap-off source in Alcoa's Davenport, Iowa, plant.

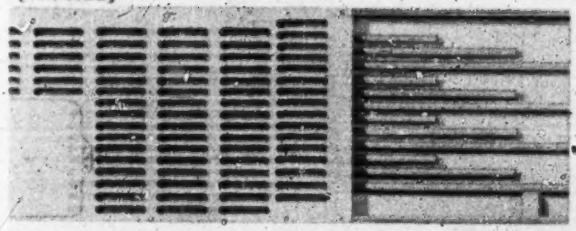
Today aluminum bus is replacing copper conductors and is the accepted standard with many in the industry. It is essentially the electrical equivalent of copper conductor bus at lower cost, providing the same load capacity as copper at about the same voltage drop, and offering significant weight saving advantages. Because an aluminum bus conductor has a slightly larger area than its copper equivalent, it can dissipate heat more efficiently. Aluminum can be silver plated for applications where silver-plated copper joints are the standard for the manufacturer.

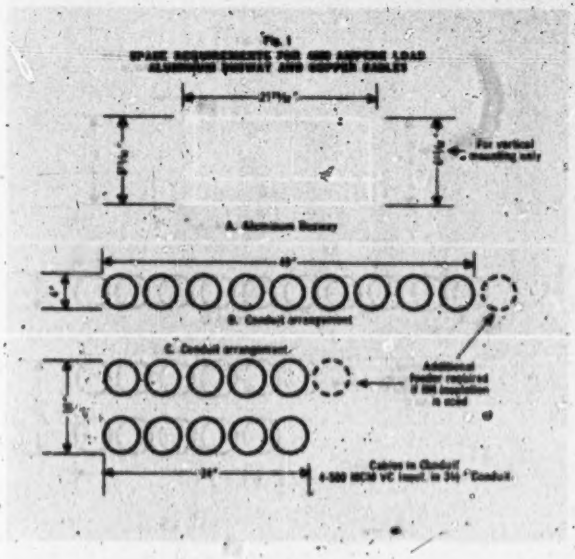
Shown here are some of the more widely known types of aluminum bus conductors including flat bus bar, square bus, integral web bus, structural bus, tubular bus and stranded conductor bus. Applications of these types in commercial and industrial busway systems are illustrated in the last part of this section. Special and unique conductor shapes can be easily extruded in aluminum if peculiar requirements exist in special applications.

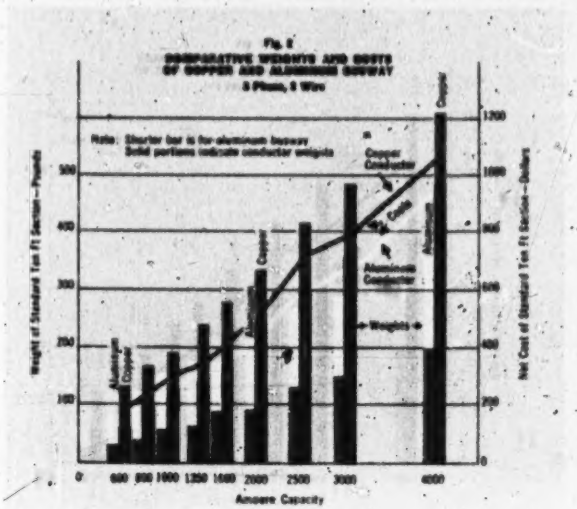
[fol. 5750]



[fol. 5751]







ALUMINUM BUSWAY

Aluminum busway is a popular commercial adaptation of bus bar. It is relatively new in the commercial market compared with traditional copper cable and copper bus. Its emergence as a practical and economical product is evidenced by its wide use in many of today's largest commercial buildings.

There are several reasons for recommending aluminum busway riser systems in preference to the older, more conventional cable and conduit systems.

Such risers are more compact than their cable and conduit electrical equivalents. Fig. 1 compares the minimum space requirements for a 4,000-amp load carried by aluminum bus and copper cables.

An aluminum busway has greater current-carrying capacity for a combination of loads than other systems. Considerable economies can be realized by combining loads with different peak times on the same feeder.

An aluminum busway riser saves switchboard room space. In effect, the busway, with its tap-offs, *is* the switchboard. Once a riser of adequate size, including spare capacity, has been installed, future loads may be tapped-off at any point along its length with a minimum of time and trouble. This flexibility is of great importance in commercial buildings where new tenant requirements or new machines may suddenly demand large increases of power at any one of a number of floors.

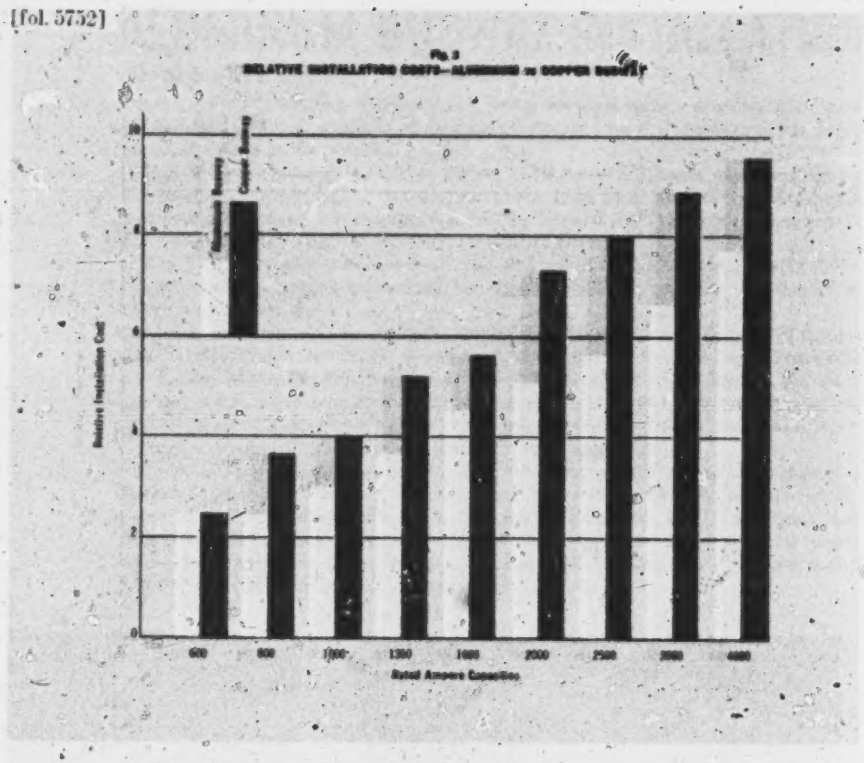
For busway applications, it is customary to silver-plate aluminum conductors the same as copper. An aluminum busway system weighs one-fourth as much as an equivalent copper cable and steel conduit system. This factor alone contributes to lower installation costs because the busway is easier to handle and installers can work more efficiently. Weight comparisons are shown in Fig. 2.

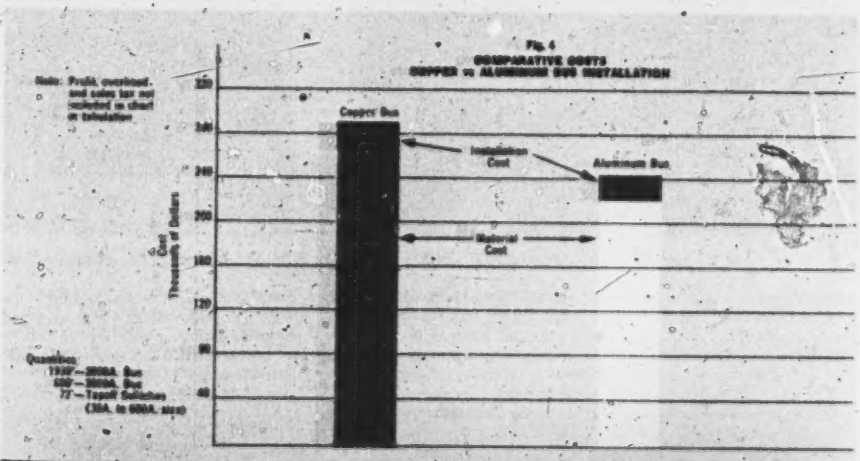
Relative costs for an aluminum and copper busway installation are shown in Fig. 3. Only relative values are shown because conditions and practices vary from job to job, depending on size of installation, working conditions, and a vertical or horizontal run. In general, it can be noted that installation savings will run about 25 per cent lower on most aluminum busway projects, as compared to those with copper of the same ampere rating.

Fig. 3 also indicates a 50 per cent greater installation cost, going from 600 to 800-amp copper bus, while these costs remain the same for the same capacity aluminum bus.

Fig. 4 compares the costs of a recently completed office building installation in New York City. Here, a complete material and installation cost breakdown for specific sizes and lengths of wire and cable is presented.

[fol. 5752]





COST TABULATION

	Aluminum	Copper	Difference
Material Cost			
Labor Cost			
Total			
Difference			
Labor as Per Cent			

[fol. 5753]

ALUMINUM BUSWAY INSTALLATIONS

SOCONY-MOBIL BUILDING, NEW YORK, N. Y.

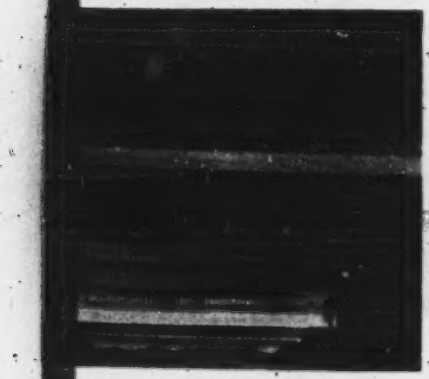
Practically all new office buildings are being designed today with an aluminum electrical backbone capable of supporting foreseeable future loads. A good example is the Socony-Mobil Building in New York.

Into this vast air-conditioned structure have been built eight 4,000-amp aluminum busways rising in two groups from basement to the 42nd floor. Four of these are 3-phase, 3-wire; and four are 3-phase, 4-wire, with full neutral. Two of the former type terminate on the 14th floor, and the remaining six extend to the 42nd floor.

Fig. 5 indicates the total linear footage and weight of aluminum bus actually installed as compared to the copper equivalent. Estimates submitted by other contractors were in line with those shown here.

Aluminum conductor busway was favored for this installation because of its lower voltage drop, a most important factor where long runs occur, as they do here. The longest busway run in the Socony-Mobil Building is about 700 feet. Over this length, the aluminum bus carries its full rated load at 86.6 per cent power factor (30-degree lagging load) with a drop of 3.50 per cent of source voltage. Copper busway with the same load would incur a voltage drop of 4.92 per cent, or 18 per cent greater than aluminum.

To match the performance of the aluminum busway with copper cable here would require twelve 3½-in. conduits, each carrying four 500 mcm cables. A comparison of estimated material and installation costs for each system is illustrated in Fig. 6. It can be seen that a copper cable and steel conduit installation would be more than four times as heavy as the equivalent aluminum conductor busway. For a 700-ft riser, the difference comes to about 110,000 pounds, or nearly an additional ton per floor.



E STATE BUILDING, NEW YORK, N. Y.

...een air-conditioning loads are making pres-...ectrical systems inadequate. The world's ... building solved this problem by installing a ...mp, 3-phase, 4-conductor, 265/460-volt alu-... busway system and a 4,000-amp, 3-phase, ...uctor, 460-volt aluminum busway system.

NEW YORK COLISEUM, NEW YORK, N. Y.

This 26-story office building has one of the first major installations of a higher voltage distribution system (480Y/277 volts). More than 2½ miles of busway incorporating aluminum conductors was used to feed power to this huge structure. The higher voltage system provides greater capacity and flexibility than conventional systems. Yet it requires only half as many, or half as large, risers and feeders. The use of lightweight aluminum busway sections made the installation easier and faster.

[Ind. 3754]

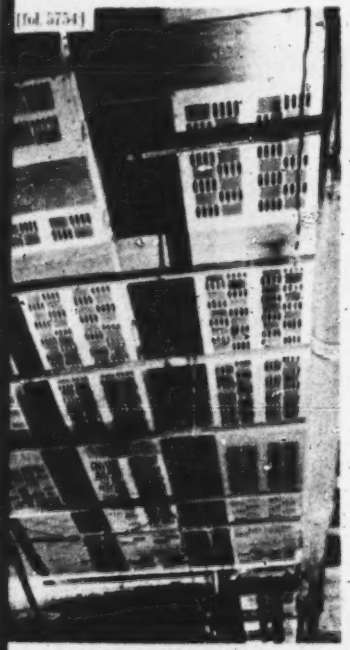
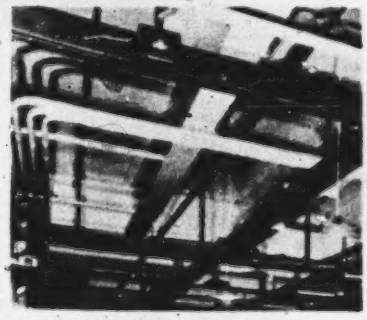


Fig. 8
RAILWAY CONDUCTOR
SUBWAY SURFACE BUILDING INSTALLATION
Based on August, 1946 Prices

	Aluminum Conductor (Actually installed)	Copper Conductor (Estimated Equivalent)
Total length (includes 3-phase, 3-wire and 3-phase, 4-wire, 4,000 Ampere busway)	4,750 ft	4,750 ft
Total Weight Per cent	107,400 lbs 100%	296,100 lbs. 167%
Material Cost Per cent	$102,000 100%	$299,000 129%
Estimated Installation Cost Per cent	$ 78,000 100%	$ 35,000 129%
Weight of Conductor Per cent	97,400 lbs 100%	274,700 lbs. 282%
Per cent of weight of Aluminum Busway	91%	173%

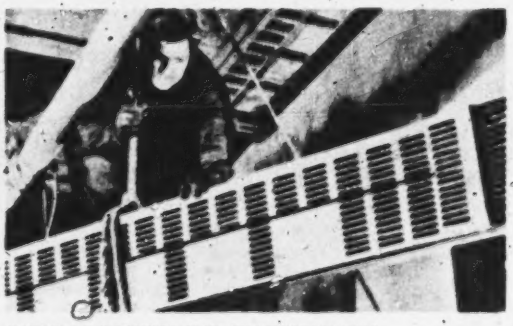
Fig. 9
COMPARISON OF ESTIMATED MATERIAL AND LABOR COSTS
FOR CONDUITS AND CABLES VS BUSWAYS

	One Conduit with Cables	Twelve Conduits with Cables	Aluminum Conductor Busway	Copper Conductor Busway
Material cost per ft.	$ 9.37	$100.00	$112.50	$135.00
Installation costs per ft	2.50	42.00	7.50	10.00
Total costs	11.87	142.00	120.00	145.00
Ratio of costs to Aluminum Busway		1.18	1.00	1.21
Weight, pounds per 10 ft. Section		7,064	500	820
Ratio of weight to Aluminum Busway		4.14	1.00	1.64



FORD MOTOR COMPANY PLANT, SAN JOSE, CALIF.

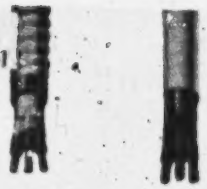
Since 1951, over 1,500,000 pounds of aluminum busway have been installed in various Ford plants. Use of this conductor in Ford's San Jose plant made a neat, safe, flexible installation that brought power to the job in any amount, at any location. Standard fittings, tools and methods of installation were employed.



CHRYSLER CORPORATION STAMPING PLANT, TWINSBURG, OHIO

The entire plant is covered with a network of aluminum busways. Light-duty, 50-amp plug-in busways serve the fluorescent lighting load. Plug-in busways, with ratings from 400 to 600 amp, braced for a 50,000-amp short-circuit current, serve the motor loads and general factory requirements. For heavy welding loads, 1,000-amp, low voltage drop, plug-in aluminum busways are used.

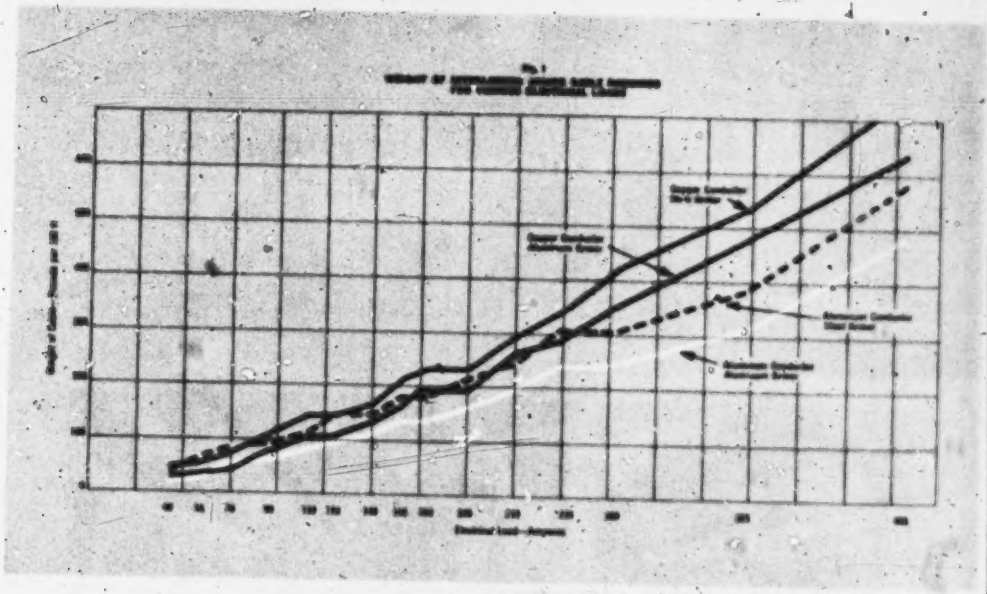
[fol. 3755]



ARMORED CABLES

INTERLOCKED ARMORED CABLE

This type of conductor is appearing more and more in industrial and power plant installations. It consists of an aluminum or copper conductor in steel or aluminum armor. The metallic exterior, or armor, is spiral-wound with successive interlocked convolutions. Armor and conductor materials may be combined in four commercially available types of cable—copper conductor in steel or aluminum armor, and aluminum conductor in steel or aluminum armor.



Interlocked armored cables have certain advantages over the common cable and conduit combination, especially for long open runs of considerable capacity where several cables may be carried in a single rack support.

Installation cost estimates of armored cable manufacturers and those quoted by electrical contractors have varied widely. Even so, the total cost of a copper cable installation in the more popular circular mill sizes would be 15 per cent to 20 per cent greater than for an equivalent aluminum cable installation.

Fig. 1 shows the weight of 3-conductor armored cables in the various combinations of copper, aluminum and steel for various electrical loads. The obvious advantage of aluminum's lighter weight and its attendant lower installation costs is a prime consideration. Weight savings run from about 20 lb per 100 ft for 3-conductor No. 6 wire to about 100 lb per 100 ft for 3-conductor 750 mcm cable. The same relationship holds true for other sizes of cables. This significant weight advantage reduces shipping costs, permits longer pulls and reduces the number of supports required.

Cable support systems for this type usually consist of troughs, racks, baskets or trays made of lightweight members, with bottoms of expanded metal plate or spaced rungs. Aluminum support systems are considerably easier to install than those made from other metals. They require no maintenance and have a practically unimpaired salvage value.

[fol. 5756]

The flexibility of aluminum-sheathed cables is demonstrated by this installation at the California Packing Corporation, Richmond, Calif. Notice how the cables may be twisted into right angle turns as they leave the cable tray. The use of clamps and trays makes installation of this type of conductor fast and convenient.

An aluminum interlocked cable at the same mill carries 12,000 volts from the secondary of the transformer at bottom right to switchgear at left.

Nine 500 mcm all-aluminum interlocked armored cables feed 2,300 volts into this switchgear at Alcoa's Davenport, Iowa, foil mill.

ALUMINUM-SHEATHED CABLE

Another product, relatively new on the building scene, that shows great promise is aluminum-sheathed cable. This type of conductor can eliminate conduits and other types of cable-carrying systems. Its flexibility and small diameter permit installation in areas inaccessible or difficult for typical conduit installations, and provide more economical use of limited space. The smooth, seamless sheath reduces the collection of electrolyte and moisture, and makes the cable impervious to insulation attacks by liquids and gases. Aluminum-sheathed cable has high tensile strength and rigidity, yet is easily bent with standard tools. It is mechanically strong and has excellent flame-resistant properties.

A tremendous market potential exists for this type of conductor, not only in control cable but in power and high-voltage applications as well. New developments in applying aluminum in this field will undoubtedly open up these markets, especially because of basic weight and cost savings over lead.

[fol. 5757] 2574

SHEET METAL ENCLOSURES, LARGE SWITCH ENCLOSURES, SWITCHGEAR

This power center controls pumps, compressors, generators, precipitators and other associated machinery in a large commercial building. Bus bars, terminals and complete housing are made of aluminum.

An all-aluminum, 480-volt switchgear unit is shown here. Main bus is rated at 1,600 amp, braced to withstand a 75,000-amp short circuit.

There are other electrical products for the building industry where aluminum offers distinct technical and installation advantages. In some instances, aluminum's physical properties strongly influence its choice over other metals.

Aluminum sheet metal enclosures, for example, have much lower induced electrical losses than ferrous enclosures, and better appearance and higher heat conductivity than their steel counterparts. In addition, they are lighter, much more corrosion resistant, and offer correspondingly reduced maintenance costs.

The use of an aluminum enclosure instead of a steel enclosure will enable a given size of switch to safely carry a greater load. For one thing, steel enclosures have appreciable magnetic losses. Another important factor is that aluminum, because of its higher thermal conductivity, dissipates heat four times better than steel.

Fig. 1 shows the cost estimates for a service entrance switch in an office building. The switch is rated at 6,000 amp, 2-phase, 4-wire in both aluminum and steel enclosures. Included in this cost estimate are the capitalized cost of the energy losses and costs for air conditioning required to remove additional heat generated by the switch in the steel enclosure.

The cost of the additional energy loss accruing to the steel enclosure should be considered when purchasing a service entrance switch of this size. In addition to the savings shown in Fig. 1, installation costs should be slightly lower for the aluminum enclosure because of its lighter weight. Fig. 1 also shows that a service switch in an aluminum enclosure may effect savings upwards of 20 per cent over a similar switch in a steel enclosure.

Fig. 1
COST OF 6,000-AMPERE SWITCH FOR OFFICE BUILDING

	Steel Enclosure	Aluminum Enclosure
Net Purchase Cost	$4,380	$4,538
Cost of Additional Energy dissipated	880	
Cost of Energy for Additional Air Conditioning	160	
Total actual cost	$5,420	$4,538
Cost difference	$882 or 19.5% more than purchase of aluminum enclosure switch.	

[fol. 5730]

Fig. 1—Here is a view of the aluminum bus system at Alcoa's smelting plant No. 3, Niagara Falls, N. Y. The bus was installed in 1898 and gave continuous service until plant was dismantled in 1949.

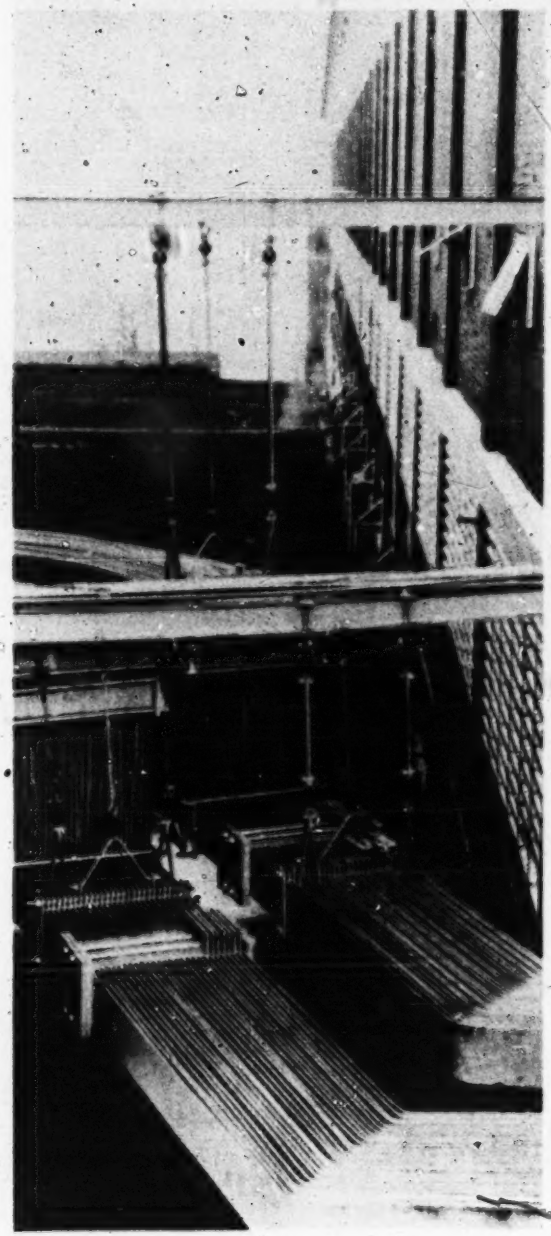
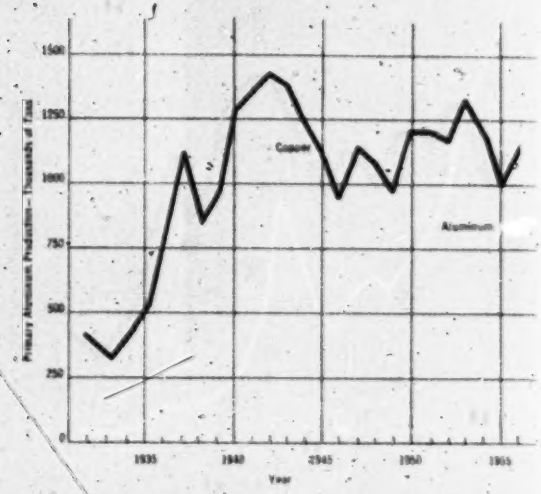
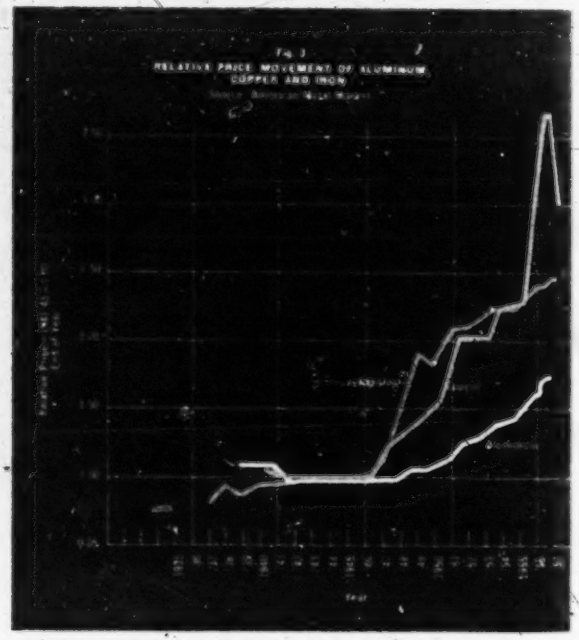


Fig. 2

PRODUCTION OF PRIMARY ALUMINUM AND COPPER IN THE UNITED STATES

Source: U.S. Bureau of Mines, American Metal Market





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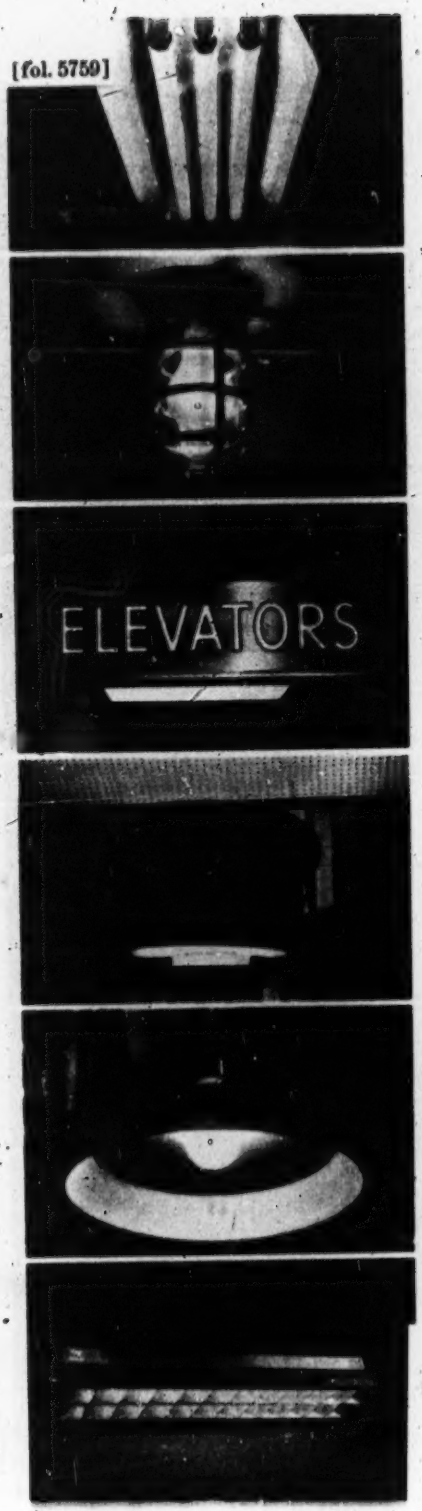

ALUMINUM LIGHTING FIXTURES AND ACCESSORIES

Aluminum fixtures are available for almost every standard application. Alzak* reflectors are used extensively for high-quality lighting and especially where accurate light distribution should be employed. Among the applications requiring skillful control of light distribution are high bay lighting, floodlights and searchlights.

Among the many troffer-type fixtures widely used in offices and commercial applications is the Alzak troffer with parabolic reflectors and special, low brightness cross baffles or louvers. The outstanding features of this fixture are simple design, excellent quality lighting without the need of special lenses, low glare factor and high visual comfort index.

The rapidly spreading popularity of aluminum for troffers and luminous ceilings is due to its natural characteristics of light weight, excellent adaptation to light control, and economy.

*Trademark of Aluminum Company of America

[L 3760] # CONCLUSION

25277

It is hoped that this Alcoa Report has served to demonstrate aluminum's versatility and economy in electrical building products, and that those reading it will have gained some measure of useful information.

The correlation between the Alcoa Report and one section of the Ashley Report is very close. The latter included some conclusions and impressions from a poll of some 400 electrical contractors—all members of The National Electrical Contractors Association. The findings of the poll are summarized as follows:

1. Nearly three-fifths of the contractors had had experience with aluminum wire and cable.
2. There is a very widespread interest among contractors in aluminum electrical applications. Practically every contractor indicated a desire to be informed of the results of the survey.
3. There is a general opinion that aluminum is economical for wire sizes above No. 4/0, but noncompetitive below this size.
4. There is a strong awareness of aluminum splicing differences, coupled with the belief that present splicing methods are adequate and practical.
5. About half the contractors feel that there are appreciable labor savings in aluminum conduit installation, although some reported difficulties in conduit threading and steel tape pulling. The rest feel that there are economies, particularly in the larger conduit sizes, ranging in general from 5 to 30 per cent.
6. Four-fifths of the contractors who have installed aluminum feeder bus duct report installation savings. Most estimated savings are in the 5 to 20 per cent range.

This report is being deliberately submitted to echelons of business where it will provoke, we hope, considerable discussion from managerial, engineering, purchasing and operating personnel.

[fol. 5761]

Alcoa Sales Offices

Aberdeen, S. D., 106 Western Union Building
Akron 8, Ohio, 108 Akron Savings & Loan Building
Albany 7, N. Y., 20 State Street
Bradford, Pa., 120 Hamilton Street
Atlanta 9, Ga., 1815 Peachtree Street
Baltimore 2, Md., 1407 Continental Trust Building
Birmingham 7, Ala., No. 12 Office Park, Mountain Brook, P. O. Box 2061
Boise, Idaho, 523 Grove Street
Boston 16, Mass., 20 Providence Street, Park Square
Bridgeport 4, Conn., Atlantic Street
Buffalo 7, N. Y., 1480 Elmwood Avenue
Charlotte 7, N. C., 1000 Wachovia Bank Building
Chattanooga 7, Tenn., 1065 Volunteer Building
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Cincinnati 6, Ohio, 2331 Victory Parkway
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Houston 2, Texas, 1240 Commerce Building
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Jackson, Mich., 1405 National Bank Building
Kansas City 5, Mo., 1330 Power & Light Building
Lafayette, Ind., P. O. Box 551
Little Rock, Ark., 116 Gaus Drive
Los Angeles 17, Calif., 1140 Wilshire Boulevard
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Omaha 2, Nebr., 16 Omaha National Bank Building
Peoria, Ill., 224 Commercial Bank Building
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Phoenix, Ariz., 6200 First National Bank Building
Pittsburgh 19, Pa., 1501 Arrott Building
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Portland 4, Ore., 1111 S. W. Second Ave. Building
Providence 3, R. I., 1900 Industrial Trust Building
Richmond 19, Va., 10 Broadrock Office Building
Rochester 18, N. Y., 1100 Midtown Tower
St. Louis 8, Mo., 1034 Four Continental Building
San Diego 3, Calif., 2550 Fifth Avenue
San Francisco 4, Calif., 2300 Russ Building
Seattle 1, Wash., 1411 Fourth Avenue Building
South Bend 1, Ind., 301 J.M.S. Building
Spokane 1, Wash., 510 Peyton Building
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Tampa 2, Fla., 501 First National Bank Building
Toledo 4, Ohio, 1403 Ohio Building
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Wichita 2, Kans., 1111 Central Building
Wilmington 1, Del., 1400 Delaware Trust Building
Worcester 8, Mass., 33 Portland Street
York, Pa., 235 Manufacturers Building
Youngstown, Ohio, 101 Wick Building
Alcoa International, Inc., 230 Park Avenue, New York 17, N. Y.

ALUMINUM COMPANY OF AMERICA
General Offices, 1501 Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM
ALUMINUM COMPANY OF AMERICA

Form 13-11152

Printed in U.S.A.

[fol. 5762] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 374

July 2, 1958.

Mr. L. C. Vipond
Office of Airports
Civil Aeronautics Association
Washington, D. C.

Dear Les:

One of our salesmen, Mr. Lawrence Kernan, has advised me of his recent visit and I hope this is just the beginning of more frequent calls at your office from Rome Cable personnel, including a certain R. C. Graham, as soon as he can get to it.

In regards to use of an aluminum conductor for L-824 Lighting Cable, our analysis indicates that a #6 AWG aluminum cable would definitely cost more and sell at a higher price than a #8 AWG copper in 600 volt Type A, 3,000 volt Type B and 5,000 volt Type B.

Simply as a matter of information, I might advise you that we have had very little experience with insulated aluminum buried directly in the ground. In fact, wherever we are selling a cable construction including an aluminum bare neutral it has become almost mandatory to use a wall of polyethylene insulation rather than neoprene in order to completely exclude any possible moisture affects.

If aluminum offered any economic or technical advantages in such a construction, I think we would be quite aware of its possibilities. However, I cannot visualize any economic or technical advantages if we must substitute the electrical equivalence as in this case.

Your interest in this matter is appreciated.

Kindest regards.

Very truly yours, Rome Cable Corporation, Bob. R. C. Graham, Chief Engineer.

RCG:ceb

[fol. 5763] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 375

September 17, 1959.

Commanding Officer,
U. S. Naval Construction Battalion Center,
Code 142,
Port Hueneme, California

Re: 14223/CMC/dw6145-FY60-3

Att: C. A. Weske, Procurement Division Director

Gentlemen:

This is in reference to your inquiry of August 25 to our Torrance, California, plant, pertaining to Portable Power Cable—600 volt, with stranded aluminum conductors.

There has been very little activity in the industry with aluminum conductor portable power cables. There has been some mining machine cable (parallel duplex) on which the service record showed very poor results due to the tension applied on the cable and due to the fact that it was run over by heavy equipment. Aluminum conductors do not have sufficient mechanical strength to withstand either of these punishments.

As a result, we do not have published information on this cable but are attaching hereto a general specification covering construction on 2/Conductors, 3/Conductors and 4/Conductors in both Type W and Type G—600 volt.

We trust this information will be of use to you, and if there is any further information required, please let us know.

Yours very truly, Rome Cable Corporation, O. O. Stedman.

OOS:O
enc.

[fol. 5764] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 377

October 19, 1959.

Mr. Harry Shopp, Chief Electrical Inspector,
County of San Diego,
1600 Pacific Highway,
San Diego 1, California

Dear Mr. Shopp:

I am sending this letter to you along with a copy to Art Vesco as I know Herb Ufer discussed this situation with you.

The point in question is whether or not bare aluminum wire should be used as a ground conductor buried directly in the earth. Our research department has done some Investigating on this and have come up with the following:

1. Problems involving the use of bare aluminum as a ground wire buried directly in the earth are inherent in the metal itself and cannot be attributed to poor quality of conductor. It is not felt that alloying the metal would help to the extent of being economical.

2. The Aluminum Company of America, the strongest advocates for the use of aluminum as electrical conductor, find it necessary to use copper for grounding conductors (buried in the soil) in and around their various plants. This company uses aluminum insulated conductors throughout in new installations.

In line with the above Rome Cable has reached a decision that they will no longer furnish or recommend the use of bare aluminum as a grounding conductor when buried directly in the earth.

We felt that the above information would be of value to you both.

Very truly yours, Rome Cable Corporation, R. D. Golly.

RDG:O
cc: Mr. Art Vesco

[fol. 5765] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 378

Internal Correspondence

August 24, 1960.

From: R. A. Schatzel
To: Mr. G. E. Rolston

Subject: Appliance Cords with Aluminum Conductor

Below is a report on development of SPT and appliance cords with aluminum conductors. If U/L approval is sought the problem and requirements are the same.

From the limited production on which this report is based the following conclusions may be drawn. If actual production were contemplated further development of improved methods would be required.

1) Based on the use of .010 aluminum wire we feel satisfactory bunched strand may be produced but at a slower speed than for bunching copper wire.

2) *Plastic Insulating*—With the use of a paper separator we believe that production of cord is possible. Down time due to breakage would be greater than with copper but tolerable. In short no insuperable production problems should exist.

3) *Cost*—If two AWG sizes larger for aluminum than for copper is required (16/al vs. 18/cu), #16 cord with paper separator would be comparable in cost with #18 copper without separator. From our tests on voltage drop, indications are that #17 AWG aluminum would be adequate. (Acceptance of this by Underwriters' could not be assured).

4) *Performance*—E.C. aluminum strand has inadequate strength and flex resistance to meet Underwriters' Laboratories indicated requirements.

[fol. 5766] Purpose:

To develop SPT Cord with aluminum conductors and to study the possibilities of the use of aluminum for this application.

Discussion:

The use of aluminum for the conductors of flexible cords would provide an outlet for considerable quantities of aluminum if it could be proven satisfactory for this service. Alcoa has been working for quite some time with the American Insulating Company on the development of SPT cord with aluminum conductors but the results have been somewhat less than satisfactory because of their inability to work closely enough with them to determine the problems involved in the manufacture of this product. The problem was, therefore, given to Rome Cable to determine if aluminum conductor SPT Cord could be economically produced and to investigate the possibilities of the use of aluminum for this application in comparison to the present U/L approved copper conductor SPT Cord.

Rome has been interested in using aluminum in appliance wire and cords.

Summary:

Samples of #16/2 and #18/2 conductor cord were produced. A preliminary study of costs indicates that a #16 aluminum conductor cord can be produced at a cost equal to or lower than the cost of a #18 copper conductor cord. The question was raised and tests were conducted which show that for this application, the aluminum equivalent may not need to be two AWG sizes larger than copper. If this is true, it would be a further cost advantage in favor of aluminum.

[fol. 5767] A comparison of the performance characteristics of aluminum conductor cord with copper conductor cord shows the aluminum to be relatively poor. The strength of the #16 conductor cord is approximately 75% that of the cord with #18 copper conductor and its flex life is roughly ⅓ that of copper. Underwriters' Laboratories have expressed themselves that for aluminum to be considered for this and appliance wire application, it should perform better than 50% as well as copper.

Procedure:

Sample Development

Wire Drawing

At the start of this investigation it was assumed that the .010" aluminum wire for stranding would be drawn at Rome. Several attempts were made to draw this on the old Rome fine wire drawing machines which had been set up for this purpose. After a considerable amount of work and investigation it was concluded that these machines were unsuitable due principally to slow drawing speed. .010" EC H-19 wire became available from Massena and wire from this source was used for most of the samples produced. The cost data for drawing .010" wire at Rome, which is shown later in this report, is based on providing Vaughn Ring Blox fine wire drawing machines and assuming that one operator could operate five machines.

Stranding

The .010" wire was bunched before annealing to take advantage of the greater strength of the hard drawn wire. Stranded conductor for the original samples was produced on the New England Butt buncher. After the Cook buncher from Massena became available, all strand was bunched on this machine as it was considered much more suitable. To [fol. 5768] avoid excessive breakage of the individual wires, the bunching speed was reduced to 50% of that used for bunching copper strand. At this speed there were relatively few breaks, but as the machine is not equipped with automatic stops, whenever a break did occur there was a loose end in the strand.

Annealing

The stranded conductor was annealed to ¼ hard temper.

Retipping

The aluminum strand was not retipped before insulating as is the practice with copper strand. Previous experience had shown that bunched aluminum strand is easily damaged by respooling, resulting in broken wires which cause "bird nesting" and conductor breaks at the insulator. Additional study of this problem is necessary.

Insulating

Samples of #16/2 and #18/2 were produced without separator and with paper fold separator. Without separator lengths ranged from 1000 ft. to 2500 ft., it being impossible to obtain longer lengths because of "bird nesting" and conductor breaks caused by the loose ends of broken wires in the strand. With separator the performance was much better, however, frequent breakage still occurs. More extended experience probably would lead to a solution. The separator was applied longitudinally at the extruder. It was also desired to obtain performance test data on the finished cord both with and without separator.

[fol. 5769] Samples and Preliminary Cost Data

Sample	Size	Strand	Insulated	Cost/M'
1	#18	16/.010"*	.126" x .227"	$ 7.38
2	#18	16/.010"**	.126" x .227"	6.72
3	#16	26/.010"*	.148" x .257"	10.18
4	#16	26/.010"**	.148" x .257"	9.09
5	#16	26/.010" paper fold*	.151" x .263"	10.42
6	#16	26/.010" paper fold**	.151" x .263	9.31
7	#18	42/34 bare copper	.126" x .227"	9.36

* .010" EC H-19 purchased from Massena. (More recent estimate from Pittsburgh, approximate Rome estimate).
** 3/8" rod purchased from Massena and drawn to .010" at Rome.

Tests:

Overall Strength Test

Samples of the finished cord were broken on the Scott rubber tensile testing machine. The results are the average of three tests.

Flexing Test

Samples were flexed on the Bureau of Mines Flex Testing Machine through an arc of 180° under tension of a six-pound weight. Results are the average of three tests.

Twisting Test

Samples were subjected to a twist test using the U/L twist testing machine for heater cords. Results are the average of three tests.

[fol. 5770] Results:

Sample	Lbs. Break	Flexing Test Cycles to Failure	Twisting Test Cycles to Failure
#16 26/.010 SPT-1 Al. Condr.	67.5	55	24
#16 26/.010 SPT-1 Al. Condr. with paper sep.	68.0	74	33
#18 16/30 SPT-1 Al. Condr.	39.0	43	16
#18 42/34 SPT-1 Copper Condr.	90.0	369	99
#18 16/30 SPT-1 Copper Condr.	88.0	220	65

The use of aluminum conductor in appliance wire and cords was informally discussed with Underwriters' Laboratories to obtain information on testing and possible requirements. U/L have previously made several investigations and have quite definite opinions. Without seeing any of our results or our opportunity to review theirs they seemed quite convinced that E.C. grade aluminum in these smaller cords would not meet service requirements. They felt that strength and flex resistance were inadequate.

The requirements they would stress were:

(a) Breaking strength compared to copper. Test to be made on uninsulated conductor. Strength should be at least 50% of soft copper.

(b) A complete study of the soldering techniques would have to be made in view of the fact that aluminum is reportedly much more difficult to properly solder than copper. In addition there would be a test on the flexibility of the soldered joint.

(c) A current flow test through soldered joints would be made which would be for roughly 60 days with a predetermined amount of current flowing. Following the current [fol. 5771] test the tensile strength of the joint would be made.

(d) A thorough study of the compatibility of insulating materials with the various soldering fluxes that might be used would have to be made.

(e) Various flexibility tests in comparison with #18 AWG copper would be made. These tests conceivably could range from a simple twist with pliers to the more complex cable flexing machines that we have. A lateral loop test would be involved here also, which is simply measuring the number of cycles taken to break the conductor when two points of the conductor are held a distance of 12 inches apart

and these points brought together and separated. This again would be compared with copper.

(f) The effects of corrosion on aluminum conductors under various atmospheres would be investigated.

(g) The impact test would be made as well as the standard crushing test.

In all the above tests they did feel it reasonable to expect that aluminum would do at least half as well as the results on copper. Up to this point their limited investigation indicates that aluminum is roughly about ⅓ that of copper with regard to flexibility. Our test results confirm this also.

Conclusions

1. Samples of aluminum conductor SPT-1 cord have been produced with a limited amount of success. It is believed that considerable improvement can be made but that EC grade aluminum will always be a problem from the standpoint of conductor breakage at the insulator. Breakage is no problem with copper conductor.

[fol. 5772] 2. Performance tests show aluminum conductor cord relatively poor in comparison to copper. Improvement may be attained if alloy properties can be developed.

3. A separator provides better processing and testing performance.

4. The preliminary cost data indicates that it would be possible to produce E.C. aluminum conductor cord at equal or lower cost as compared to copper conductor. Insulating costs because of use of separator and more breakage would probably remain higher than with copper. These could not be evaluated without production experience.

R. A. Schatzel.

RAS:mhc

CC: R. L. Williamson—Rome, C. H. Ellis—Rome, E. C. Hartmann—New Kensington, S. R. Chapman—New Kensington, T. L. Gilbert—Massena, C. L. Kessler—Massena, R. W. Adams—Pittsburgh, W. F. Lowry—New York.

[fol. 5773] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 379

Mr. L. N. Grier—Pittsburgh
R. N. Wagner

June 17, 1955.

Firm of Edward E. Ashley
Consulting Engineers
10 East 40th Street
New York 16, New York

Dear Mr. Ashley:

We have given careful consideration to your letter of June 2 in answer to my letter of April 29th to you, concerning our proposal for a comparative study showing the economic advantages of utilizing aluminum building wire in lieu of copper building wire.

We certainly appreciate the time and effort that obviously has been put into the proposal outlined in your June 2 letter and after we have a clear picture of the basic engineering economics, then we will be in a better position to give careful consideration to undertaking the entire program as you have outlined it.

However, we feel that perhaps the basic economic advantage of aluminum should be evaluated before we decide on the mechanism for making this information available to others. We are particularly interested, at the present time, in the cost comparison study along lines outlined in my letter of April 29. Can you give us an estimate of just what this study might entail cost-wise? Also, can you estimate how long such a study might take?

Very truly yours, Aluminum Company of America,
R. R. Cope, Head, Electrical Section, Development Division

RRC:mas

cc: Mr. P. T. Coffin—Pittsburgh, Mr. L. W. Grier—Pittsburgh.

[fol. 5774] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 381

Mr. R. J. Williamson, Dallas

Internal Correspondence

May 12, 1959.

From: Philip T. Coffin
Pittsburgh Office
To: Electrical Conductor Salesmen
District Mgrs.—Ass't District Mgrs.
Branch Mgrs.—Resident Managers
Administrators

Confirmation

This will confirm my telegram of May 11th as follows: "We have received several reports today advising that Kaiser salesmen are quoting bare ACSR and aluminum conductor prices one percent off published schedules. Apparently covered conductors and service drop are not affected. Effective immediately we are reducing our prices by the same amount. New sheets dated May 11, 1959, are being published. Apparently Kaiser pattern is to reduce each price by factor of point nine nine and drop all digits beyond four decimal places. For example Peachbell X point 99 equals $.465993. Call this $.4659. Please follow this procedure pending receipt revised schedules. Revised prices will apply on all shipments made on and after May 11."

Philip T. Coffin.

PTC:ags

Copies to: Mr. L. P. Favorite, Mr. I. W. Wilson, Mr. R. V. Davies, Mr. R. B. McKee, Mr. F. L. Magee, Mr. L. E. Hickman, Mr. E. B. Wilber, Mr. A. P. Hall, Mr. N. B. Lane, Mr. F. J. Close, Mr. W. S. McChesney, Mr. W. J. Jenkins, Product Managers, Ass't Product Managers, Mr. J. V. Kohler, Mr. R. E. Coulter, Mr. N. M. Kehew, Mr. V. R. Chase.

[fol. 5775] Alcoa Private Wire

Copy

62 DA PI 5-11-59
K. V. Alexander
C. W. Beck
W. E. Moerschell
R. J. Williamson
Electrical Conductor Salesmen
District Managers, Ass't District Managers, Branch Managers, Resident Mgr., Chief Administrators

We have received several reports today advising that Kaiser salesmen are quoting bare ACSR and aluminum conductor prices one percent off published schedules. Apparently covered conductors and service drops are not affected. Effective immediately we are reducing our prices by the same amount. New sheets dated May 11, 1959 are being published. Apparently Kaiser pattern is to reduce each price by factor of point nine nine and drop all digits beyond four decimal places. For example Turkey X point 99 equals $.465993. Call this $.4659. Please follow this procedure pending receipt revised schedules. Revised prices will apply on all shipments made on and after May 11.

Philip T. Coffin, Pgh.

PLAINTIFF'S EXHIBIT 382

7

April 1960
PCEA
Berkley Cal

POLYETHYLENE INSULATED CABLES FOR PRIMARY DISTRIBUTION AND SIMILAR APPLICATIONS

By

R. C. Graham
Chief Engineer
ROME CABLE DIVISION OF ALCOA

The author presented a paper at the 1957 A.I.E.E. Winter Meeting on the subject "Polyethylenes For Higher Voltage Cables". It will be the object of this discussion to summarize elements of that and other information appropriate to primary distribution, together with a review of developments in this particular field.

HISTORY

Other authors at previous P.C.E.A. technical meetings have adequately covered the story of the birth and progress of polyethylene. Of interest to this group is the estimate that over 3,000,000 feet of polyethylene insulated power cable in the 5 to 15 KV ratings have been installed since 1947. Most of this is either underground, submarine, or in conduit - although considerable quantities of aerial cable are also involved.

Up until 1956 most of the experience was obtained in the plant distribution circuits of the chemical, oil, paper, and other heavy industry. Also, up until 1956 most utility experience with polyethylene was as insulation for station control cable, service drops, and series street lighting cables. However, since 1956 a steadily increasing quantity of polyethylene insulated cables in the 5 to 35 KV ratings has been installed by utilities for both underground as well as overhead primary distribution.

The satisfactory performance of polyethylene on these widespread and substantial historical applications point to an almost obvious expansion of its use which we believe will be principally in primary distribution circuits. Compared with other new non-metallic sheathed cable insulations, polyethylene has an outstanding performance record since World War II for these applications. In recognition of this experience the IPCEA-NEMA industry group have recently issued interim specifications for polyethylene insulated power cable through 15 KV rating.

The logical question is why should this material receive such consideration and interest for distribution circuits where the environmental conditions of a chemical or refinery plant are not present and since other well established types of insulation such as paper, rubber and varnished cambric have been doing a satisfactory job? There are various interesting technical reasons including reduced weight and dimensions, but the principal attraction involves economies which will be discussed later.

Polyethylene Insulation Characteristics

The electrical, chemical, physical and mechanical properties of polyethylene have been thoroughly documented in the literature by many authors.

[Vol. 5777]

Even while continuously immersed in water, it is electrically the best dielectric now used on solid insulated power cables. The electrical characteristics listed in the Table 1 are typical for polyethylene as compared with other conventional power cables.

TABLE 1

	Polyethylene	Butyl Rubber	P.I.L.C.	V.C.I.
Dielectric strength (a-c) Volts per mil	500	350	350	300
Impulse strength per mil	1300-1800	900-1200	1700-2000	900-1100
Dielectric constant (60 cycles)	2.3	3.5	3.5	6.0
Power factor (60 cycles)	.0004	.015	.008	.060
Insulation resistance (M per 1000 ft.)	50,000	20,000	10,000	5,000

Since polyethylene is a thermoplastic, its thermal properties are of major significance and an understanding of these characteristics is essential in determining proper cable design, ratings, and operating limitations. For example, the coefficient of expansion (volume) at maximum operating temperature is about 10.0×10^{-4} which is greater than other power cable insulations. This means that special internal as well as external shielding methods must be employed in the cable design to eliminate possible void formation during load cycles. Its thermal resistivity is in the order of 300-watt-cm units which is about one-half that for rubber, paper, and VC insulations.

Up to its softening temperature all electrical and, incidentally, physical properties of polyethylene are unusually stable as illustrated by the power factor comparisons in Table 2.

TABLE 2

Temperature Degrees Cent.	POWER FACTOR Polyethylene	Butyl Rubber	P.I.L.C.	V.C.I.
60	.0004	.015	.009	.070
70	.0004	.020	.015	.080
75	.0004	.025	.018	.087
80	.0005	.030	.021	.096
85	.0006	.040	.025	.110
90	.0007	.050	.030	---

* Maximum AEIC

** Maximum IPCEA

[fol. 5778]

The softening temperature for conventional polyethylene is 110°C and, when the entire volume of insulation reaches this temperature, it becomes soft in consistency, and upon cooling, could result in serious eccentricity and void inclusions. However, up to 100° centigrade the material exhibits negligible deformation (sometimes called cold flow) as illustrated in Figure (1). The development of higher density (linear) polyethylenes will appreciably extend the softening temperature.

This means that the limiting destructive temperature for conventional polyethylene is 110°C because of excessive softening. The destructive temperatures for other insulations are limited by other physical phenomenon but the end result is the same in that the cable will fail. For P.I.C.L. this value is in the order of 140°C because of oxidation of the oil and charring or carbonization of the paper. For V.C.L. this value is about 120°C. For ozone-resistant butyl insulation this value is in the order of 220°C. due to embrittlement and porosity of the insulation. For most polyvinyl chloride insulations this temperature is about 130°C because of excessive softening.

It has been demonstrated by test that a metallic sheathed polyethylene cable operated for a short time at an overload equivalent to a temperature well in excess of its melting point may, upon cooling, solidify in such a manner that the cable is still operative although an eventual repair or replacement is definitely warranted.

Table 3 illustrates a comparison of different 15 KV cable normal recommended maximum continuous operating temperatures as well as emergency overload ratings based upon 100 hours per year.

TABLE 3

Cable Type	Maximum Normal Temperature	Emergency Overload Temperature
Polyethylene	75°C	90°C
P.I.L.C.	81°C	96°C
V.C.L.	77°C	85°C
Butyl Rubber	85°C	100°C

The short time short-circuit ratings for polyethylene insulated cables with copper as well as aluminum conductors have been established and are given in an IPCEA publication P-32-382 dated August 1958.

It is an usual misconception that a failure on a polyethylene insulated cable will result in considerable melting and "flowing back" of the insulation from the point of fault. Deliberate fault conditions with conventional protective devices have been introduced on cable samples to

[fol. 5779]

simulate this effect. It was observed that the destructive area was limited to the same few inches as obtained with conventional insulations under similar test conditions.

Perhaps some mention should be made at this point regarding the long time effect of heat on polyethylene insofar as aging and oxidation are concerned. In a paper, "Accelerated Heat Aging of Polyethylene" by S. P. Foster and W. W. Spohn which appeared in December 1953 issue of "Wire and Wire Products" the following conclusion was made regarding the effect of accelerated heating aging on polyethylene. "The crystallinity of the polymer increases, reducing the apparent elongation. There is no oxidation degradation of the polyethylene under the test conditions used. Heat aging actually improves the polymer for some applications, such as wire and cable, and gives better abrasion resistance and less heat distortion at a given temperature."

Cable Design, Manufacture and Specifications

The design and manufacture of a polyethylene-insulated power cable follows conventional principles except that special precautions must be observed to eliminate the presence of any air voids and to guard against their formation in service. Excessive or continued ionization (corona discharge) in such voids produces an "eroding" effect that may lead to an eventual concentrated thermal failure due to heat of the arc. This effect has sometimes been referred to as corona cutting, which is a failure since polyethylene possesses inherently excellent resistance to corona. Because of the possible effects of internal corona it is recommended that only a cable design which has been proved to be corona-free at the operating voltage, both before and after load cycles, be specified. Failures due to this or similar causes on cable designed and produced in such a manner have been unknown.

The first important step in the design of a satisfactory polyethylene insulated power cable for the higher voltage ratings involves the use of a semi-conducting conductor shielding layer that is either adequately adherent to the polyethylene insulation or is one which may expand and contract at approximately the same rate as the insulation under load cycles.

Next, it is essential that the specified wall thickness of polyethylene insulation be extruded in such a manner so as to prevent any internal voids, bubbles, contamination, or strain. This requires a carefully controlled and gradual cooling of the insulation immediately after it leaves the die of the extrusion machine. We, based on test of our laboratories, recommend the use of high molecular weight natural (not colored) polyethylene for power cable insulation towards obtaining longest voltage life and maximum uniformity of other properties.

For the external shield, it is important to again utilize one of the various special or so-called "resilient" shielding methods to insure a corona-free cable at all times.

The outer jacket or covering may be either polyvinyl chloride thermoplastic

[fol. 5779]

simulate this effect. It was observed that the destructive area was limited to the same few inches as obtained with conventional insulations under similar test conditions.

Perhaps some mention should be made at this point regarding the long time effect of heat on polyethylene insofar as aging and oxidation are concerned. In a paper, "Accelerated Heat Aging of Polyethylene" by S. F. Foster and W. W. Spohn which appeared in December 1955 issue of "Wire and Wire Products" the following conclusion was made regarding the effect of accelerated heating aging on polyethylene. "The crystallinity of the polymer increases, reducing the apparent elongation. There is no oxidation degradation of the polyethylene under the test conditions used. Heat aging actually improves the polymer for some applications, such as wire and cable, and gives better abrasion resistance and less heat distortion at a given temperature."

Cable Design, Manufacture and Specifications

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The outer jacket or covering may be either polyvinyl chloride thermoplastic

[fol. 5780]

or preferably black flame retardent (RoSeal) polyethylene in accordance with IPCEA specifications. Alternately, a lead sheath may also be employed as a covering either with or without further protective layers.

Because of economy and the advantages of longer lengths these cables are generally preferred in a single conductor arrangement although multiple conductor or triplexed assemblies may be satisfactorily designed and produced. The insulation thickness of the polyethylene has thus far been established as approximately 70% of the recommended thickness for rubber insulation which approaches dimensions of solid oil-impregnated, paper-insulated cable. This results in the comparative dimensions and weights for power cable as illustrated in Table 4 which indicates the possibility of easier and longer pulling lengths for polyethylene insulated and jacketed cable.

TABLE 4

Single Conductor 500MCM Copper, 15 KV Grounded Neutral

Cable Type	Approximate O.D. (Inches)	Approximate Weight (lbs. per 1000 ft.)
P.I.L.C. (Unprotected)	1.42	4100
Polyethylene (Non-leaded)	1.60	2350
Butyl Rubber (Non-leaded)	1.80	2700
V.C.L. (Non-leaded)	1.57	4150

Installation

Relatively simple low-cost installation procedures may be followed on polyethylene insulated constructions. Where polyethylene jacket is employed, no special pulling lubricant other than water is needed for pulling in ducts or conduit. For aerial, direct burial, or submarine installations, the same precautions and methods should be observed as for conventional, non-metallic sheathed, rubber-insulated cable.

Manual splicing and terminating methods have proved satisfactory for polyethylene power cable. Potheads are seldom required unless for some special installation condition. When potheads are used, the only real difference from other potted cable terminals is in the special filling compound used with polyethylene. Certain materials such as polyisobutylenes of the desired viscosity have proved satisfactory.

Figure (2) illustrates a suggested splicing procedure for shielded cable. The splicing tape is a special self-sealing polyethylene base material that resembles and handles like a rubber splicing tape. Distance "L" varies from 8 to 10 inches on 5 KV cable and 13 to 16 inches on 15 KV cable. Figure (3) illustrates a manual procedure for makeup of indoor terminations and Figure (4) illustrates an outdoor terminal.

[fol. 5781]

Economics

Figure (5) illustrates today's approximate price relationship for similar typical sizes of 5 KV rated power cables with copper as well as aluminum conductors covered with ozone-resistant rubber, solid paper, varnished cambric and polyethylene insulations. Since there is only a moderate difference in ampacities, we may evaluate all of these on an equal conductor size basis for all practical purposes. Analysis of this illustration indicates:

1. Polyethylene insulated cables provide by far the lowest cost unshielded non-metallic sheathed type of cable available today for this voltage range.

2. A 5 KV shielded polyethylene-insulated cable costs less than a 9 KV unshielded rubber-insulated cable.

3. Polyethylene-insulated cables are over 25 percent less costly than equivalent rubber-insulated designs.

4. The lowest initial shielded cable cost involves P.I.L.C. (paper insulated lead covered) which in the 9 KV range is about 5 percent less than shielded polyethylene. However, this differential could well be eliminated if evaluated on a "final installed" basis since the lighter weight and use of manual splicing and terminating methods for the polyethylene cable would provide appreciable savings in installation cost. Further, if a corrosion protective barrier or other coverings were added to the P.I.L.C., then even the initial cost of the polyethylene non-metallic sheathed cable would be less, since this latter cable would not ordinarily require such additional protection.

5. It is interesting that a 15 KV shielded polyethylene cable actually costs less than a shielded 5 KV ozone-resistant rubber-insulated cable for the same conductor size.

6. It is also significant that, at today's relative metal price for copper and aluminum, only polyethylene-insulated cables reflect any savings by incorporation of the equivalent size of aluminum conductor. In other cables, particularly rubber and V.C.D., the increased cost of coverings on the increased "equivalent" conductor dimensions more than off-set the relative metal savings; whereas the inherently lower covering costs for the polyethylene cables permit some metal savings. Of course, these differences will vary and are greatly dependent upon size and voltage rating.

Such economics warrant serious consideration of polyethylene-insulated cables for the lowest-cost underground primary system for residential distribution.

[fol. 5782]

Underground Residential Distribution

With recent development of the pad mounted transformer, this new form of distribution has become a popular subject with most utilities. It is not within the scope of this discussion to compare duct vs. buried systems or to compare the relative merits of 4160 vs. 12000 volt primaries. In any case, the cable cost is a very significant part of the total cost and it becomes imperative to seriously consider this element on an installed basis if the famous cost ratio to overhead is to be held within reason.

The previous dissertation on the economics of polyethylene insulation leads to the correct idea that here is a material almost tailor made for the job. Further, the incorporation of a lead sheath results in additional savings over a design involving shielding tapes and jackets. The overall lead sheath in proper thickness provides a truly impervious covering, full "tubular" electrostatic shielding, continuous grounding if buried, a degree of mechanical protection, and most if not all of the desired neutral capacity. This low cost lead sheathed, polyethylene insulated "concentric" cable design is now being used in substantial quantities by at least three operating companies. Simple manual terminating and splicing procedures are used. Occasional damage to the sheath does not result in cable failure since the insulation itself provides an adequate moisture barrier.

Over 15 KV

In addition to some European practice at higher voltages, there are at least three installations operating in this country in the 35 KV range. The first, installed in 1956, is described in the 1957 AIEE paper referred to in the opening paragraph. The second job involves an aerial cable installation described in AIEE paper 59-496, "A 35 KV Polyethylene Cable Installation" by G. J. Crowdes, and presented at the AIEE 1959 Summer General Meeting in Seattle. The third installation is very recent and involves nearly 10 miles of an aerial cable circuit at a large eastern utility. These applications lead to the belief that future developments will make polyethylene insulated cables practicable for circuit voltages in excess of this - perhaps as far as 69 KV, but not much beyond due to inherent material limitations.

Future

New polyethylenes promise a bright future for cable insulation. The high density materials have interesting properties, such as higher softening temperatures and greatly increased toughness, although their inherent stiffness may limit their general application in power cable. Trial installations of this material on 5 KV overhead circuits have already been made. New cross-linked polyethylene polymers hold great promise and other polyolefins materials such as polypropolene may provide an answer towards still better cables. The possibility of irradiated polyethylene must not be overlooked in looking forward with polyethylene.

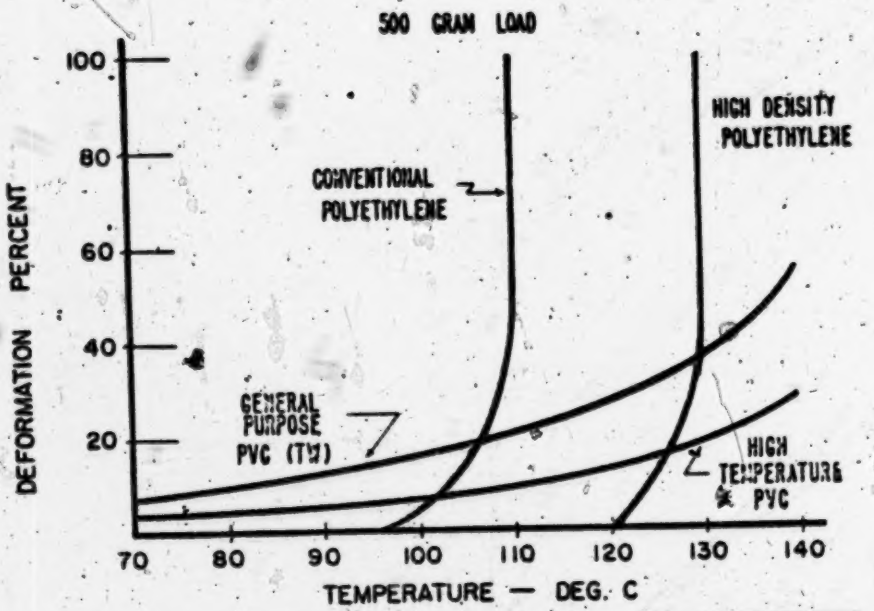

Figure 1 DEFORMATION OF POLYETHYLENE ON WIRE

[fol. 583]

POLYETHYLENE . INSULATED — THERMOPLASTIC JACKETED CABLES

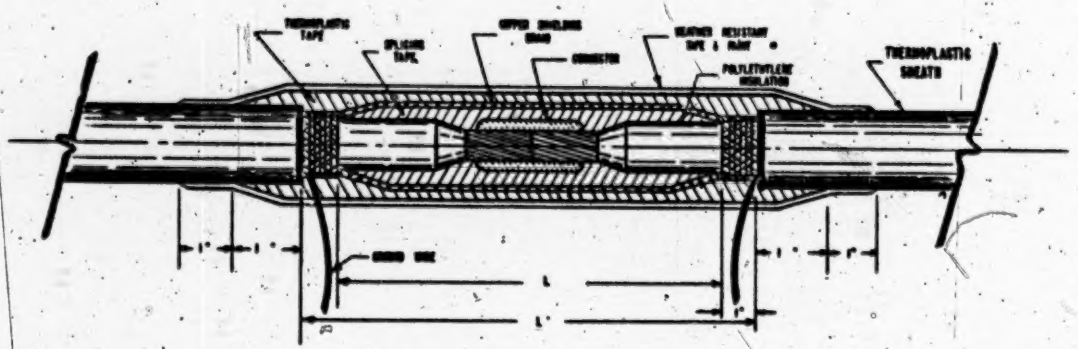

Figure 2

[fol: 5784]

[fol. 5785]

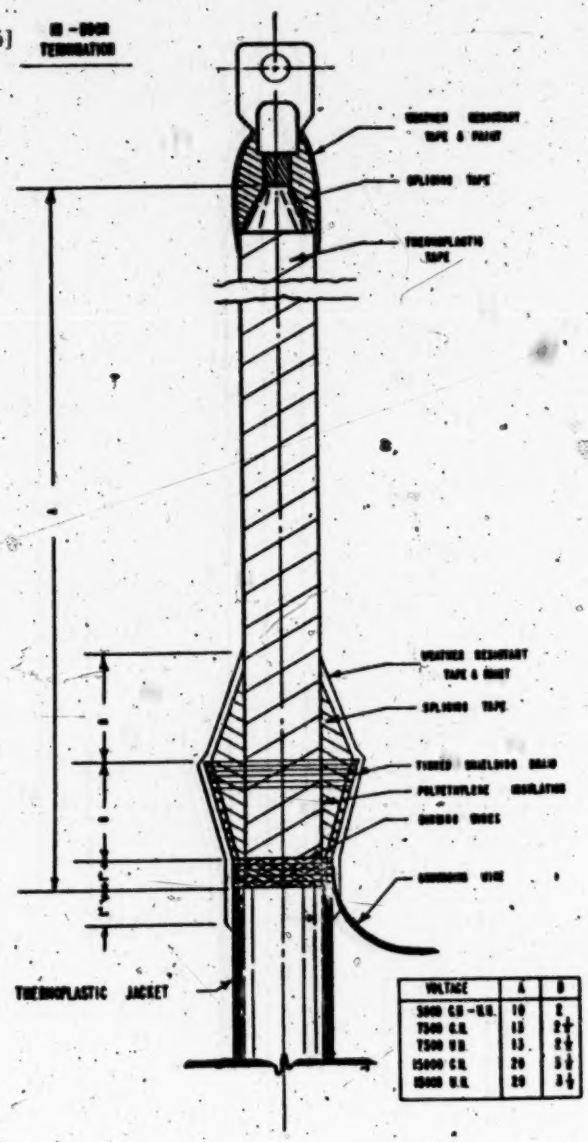

Figure 3

[fol. 5786]

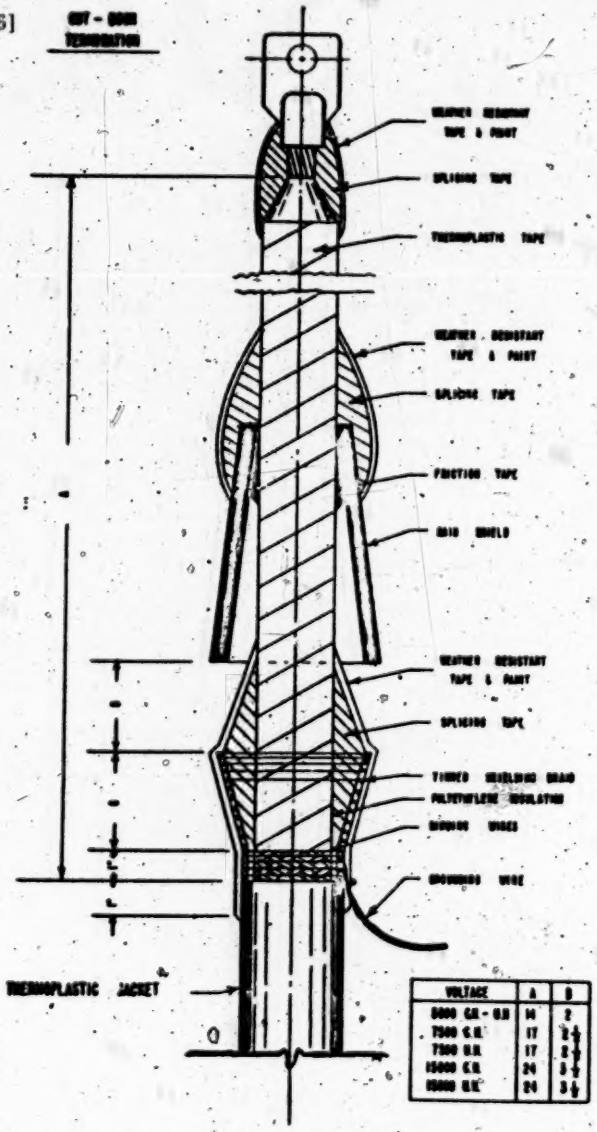

Figure 4

[fol. 5787]

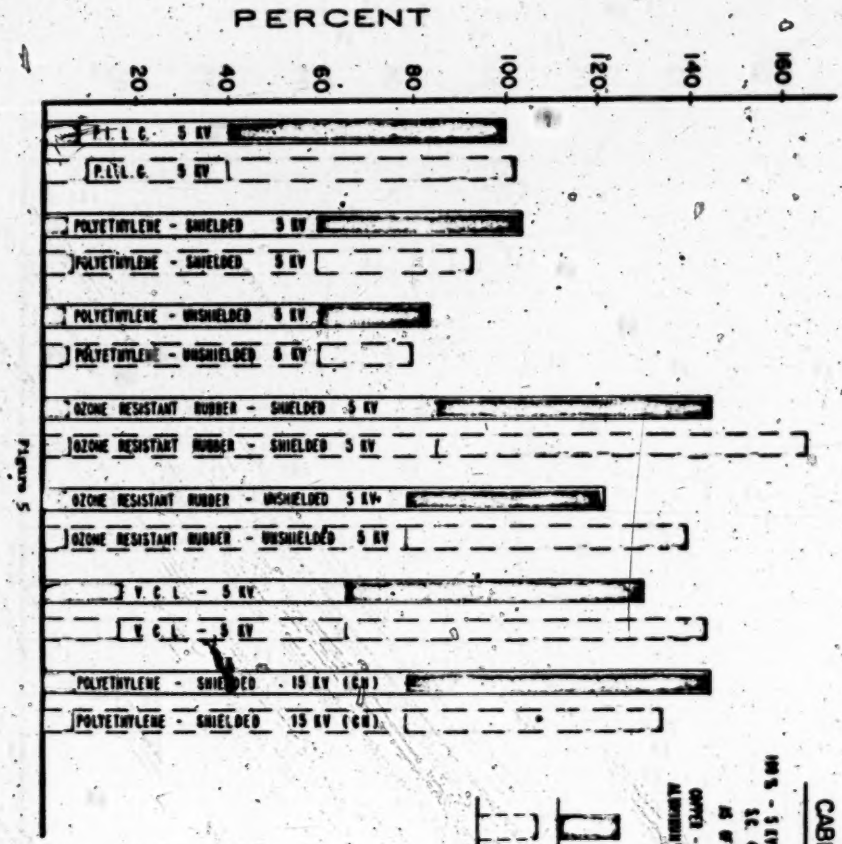

Figure 5

Overhead Cables for Distribution

CURRENT TRENDS

No. 6 in a series of articles

Up until the last decade practically all overhead distribution involved some form of open-wire construction. Probably the most advantageous factor justifying this procedure has been economy plus an acceptable experience record. Like everything else, times are changing so that it is no longer axiomatic that open-wire circuits must continue to be used for overhead power distribution. Therefore, a brief story behind some of the modern cable designs for these applications may be of interest.

The need for cable is unquestioned. Overcrowded poles, severe tree conditions, storms, public relations, regulation problems and appearance are some of the contributing reasons for this need. The cable industry in recognition of this need has developed suitable cable products for almost every overhead distribution job and the Rome Cable Corporation has played a most active role in this progressive development. Cable costs have been so reduced by careful design and use of new materials that installed economics now closely approach open-wire construction in many instances. Today's distribution engineer would be remiss if he did not at least consider an appropriate type of cable for his new or replacement overhead distribution circuits. Rome Cable is prepared to supply all of these products and associated engineering services.

Primaries

There is a definite trend towards aerial cable in the 5 kv to 15 kv range but it is difficult to conclude whether this trend is more in factory-assembled or the field-assembled variety, since there are merits for each.

In the 5 kv range the cost of cable compared to open-wire construction may not be too attractive when evaluated on the installed cost per mile of line, averaging approximately twice as much. In the 15 kv range this picture improves somewhat. However, if this comparison is based upon final installed cost per KVA this differential between cable and open wire is considerably narrowed. Naturally, there must be other determining reasons for using cable, such as improved appearance, resistance to storms, less tree trimming, better voltage regulation and greater reliability.

Preference for cable design in the 5 kv rating utilizes ozone resistant rubber insulation (such as Rome Cable RoZone) with a suitable nonmetallic sheath (such as Rome Cable RoPrene or RoSeal) . . . unshielded and relatively easy to hot tap, particularly when the cable incorporates the "reverse-lay" feature. Economic preference for cable designs for the higher primary voltages, utilizes the same grade of insulation on each conductor covered with a bronze tape which serves as a combined shield and armor but makes "hot tapping" difficult and hazardous. These and other cables may be supplied with insulated copper or aluminum power conductors all properly bound to the correct Copperweld messenger as described in the new IPCEA-NEMA specifications for aerial cable or an equivalent type. Installation procedures for factory-assembled or field-spun cables are described in the technical literature as well as manufacturers' catalogs.

Secondaries

Until quite recently there has been relatively little activity or interest in using cable for overhead secondaries but several utilities have been investigating and experimenting with either field- or factory-assembled cables for this application. Joint pole construction, elimination of crossarms, reduction of hardware, ease of installation, improved appearance, storm resistance, improved regulation and less tree trimming are some of the features to be realized, provided final installed cost is not prohibitive.

It is here that aluminum, at least for the phase conductors, seems to offer definite economic and technical advantages since the lighter weight is a most useful feature for line construction. With the advent of these popular Triplex construction for service drops the idea of a similar factory-assembled cable for secondaries has certain merits. For single-phase secondaries, this cable generally consists of two insulated aluminum conductors (usually # 1/0 or # 2/0 AWG aluminum) spiralled around a suitable neutral messenger.

When this cable is used on conventional 150 foot pole spacings the service taps can be made at or near each pole with special fixtures now available. However, it is obvious that greater savings are possible with increased pole spacings and "flying" midspan service taps made where possible or convenient. Prefabricated designs to accomplish these taps have been developed. Thus, the combination of Triplex secondaries and services offer a new and advantageous construction idea at modest cost.

When secondary sizes larger than # 2/0 AWG are required, either spinning or a cable construction similar to primary aerial cable is suggested.

Services

The use of open-wire service drops is rapidly disappearing particularly in new construction and housing developments. Service drop cable, Type SD, utilizing concentric neutral has been too costly to merit universal acceptance unless some special feature such as reduced theft possibility was desired. Nine years ago the Rome Cable Corporation introduced the new popular neutral or self-supported Triplex type of service drop cable. This design received almost instant acceptance and has proven highly satisfactory. The power conductors, insulated with polyethylene, or Neoprene, are spiralled around a neutral messenger in accordance with IPCEA recommendations.

Aluminum unquestionably offers economic and technical advantages for the power conductors and has become the general choice of metal for this particular application. A popular neutral messenger has been a reduced size ACSR but the idea of hard-drawn copper has been gaining favor, particularly where there is planning towards Triplex secondaries with Copperweld messengers in order to provide copper-to-copper contacts on the exposed neutrals. Consideration of this "combination" design is suggested.

For further information on Triplex services or secondaries we suggest you obtain Rome Cable Bulletins RS-5 and MST-1.

Tree Wire

This discussion would not be complete without some reference to so-called Tree Wire installed on insulators for overhead construction. For primaries and unusually important secondary circuits this product would cost considerably less than insulated cable and somewhat more than weatherproof wire. Where extensive tree trimming is a problem or too costly the use of the newer low-cost special thermoplastic Tree Wire designs might be considered. Here, again, Rome Cable is ready with the information and the product.

ROME CABLE CORPORATION, Rome, New York

TRANSCRIPT OF RECORD

SUPREME COURT OF THE UNITED STATES

October Term, 1945

No. 304

UNITED STATES, APPELLANT,

vs.

ALUMINUM COMPANY OF AMERICA, ET AL.

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF NEW YORK

FILED JUNE 11, 1945

PROBABLE JURISDICTION NOTED OCTOBER 14, 1945

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1963

No. 204

UNITED STATES, APPELLANT,

vs.

ALUMINUM COMPANY OF AMERICA, ET AL.

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF NEW YORK

Volume V

INDEX

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
387—Minutes of Insulated Wire and Cable Discussion, dated January 28, 1959	5789	2605
388—Memorandum dated September 22, 1959, Subject: "A Plan for the Joint Promotion of Copper and Aluminum In the Electrical Market by Phelps Dodge and Reynolds"	5792	2608
392—Letter from William C. Ridge to John H. Krey, dated February 1, 1961	5798	2613
393—Letter from John H. Krey to William C. Ridge, dated March 1, 1961	5799	2615
396—Letter from J. M. Stuart to D. P. Reynolds, Subject: "Insulated Wire and Cable Program", dated October 4, 1957	5802	2619

Record from the United States District Court for the Northern District of New York—Continued	Original	Print
PLAINTIFF'S EXHIBITS—Continued		
396—Memorandum from J. M. Rae to W. C. Huebner, Subject: "MEFA-8285", dated June 4, 1958	5804	2621
399—Letter from Walter C. Huebner to John E. Toulmin, dated June 27, 1958 with attached letter from Mr. Toulmin to Walter C. Huebner, dated June 26, 1958	5806	2623
400—Letter from Walter C. Huebner to Donald P. Horsey, dated July 25, 1958	5808	2624
401—Letter from Walter C. Huebner to Philip T. Coffin of Alcoa, dated August 1, 1958 with attachments:	5810	2626
Memorandum from W. C. Huebner to File, Subject: "The Okonite Company", dated July 17, 1958	5811	2626
Memorandum from W. C. Huebner to File, Subject: "Simplex Wire and Cable Company", dated June 23, 1958	5812	2628
Memorandum from W. C. Huebner to File, Subject: "Triangle Conduit & Cable Corporation", dated July 25, 1958	5813	2629
Memorandum from W. C. Huebner to File, Subject: "Walker Bros. of Conshohocken, Pa.", dated July 24, 1958	5815	2632
402—Letter from Walter C. Huebner to Philip T. Coffin of Alcoa, dated August 4, 1958	5816	2633
403—Memorandum dated January 9, 1959 from R. L. Schlesinger to F. C. Gardner, Subject: "Summary of Alcoa Assignment"	5817	2634
405—Memorandum from R. L. Schlesinger to W. C. Huebner, Subject: "MEFA", dated August 12, 1958	5819	2636
406—Memorandum from R. L. Schlesinger to File, Subject: "Triangle Conduit & Cable Co., Inc., dated October 17, 1958	5820	2637
408—Memorandum from R. L. Schlesinger to File, Subject: "Rome Cable Corporation", dated October 29, 1958 (Exhibit 40)	5824	2639
409—United States Department of Commerce, Report Form BDSAF 122	5826	2641
410—United States Department of Commerce, Report Form BDSAF 84	5828	2643
421a—"Mineral Facts and Problems" 1960 Edition, Department of the Interior, Bureau of Mines, Chapter headed "Alumina and Bauxite" by R. C. Wilmot	5831	2646

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
421b—"Mineral Facts and Problems", 1960 Edition, Department of the Interior, Bureau of Mines, Chapter headed "Aluminum" by R. A. Heindl	5843	2658
421c—"Mineral Facts and Problems", 1960 Edition, Department of the Interior, Bureau of Mines, Chapter headed "Copper" by A. D. McMahon	5859	2674
422—Letter from M. C. Harris, Vice President, Central Cable Corporation to A. R. Gneiser of Alcoa, dated January 26, 1955	5884	2699
423—Letter from L. C. Fisher of Alcoa to M. C. Harris, dated February 14, 1955	5885	2700
424—Letter from Paul A. Nehring, Nehring Electrical Works to C. B. Owen, Alcoa, dated July 1, 1957	5887	2702
425—Alcoa memorandum from C. B. Owen to D. B. Miller, dated July 2, 1957	5888	2703
426—Alcoa memorandum from D. B. Miller to C. B. Owen, dated July 11, 1957	5889	2704
427—Letter from C. B. Owen of Alcoa to Paul A. Nehring, dated July 15, 1957	5891	2705
428—Letter from Paul A. Nehring to C. B. Owen of Alcoa, dated July 16, 1957	5893	2706
429—Alcoa memorandum from C. B. Owen to D. B. Miller, dated July 17, 1957	5894	2708
430—Letter from Paul A. Nehring to J. B. Holloman of Alcoa, dated January 28, 1958	5895	2709
431—Letter from Paul A. Nehring to J. B. Holloman, dated February 13, 1958	5896	2710
432—Letter from Paul A. Nehring to Aluminum Company of America, dated February 27, 1958	5897	2711
433—Letter from Paul A. Nehring to J. B. Holloman of Alcoa, dated April 17, 1959	5898	2712
434—Tabulation entitled "Shipments of Aluminum Conductor Wire and Cable, 1955-1959"	5899	2713
435—Tabulation entitled "Shipments of ACSR and Aluminum Cable Bare, 1955-1959"	5901	2715
436—Tabulation entitled "Shipments of Aluminum Wire and Cable, Insulated or Covered, 1955-1959"	5903	2717
438—Tabulation entitled "Concentration of Shipments of Aluminum Conductor Wire and Cable Accounted for by Integrated Producers, 1955-1959"	5905	2719

Record from the United States District Court for the Northern District of New York—Continued

	Original	Print
Plaintiff's Exhibits—Continued		
439—Tabulation entitled "Concentration of Shipments of ACSR and Aluminum Cable, Bare, Accounted for by Integrated Producers, 1955-1959"	5907	2721
440—Tabulation entitled "Concentration of Shipments of Aluminum Wire and Cable, Insulated or Covered, Accounted for by Integrated Producers, 1955-1959"	5909	2723
441—Tabulation entitled "Position of Rome Among Non-Integrated Producers of Aluminum Conductor Wire and Cable, 1955-1958"	5911	2725
442—Tabulation entitled "Companies Listed as Producing Aluminum Conductor Wire and Cable in the U. S. Department of Commerce BDSA Directory of Aluminum Suppliers, dated April 1, 1961, but not Listed in the Directory for June 30, 1955	5912	2727
443—Tabulation entitled "Shipments of Aluminum Weather-proof and Service Drop Wire and Cable Compared with Total Shipments of Aluminum Wire and Cable, Insulated or Covered, by Six Companies, 1959"	5913	2728
444—Tabulation entitled "Sales by Domestic Primary Aluminum Producers of E. C. Aluminum Pig and Ingot and E. C. Aluminum Rod and Bar to Nonintegrated Producers of Aluminum Conductor Wire & Cable, and to Other Firms 1956-1959"	5914	2729
450—Tabulation entitled "Value of Shipments of Conductor Wire and Cable, 1958" (Thousands of dollars)	5915	2731
451—Tabulation entitled "Value of Shipments of Wire and Cable, Insulated and Covered, 1958" (Thousands of dollars)	5916	2731
452—Tabulation entitled "Value of Shipments of Conductor Wire and Cable, Bare, 1958" (Thousands of dollars)	5917	2732
454—Tabulation entitled "Value of Shipments of Service Drop Cable, 1958" (Thousands of dollars)	5918	2732
455—Tabulation entitled "Value of Shipments of Conduit in the United States, 1960" (Thousands of dollars)	5919	2733
458—Tabulation entitled "Value of Shipments of Aluminum Conduit, 1960" (Thousands of at the end of 1960"	5921	2733

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
PLAINTIFF'S EXHIBITS—Continued		
465—Tabulation entitled "Aluminum Ingot Capacity Existing or Under Construction dollars)	5920	2734
466—Map entitled "Location of Alcoa, Rome, and Rea Plants Producing Aluminum Ingot, and Wire, Cable, or Conduit Products, 1960"	5922	2735
467—Graph entitled "Monthly Average Prices of Electrolytic Copper New York Refinery and Ingot Aluminum of New York, 1940-1960"	5923	2736
468—"Report on the use of Copper and Aluminum Conductor for Overhead Electric Lines and Underground Electric Cable by Electric Utilities in the United States for the Years 1950, 1955 & 1959" by Ellery R. Fosdick, January 1962	5924	2737
468a—Schedules prepared by electric utilities showing use of copper and aluminum conductor (used in preparation of Exhibit 468)	5971	2776
Region I Northeastern	5971	2776
Region II Great Lakes	6080	2886
Region III North Central	6141	2946
Region IV Northwestern	6198	3004
Region V Southwestern	6243	3049
Region VI South Central	6302	3107
Region VII Southeastern	6348	3152
469—Highway Map—Norfolk and Princess Anne Counties showing Copper Conductor Area (within 0.5 mile ± of Bay) (within 1.0 mile ± of Ocean)	6399	3205
472—Maps prepared by Long Island Lighting Company showing Copper and Aluminum Areas of Long Island Sound and in Great Neck	6400	3206
502—Tabulation entitled "Alcoa Primary Aluminum Production, Sold to Customers, and Used by Alcoa, years 1950-1960"	6402	3208

Record from the United States District Court for the Northern District of New York—Continued	Original	Print
DEFENDANTS' EXHIBITS		
4—Chart entitled "Shipments of Wire by Primary Producers or Affiliates (Including Merged Companies) and Other Producers, 1954-1960", from U. S. Department of Commerce, Business and Defense Services Administration, Aluminum and Magnesium Division	6404	3210
5—Directory of Aluminum Suppliers, Revised, April 1, 1961, U. S. Department of Commerce, Business and Defense Services Administration	6405	3211
7—Chart entitled "Primary Aluminum Capacity, Production and Supply", and supporting documents listed thereon	6437	3245
12—Picture entitled "A Typical Electrical System"	6438	3546
13 and 13a—Picture entitled "Transmission Overhead and Subtransmission overhead" and Legend	6440	3248
14 and 14a—Picture entitled "Primary Distribution Overhead" and Legend	6442	3250
15 and 15a—Picture entitled "Secondary Distribution Overhead" and Legend	6444	3252
16 and 16a—Picture entitled "Primary Distribution Underground" and Legend	6445	3253
17 and 17a—Picture entitled "Utilization" and Legend	6447	3255
18 and 18a—Picture entitled "Other Representative Rome Products" and Legend	6449	3257
19 and 19a—Picture entitled "Service Drop Cable" and Legend	6451	3259
20 and 20a—Picture entitled "Alcoa-Rome Overlap Products" and Legend	6453	3261
21—Insulating Materials (list of)	6455	3263
22—Insulating Materials—Thermoplastic (list of)	6456	3264
23—Insulating Materials—Thermosetting (list of)	6457	3265
24—Protective Coverings (list of)	6458	3266
25—American Standard Specification for Weather-Resistant Wire and Cable—Neoprene Type, Approved January 15, 1954	6459	3267
26—American Standard Specification for Weather-Resistant Wire and Cable—Polyethylene Type, Approved August 13, 1957	6468	3282
27—IPCEA-NEMA Standards Publication (excerpts)—Thermoplastic-insulated Wire and Cable for the Transmission and Distribution of Electrical Energy	6483	3305

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
DEFENDANTS' EXHIBITS—Continued		
28—IPCEA-NEMA Standards Publication (excerpts)—Rubber-insulated Wire and Cable for the Transmission and Distribution of Electrical Energy	6494	3322
29a—List showing Lost Business Since April, 1957 (From Potential Business Reports)	6508	3343
30—Rome Product Bulletin WP-2A—Neoprene Covered Weatherproof Wire	6509	3345
31—Rome Product Bulletin RCP-361—Neutral-Supported Secondary and Service Drop Cables with copper or aluminum power conductors	6513	3349
32—Rome Product Bulletin RCP-200—Guide to representative Wire, Cable and Conduit	6521	3357
34—Request for Quotation, Inquiry No. NE-1383, Boston Edison Co., Boston, Mass., January 5, 1959	6525	3361
35—Request for Quotation, Inquiry No. NY-668-C, Public Service Elec. & Gas Co., New York, December 1, 1958	6529	3365
36—Request for Quotation, Inquiry No. NY-667-C, Public Service Electric & Gas Co., New York, December 1, 1958	6537	3373
37—Request for Quotation, Inquiry No. NY-665-C, Public Service Elec. & Gas Company, New York, November 25, 1958	6539	3375
38—Request for Quotation, Inquiry No. NY-639-C, Public Service Elec. & Gas Co., New York, November 5, 1958	6545	3381
39—Request for Quotation, Inquiry No. NY-362-C, Con Edison, January 27, 1958	6552	3388
40—Request for Quotation, Inquiry No. NY-379-C, Long Island Lighting Co., Hicksville, L.I., N.Y., February 21, 1958	6558	3394
41—Rome Cable Division of Alcoa, Sales Order dated November 23, 1960, Boston Edison	6560	3396
42—Rome Cable Corporation, Sales Order dated May 16, 1960, Dow Chemical, Plaquemine, Louisiana	6561	3397
43—Tabulation entitled "Unused Primary Aluminum Capacity"	6562	3398
45—Statement showing "Aluminum Pig, Ingot or Billet To Be Made Available to Non-Integrated Users Under Provisions of GSA Supply Contracts	6563	3399

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
DEFENDANTS' EXHIBITS—Continued		
47—Statement showing "Primary Aluminum Purchased by Rome" (as compared to U. S. and Alcoa primary aluminum sales to non-integrated fabricators, in thousands of dollars)	6564	3401
48—Statement showing "Primary Aluminum Purchased by Rome" (as compared to U. S. and Alcoa primary aluminum sales to non-integrated fabricators, in thousands of pounds)	6565	3402
49—Statement showing "Primary Aluminum Purchased by Rome" (as compared to U. S. and Alcoa primary production in thousands of pounds)	6566	3403
50—Statement showing "Copper and Aluminum Purchased by Rome" (in thousands of dollars)	6567	3404
51—Statement showing "Copper and Aluminum Purchased by Rome" (in thousands of pounds)	6568	3404
52—Statement showing "Copper and Aluminum Wire and Cable Sold by Rome" (in thousands of dollars)	6569	3405
53—Statement showing "Aluminum Wire and Cable Overlap Products Sold by Rome" (in thousands of dollars)	6570	3405
54—Statement showing "Rome Sales of Weatherproof" (1956-1960) (in thousands of dollars)	6571	3405
55—Statement showing "Rome Sales of Service Drop Cable" (1956-1960) (in thousands of dollars)	6572	3406
56—Statement showing "Rome Sales of Service Drop and Weatherproof" (1956-1960) (in thousands of dollars)	6573	3406
57—Statement showing "Changes in Base Price of Primary Aluminum, E. C. Redraw Rod and Selected Cable Sizes from July 22, 1946 to date and Comparison of Spread Between These Products During Same Period	6574	3407
58—Statement showing "Alcoa Electrical Conductor Business Reported Lost to all Competitors, April 1957 through March 1959"	6575	3409
59—Statement showing "Shipments of ACSR and Aluminum Cable, Bare By Primary Producers or Affiliates (Including Merged Companies) and Other Producers (1954-1961)	6576	3410

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
DEFENDANTS' EXHIBITS—Continued		
60—Statement showing "Shipments of Aluminum Insulated or Covered Wire and Cable by Primary Producers or Affiliates (Including Merged Companies) and Other Producers (1954-1961)"	6577	3411
61—Statement showing "Shipments of Aluminum Conductor Wire and Cable by Primary Producers or Affiliates (Including Merged Companies) and Other Producers (1954-1961)"	6578	3412
62—Statement showing "Post-Acquisition Growth of Nonintegrated Producers of ACSR and Aluminum Cable, Bare (1958-1961)"	6579	3413
63—Statement showing "Post-Acquisition Growth of Nonintegrated Producers of Aluminum Insulated or Covered Wire and Cable (1958-1961)"	6580	3414
64—Statement showing "Post-Acquisition Growth of Nonintegrated Producers of Aluminum Conductor Wire and Cable (1958-1961)"	6581	3415
65—Statement showing "Copper and Aluminum Utilization in Weatherproof Wire" (in Thousands of Dollars)	6582	3416
66—Statement showing "Copper and Aluminum Utilization in Service Drop Cable" (in Thousands of Dollars)	6583	3417
67—Statement showing "Copper and Aluminum Utilization in Weatherproof and Service Drop Cable" (in Thousands of Dollars)	6584	3418
69—Registration Record of Aluminum Association Alloy Designations and Chemical Composition Limits for Wrought Aluminum Alloys	6585	3419
70—Business and Defense Services Administration Bulletin, April 11, 1961	6589	3423
71—BDSA List of Companies and Plants Producing Copper Wire and Cable, July 10, 1958	6591	3425
73—Wire and Wire Products Buyers' Guide and Yearbook of the Wire Association, 1961 Edition	6604	3439
74—Standard Industrial Classification Manual, Bureau of the Budget, 1957	6616	3451
75—Mineral Market Survey No. 3349 entitled "Aluminum and Bauxite in 1961" (Preliminary Annual Data), U. S. Bureau of Mines	6627	3466
76—Economic Study—Use of Aluminum and Copper Conductors on Consolidated Edison System, dated February 5, 1959	6630	3470

	Original	Print
Record from the United States District Court for the Northern District of New York—Continued		
DEFENDANTS' EXHIBITS—Continued		
77—Letter from F. C. Gardner, Ebasco Services to R. V. Davies, Alcoa, dated April 3, 1958	6663	3503
78—Memorandum from W. C. Huebner to H. Richter, Re: Cable Companies Study, dated June 16, 1958	6664	3504
81—Table entitled "Aluminum Wire", Long Island Lighting Co., January 30, 1962	6665	3507
82—List of Public Utilities Purchasing Covered and Insulated Overlap Aluminum Conductor from Both Alcoa and Rome in 1958	6666	3509
Order noting probable jurisdiction	6667	3510

[fol. 5789] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 387

Exhibits in Reynolds Metals Company depositions of John H. Krey, W. M. Franklin, Robert L. Teeter, Allyn Dillard.

March 29, 1961.

[fol. 5790] Confidential

January 28, 1959

Minutes of Insulated Wire and Cable Discussion

Copy sent to John Krey, February 2, 1959

Present: Messrs. W. M. Franklin, H. A. Adams, J. C. Warford, R. L. Teeter.

The Reynolds Metals Company has been meeting increasing objections from its customers, particularly its distributors, regarding the incompleteness of its line of wire and cable products. Since Alcoa's acquisition of Rome Cable Co. last week now leaves Reynolds as the only major aluminum or copper company without insulating facilities, it is expected that our sale of metal to electrical applications will suffer materially if some action is not take to enlarge our wire and cable product line.

It was recognized that our recent acquisition of the British aluminum stock, prohibited any early acquisition of a wire and cable company. This meeting was, therefore, called to consider what other alternatives might be available.

Messrs. Franklin, Adams and Warford felt that installation of our own compounding stranding, and installation facilities would be the next best alternative to acquisition. Pending detailed study of exact product line requirements and necessary facilities additions, it was expected that at least 2 to 3 million dollars immediate investment would be required.

Mr. Teeter did not agree that installation of our own facilities was the best alternative. He pointed out that establishment of the necessary reputation for quality and know-how in insulated products manufacture would take at least several years. In addition he questioned the availability at this time of the necessary 2 or 3 million dollars, particularly in view of the fact that a satisfactory return on investment could not be conservatively claimed for a period of several years after the installation. Finally, all agreed that the ability to offer copper products, where superior, was very desirable. Installation of our own facilities would permit this to only a limited extent.

All agreed that if funds were not available either for acquisition or for installation of our own facilities, a satisfactory temporary solution might be a team or joint merchandising arrangement with one of the better remaining independent insulated wire and cable manufacturers. For example, we could arrange to merchandise some of their items under the Reynolds' insignia, recognizing the source if desirable, and they could merchandise our wire and cable products similarly if they so desired. The following possibilities were discussed:

1. *John A. Roebling (Subsidiary of Colorado Fuel & Iron Co.)* This company has a national reputation for competitive quality, and a product line containing predominately those items subject to early penetration by aluminum, such as power cables, magnet wire, building wire, etc.: They do not manufacture ACSR and [fol. 5791] related products, thus a team merchandising arrangement would permit them to augment their own product line to their benefit as well as to ours.

   In addition, whereas we now buy the steel core wire for our ACSR from Detroit Steel, Roebling also offers this material and might in this manner be able to obtain our account.
2. *Simplex Wire & Cable Co.* It was doubted if any partnership arrangement would be of interest to them. Although their facilities are suitable, they do not currently manufacture building wire, service entrance cable, overhead transmission cable, or magnet wire; all of which would be of interest to us.
3. *Essex Wire Corp.* These people have previously indicated an interest in working with us in connection with a molten metal arrangement, but their line and reputation for quality are not as suitable for a team operation as the preceding companies.
4. *Triangle Conduit & Cable Corp.* Messrs. Adams, Franklin and Warford felt that this company was the least attractive of the four major independents for a team arrangement. In particular, its line does not include the heavier industrial cables of most interest to us.
5. *General Cable Co.* Too large to be interested.

6. *General Electric Co.* Except for the complicating legal problems raised, G.E.'s product line would fit nicely in with our own, and they could benefit from the addition of our line.

In addition to the above noted U.S. companies, Mr. Teeter advised the group of the existence of a partnership between Canadian British Aluminum and the Phillips Electrical Co. Ltd. in Canada called Phillips-CBA Conductors, Ltd., for the production of wire and cable products. Additional information is to be obtained about this relationship to see if our product line could be usefully supplemented by arrangement with Phillips-CBA Conductors.

The above possibilities are to be discussed with our respective managements, to be pursued as they indicate.

Robert L. Teeter.

RLT/rk

cc: Messrs. W. M. Wells, C. A. Wishart, I. Roberts (2), W. M. Franklin (2), H. A. Adams, J. C. Warford, R. L. Teeter.

[fol. 5792] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 388

A Plan for the Joint Promotion of Copper and Aluminum in the Electrical Market By Phelps Dodge and Reynolds

Introduction

In view of the large price differential favoring aluminum over copper in the electrical field it is inevitable that we shall see a continuing substitution take place as technological improvements are made in overcoming aluminum's inherent mechanical disadvantages. First there was the overhead transmission cable, then the overhead distribution cables and the service drop cables and now the aluminum companies are organizing to go after the insulated cables.

Kaiser took over the U. S. Rubber Company's wire and cable division and launched a vigorous campaign to pro-

mote aluminum building wire and power cable but being the only company really pushing these products they have not made too much progress.

Alcoa bought the Rome Cable Company and have put in one of their own men as Vice President and General Sales Manager and we can expect that they will now aggressively push aluminum insulated cables along with Kaiser. Progress in the utility field can be expected as they are greatly concerned about rising costs and the stepping up of the public power competition. In the industrial and construction fields the price difference cannot help but bring about a greater use as soon as methods are found and publicized for overcoming the troubles with connectors and joints.

The next move was when Reynolds told us in June that they were going to go aggressively after the electrical market in which they had not been much of a factor. They intend to do one of three things—build a completely new facility estimated at around $30,000,000, purchase an existing company and enlarge it, or work out a deal with us to jointly promote both copper and aluminum in the electrical market. [fol. 5793] At the meeting held on June 17th between officials of Phelps Dodge and Reynolds, it was agreed that there was a sufficient common interest to justify having a joint task force prepare a plan whereby the two companies could cooperate in the sale of aluminum and copper in the electrical market, it being the feeling that the total volume of sales would be greater if the two companies acted together than if each went its own way.

Plan I developed by the task force called for a joint sales company equally owned which would sell the products manufactured by each of the parent companies. Reynolds rejected this because they did not think the sales company would have enough substance binding the two parties together with the result that it could come apart too easily.

Plan 2 was primarily Reynolds thinking and called for the joint company to lease the cable-making facilities of Habirshaw and their cable mill at Listerhill, Alabama. We were not enthusiastic about this because the leasing arrangements would be very complicated and they would have equal control of the company of which 80% of the sales force would be our people and the volume of copper products would be almost three times that of the aluminum products.

We have now come up with Plan 3 which so far has only been roughly outlined to Reynolds.

Basically, the plan calls for the formation of two companies, a manufacturing company to be equally owned and a sales company to be owned two-thirds by Phelps Dodge and one-third by Reynolds.

The manufacturing company would be known as "Phelps Dodge Reynolds Wire and Cable Corporation" and it is proposed that it be located in the south or middle west. [fol. 5794] One possible location would be the U. S. Rubber Company's plant adjacent to our Inca plant. This would have the advantage of enabling the company to get into production a year earlier than if a new facility were built and in view of the proximity of I. R. & W. would eliminate the necessity of having any copper wire drawing or stranding equipment in case it was necessary to fill out the manufacturing at times with copper products as these products could be obtained from our I. R. & W. plant.

The plant is more than adequate for the proposed operations, comprising 568,000 square feet on 60 acres of land. There would be ample space for the proposed operation, including space for a rod mill, casting shop, and a reasonable amount of room for further expansion and storage.

This plant would be on the lines of the American Electric Power Corporation which is a large user of aluminum transmission cable but unfortunately also has Anaconda, Essex and Kaiser on their lines. Ormet is also a large customer of theirs so any cable company using their aluminum would have a reciprocal position, therefore, consideration should be given to locating the plant on the lines of a utility system that could do more for us such as the Southern Company or Texas Utilities.

The plant would have the most efficient possible setup for the manufacture of aluminum cables in view of the very competitive nature of this market. This would involve a new rod mill particularly as Reynolds does not have a rod mill at present. It produces its rods by slitting heavy sheet.

Reynolds would contribute the wire and cable equipment [fol. 5795] now at its Listerhill plant on a depreciated value basis, and would discontinue that mill.

An estimate of the capital needed for the manufacturing company is $20,100,000 made up as follows:

Purchase price of U.S. Rubber plant	$ 4,000,000
Alterations of building	400,000
Equipment	5,200,000
Installation cost	1,200,000
Rod mill, including installation	2,000,000
Casting facilities	500,000
Pre-operating expenses	700,000
Engineering	700,000
	14,700,000
Contingencies (10%)	1,500,000
	16,200,000
Inventory of lifo aluminum and other materials	2,400,000
Other working capital	1,500,000
	$20,100,000

The above estimated equipment costs are based on new equipment and do not take into consideration the equipment to be furnished by Listerhill. The cost of the new equipment included in the above estimate corresponding to the Listerhill equipment is $2,600,000.

The proposed initial capacity of this plant, based upon the estimated business the sales company could obtain in 1960 would be approximately:

ACSR transmission cable	$15,000,000
All-aluminum bare cables	2,000,000
Aluminum bare and covered line wire	3,000,000
Aluminum service cable	1,500,000
Aluminum building wire and power cable	3,500,000
Total	$25,000,000

This would require approximately 50,000,000 pounds of aluminum per year although initially, at least, a part of the building wire production might be made with copper conductors.

[fol. 5796] The estimates are based on the following operating rates:

	1960	1965
Drawing	1 shift	3 shifts
Stranding	1½ shifts	3 shifts
Cabling	1½ shifts	3 shifts
Extruding	One or more shifts, depending upon the insulating volume of the various compounds.	

The above tabulation might seem to be out of balance for a five-year growth, but it is necessary to have a large initial investment in machinery, especially in ACSR, in order to obtain the required percentage of the immediate market.

Reynolds have indicated that at the present time they are doing $12,000,000 a year of ACSR transmission cable, all aluminum bare cables and line wire. They estimate that by 1960 the total market for these products will be 300,000,000 pounds or about $150,000,000, therefore, our sales of $20,000,000 would only be about 13% of the market.

Aluminum has replaced copper to a large extent in the service cable market and we believe the joint company can reach the $1,500,000 sales figure in 1960.

In our opinion the $3,500,000 figure for aluminum building wire and power cable for 1960 is on the high side but Reynolds are convinced that this market is going to develop rapidly and that by then we should be able to reach this amount.

Nema statistics unfortunately do not help us too much in forming our opinion on this as there are companies who are important in this field which do not report to Nema. Nema's aluminum sales only show $2,000,000 for the first six months of 1959.

The sales company is outlined in the attached memorandum.

[fol. 5797] It is recommended that we submit Plan 3 to Reynolds for their consideration making it clear that it is submitted for discussion purposes of the task force and has not yet been fully approved by Phelps Dodge, although we do consider it as a definite possible method of operating. If this plan should eventually be approved it would be our suggestion to proceed immediately with the formation of the sales company and agree to go ahead with the manufacturing company but consideration should be given to the fact that the prices for aluminum wire and cable at the present time are so low that the manufacturing company could not possibly show a profit using the market price of aluminum ingots. In fact some items are so low that the aluminum would have to be put in at no cost, therefore, the joint manufacturing company's new facility should be postponed until there are signs of better prices or some way is found whereby Reynolds can underwrite this loss the same as Kaiser and Alcoa must be doing for their fabricating subsidiary.

[fol. 5798] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 392

John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation
640 South Broad Street, Trenton 2, New Jersey

William C. Ridge
Executive Vice President

February 1, 1961.

Mr. John H. Krey, Vice President
Reynolds Metals Company
6601 Broad Street Road
Richmond, Virginia

Dear Mr. Krey:

The following will confirm our recent discussion. Our Board of Directors has decided to liquidate a portion of our Electrical Wire Division and we are now in the process of accomplishing the project. In this connection we wish to sell, as is, where is, certain machinery and equipment used in the manufacture and testing of electrical wire and cable, and located in our Buckthorn Plant, Trenton, N. J., and our Copper Wire Mill, Roebling, N. J. Excluded from the sale would be:

(1) The equipment used for cleaning and bundling copper rods, and for electrolytic copper recovery and overhead tramrail system, all located in the Copper Wire Mill.

(2) Equipment which is properly considered a part of the real estate or facilitates its operation and sale, such as the equipment contained in the boiler house, the electrical distribution system, yard railroad tracks, fire protection equipment, overhead cranes, incinerators, elevators, docks, radio and transportation equipment used by plant guards, yard railroad tracks.

(3) Office furniture and equipment, time clocks, certain industrial lift trucks.

We are prepared to sell this machinery and equipment at a price of one million dollars ($1,000,000). Any such sale would, of course, be subject to our mutual agreement on a list of items of machinery and equipment to be sold, arrangements for the removal and reconditioning of buildings after removal and detailed terms and conditions of sale.

Very truly yours, William C. Ridge, Executive Vice President.

W.C.Ridge:EPG

[fol. 5799] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 393

March 1, 1961.

Mr. William C. Ridge
Executive Vice President
John A. Roebling's Sons
640 S. Broad Street
Trenton 2, New Jersey

Dear Mr. Ridge:

This will reply to your letter of February 1, 1961.

Since your letter was received there have been, as you know, further discussions about the exclusions which you mentioned, and there are to be certain changes in the items which you listed. I believe it is now understood also that there is not to be any arrangement for reconditioning of buildings. Subject to these qualifications, your letter in general is in accordance with our understanding.

As you know, the inventory of equipment has not been completed. In order to clarify further our understanding of the items which are to be included in the sale I have asked Mr. Hedgecock to indicate in a general way the items which he understands are to be included. The list which he has prepared is enclosed.

Sincerely yours, John H. Krey, Vice President.

GBM:mf
Enclosures

[fol. 5800] Items to Be Included in Sale

Copper Mill

This includes all of the production equipment in this building and its accessory items. This primarily consists of the complete tin plating lines, stranding equipment, marking and forming machines, wire drawing equipment including solution pumps, tanks, furnaces complete with atmosphere converter and controls, wire shaving equipment, turkhead and flattening equipment, bunching and spooling equipment, portable and floor scales, specialized handling equipment including industrial trucks, both rider and hand operated, battery charging equipment and batteries, complete die room equipment including all dies, equipment spare parts including motors and controls, wood and steel pallets and wood and steel reels, D. C. rectification equipment, including transformer, small maintenance shop and portable equipment, overhead tramrail and handling equipment serving production machinery including grabs, skids, all butt welders and brazing equipment, miscellaneous wire balers, wrapping machines, all motors and control equipment serving production units, tensile and electric test room equipment, operating data and instructions and records, including equipment drawings.

This excludes office equipment, rod cleaning system and tanks, copper recovery system, tramrail and other handling equipment over this area, workmen's locker facilities, general lighting, air and water piping.

The above basically includes all of the production and associated equipment listed in the copper mill asset records dated January 1, 1961 as Report No. 999, with the above listed exclusions. Not listed in this asset record but included in this transfer are miscellaneous supplies and equipment concerned with the production equipment and operations.

Buckthorn Plant

This includes all of the production equipment in this plant, as well as its accessory equipment. It also includes all operating data and instructions and records, including equipment drawings.

All maintenance shop equipment including maintenance

and production equipment and spare parts and hand tools and miscellaneous maintenance equipment for electrical, riggers, millwrights and other trades, box shop equipment, [fol. 5801] pipefitters shop equipment including hand tools and miscellaneous pipefitting maintenance equipment, air compressors and accessories, floor maintenance equipment, platform and floor scales, all laboratory and production testing equipment and accessories, development laboratory equipment associated with power cable.

All salvage center (stripping shed) equipment, all portable and floor scales. All industrial trucks including batteries and charging equipment. All general type material handling equipment including grabs, slings, etc. All D. C. generating equipment for production machinery and testing, all rubber mill equipment including Banbury mixer, conveyors, mills, calenders, tubers, slitters, boxes, bins, braiders, all patching equipment, continuous vulcanizing machines, cabling equipment, electrical test equipment, saturators, lead extruder equipment, lead strippers, strip covering machines, taping machines, test sparkers, service entrance machinery, spoolers, universal winders, presaturating equipment, Dialec wrappers, spiral marking striping, printing and polishing equipment, coilers, plastic extruders, testing and reel equipment, all tool room equipment and tools, vulcanizing equipment (dome and horizontal), rubber filling machinery, ventilating equipment, lacquering equipment, all winding machines, large and small coilers and other shipment preparation equipment, paper insulating and belting equipment, varnished cambric insulating equipment, taping equipment, all spooling and rewinding equipment, armoring equipment, curing tube equipment, horizontal and vertical impregnating tanks, pumps, oil purification systems and associated equipment, lead presses, lead melting pots, control pumps, all tools and dies for all equipment, all film covering (enamel wire) equipment, controls, rewinders and associated equipment, including weighing, wrapping and packing units, all fibrous covering (magnet) wire insulating and rewinding equipment.

The above includes all spare equipment parts, tools, dies, reels, spools, pallets and accessories for the production equipment. It is also assumed that the equipment attached to and part of the basic production equipment is included,

making each piece of equipment a complete operating machine.

The above basically includes all of the production and associated equipment listed in the Buckthorn Plant asset records dated January 1, 1961, as Report No. 999. Not included in this report but included in this transfer are miscellaneous supplies and equipment concerned with production equipment and operations.

[fol. 5802] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 396

Transmittal Memo
R-673-1 (Rev. 1-60)

Date.....
To..... At.....

- ☐ Per Your Request
- ☐ Read and Pass On
- ☐ Note and Return to Me
- ☐ Note and Retain for Your Files
- ☐ Handle with Sender
- ☐ Prepare Reply for My Signature
- ☐ Take Appropriate Action
- ☐ For Your Information
- ☐ Signature

Remarks:

Mr. D. P. Reynolds' secretary, Beatrice Adkins, has made a thorough search in the files in his office but cannot find the original of this letter.

From.....
At.....

[fol. 5803] October 4, 1957.

Mr. D. P. Reynolds
General Sales Office

Dear Dave:

Subject: Insulated Wire and Cable Program

One of the most important projects we have before us at present is firming up a program on increasing the supply of aluminum to the electrical industry.

Walter Franklin, Dr. Irving Roberts, and others are presently investigating companies in the insulated wire and cable field with regard to their line of products, the physical making of equipment, and evaluation of products most adaptable to conversion to aluminum.

My feeling at this time is that the die is cast on direction we should take. Our principal competitors in primary production are committed to integrated supply of these products. General Cable will be affiliated with Olin-Revere Reduction Company. Kaiser has purchased U.S. Rubber, and I believe will acquire others. Anaconda has the Anaconda Wire and Cable Company.

To properly introduce and merchandise insulated wire and cable products, you must be in a position to have product control. Also important is a complete line of products to become a factor with the supply houses or distributors. They will want to associate themselves with a company with an integrated and complete line.

My purpose in this letter is to emphasize these points and ask that you personally review this subject with the group involved as soon as they complete their reports and have recommendations.

With best regards, J. M. Stuart.

JMS:dd

Copies: W. T. Ingram, K. E. Hall, W. Franklin, Dr. I. Roberts—Richmond

October 7, 1957.

[fol. 5804] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 398

Memorandum from
Corporate Finance Department

June 4, 1958.

To: W. C. Huebner
From: J. M. Rae
Subject: MEFA-8285

On Tuesday, May 27, 1958, I talked with the following people in Philadelphia regarding the company in Conshohocken, Pa.

Mr. William B. Walker, Executive Vice President
The First Pennsylvania Banking and Trust Company
Mr. Garner O. Fletcher, Sr. Trust Investment Officer
Girard Trust Corn Exchange Bank
Mr. John H. Rypass, Partner
E. W. Clark & Co. (Investment Bankers)
Mr. Shaler Stidham, Vice President
The Philadelphia National Bank

and in Conshohocken, Pa:

Mr. Donald P. Horsey, Vice President
The Philadelphia National Bank (Branch Manager)

Principal bank of account is the Philadelphia National Bank. It came to them through the bank in Conshohocken which they bought and now operate as a branch. The company has done business there for many years.

The senior management are men of long residence in Conshohocken, active in community affairs, the Presbyterian Church, and are very highly regarded. Opinion is that they are the type who would get along well with other management people.

They have been approached a number of times recently by people seeking to purchase or acquire this company by one means or another. The answer to such proposals has so far been a definite No! That does not mean, however, that an approach by our client would be rebuffed. One of the

officers at Girard Trust has a good entre through the Company's auditors through which he can ascertain the owner's true attitude regarding acquisition under the general conditions our client proposes. He will do so and write us the information he obtains. (Note: we asked this officer to refrain from any follow up).

All of the stock is held by Mr. H. S. Walker, the Chairman, and his family, and the family of his brother who died not long ago. Mr. Hervey J. Walker is 79 and certainly should understand and appreciate matters of estate taxes and capital gains taxes. He is the power in this company, very able, and has actually been the active operating management head for many years.

[fol. 5805] A. M. Callanan, Vice President, is the second man on the senior management team. He has always been and still is the principal marketing man for the organization. I am told he is a very able man, but he also is about 70 years old.

The third man on their senior management team is A. T. Cameron, Executive Vice President. He is the financial man, and an excellent one. Again, however, he is about 70.

Presumably, these three senior officers are about ready to retire. To take their places, I am informed that the company has a solid and progressive successor management team to take over. They also, I understand, are people who would fit in well for the kind of relationship our client seeks.

I am told the company has excellent products used for electrical transmission and distribution, both aluminum and copper cable of best modern type, also steel conduit products, and similar items. They have a nation-wide market which they serve through independent distributors. The distributor organization is said to be a very good one. Sales have shown very substantial growth in recent years, and they have more than kept up with the industry. Sales in 1957 were about $21 million, I understand, and profit margins are very satisfactory, but I couldn't get the exact figures.

The plant, I understand, is in excellent condition and much of the equipment is new. Manufacturing is said to be excellent. They have above average production management, thoroughly competent labor, and good labor relations. Products are well engineered and the company is alert in research

for new developments. A new product for which sales have been substantial and growing is known as the "underflooring" line.

Financially, the banks regard this company a strong and a very high credit risk. They believe it to be thoroughly sound in this regard, with excellent financial management. I was told they have a revolving credit line of $2,000,000 and currently borrowing about $1,000,000 from the principal bank.

In brief, this seems to be an excellent company in every respect.

In regard to Crescent Insulated Wire & Cable Co. (Inc.) in Trenton, I was unable to obtain information from Philadelphia banks other than that they do its banking with the Trenton Trust Company (known as Mrs. Roebling's Bank).
ah

[fol. 5806] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 399

June 27, 1958.

Mr. John E. Toulmin
Senior Vice President
The First National Bank of Boston
Boston 6, Massachusetts

Dear Mr. Toulmin:

Thank you very much for your letter of June 26. I appreciate very much your interest and time spent on our behalf. While we are naturally disappointed to have the "door closed" it certainly saves us any unnecessary time and expense of further investigation.

Sincerely yours, Walter C. Huebner, Assistant Manager.

WCH:ah

[fol. 5807] THE FIRST NATIONAL BANK OF BOSTON

Boston 6, Massachusetts

John E. Toulmin
Senior Vice President

June 26, 1958.

Mr. Walter C. Huebner
Ebasco Services Incorporated
Two Rector Street
New York 6, New York

Dear Mr. Huebner:

I had an opportunity yesterday to spend a hour or more with Everett Morss, President of Simplex Wire & Cable Company. While it is possible that a few minority stockholders might be willing to sell their shares, the overwhelming majority wish to retain their investment. In other words, certainly at this time the management is unwilling to even discuss the question of a sale or merger of Simplex.

I might add that Ebasco's name was in no way mentioned during the conversation.

Sincerely yours, J. E. Toulmin.

[fol. 5808] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 400

bc—F. W. Ohles, R. E. Pierce

July 25, 1958.

Mr. Donald P. Horsey, Vice President
The Philadelphia National Bank
Fayette at Fifth Avenue
Conshohocken, Pennsylvania

Dear Mr. Horsey:

I wish to thank you for bringing our interest in Walker Brothers to the attention of the Board at its July 22 meeting.

Naturally we are disappointed Mr. Hervey Walker should

be so firm in his decision about an exchange of stock with our client. In the event there is a change in his viewpoint, I think it desirable to indicate that our client's interest may be continuing even though it acquires another company in this field.

We have to respect the request for confidentiality but some background leading up to our contact of you may be of interest in the event there is a reconsideration in the future.

As you know, we are not commission brokers and our interest is in helping a client with whom we have had a long business association as both customer and client and which has resulted in their high regard for our discretion and for our judgment in the utility field.

Our client is desirous of expanding into the electric utility supply field. It specified that any company we might suggest have a well engineered product of high quality; a competent management of high integrity; the management willing and able to stay on and run the company; and an exchange of stock preferred though a cash transaction will be acceptable.

Walker Brothers was one of a number of companies we suggested for consideration which was satisfactory. We, of course, would not remain in the picture if Mr. Walker sincerely wished to discuss this matter directly with our client, but until it was certain there was genuine interest our client did not want it known that it was seeking to diversify. Also, although it is not looking for a bargain acquisition, any arrangement must be fair to both parties.

[fol. 5809] The stock of our client is listed on the New York Stock Exchange and has a long record for continuous dividend payments. Its revenues run well into the hundreds of millions of dollars and its financial strength would not be taxed in the slightest by any acquisition we have so far suggested. We are quite proud to be associated with this organization and know that you and the Walker company would be also.

Thank you again for your intercession and hope you will visit us if you ever have the opportunity when in New York City.

Sincerely yours, Walter C. Huebner, Assistant Manager.

WCH:iz

[fol. 5810] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 401

August 1, 1958.

Confidential and Personal
Mr. Philip T. Coffin, General Sales Manager
Aluminum Company of America
Alcoa Building
Pittsburgh 19, Pennsylvania

Dear Mr. Coffin:

Enclosed are the memoranda on the four situations I discussed with you this afternoon. We are pursuing the investigation of the other two companies of our list of six. There is enclosed also a table giving a brief summary of the market price history for the three companies which have stock in the hands of the public.

Sincerely yours, Walter C. Huebner, Assistant Manager.

WCH:iz
Encl.
bc—F. W. Ohles, R. E. Pierce

(Copy)

[fol. 5811] Memorandum from Corporate Finance Department

July 17, 1958.

To: File
From: W. C. Huebner
Subject: The Okonite Company

There have been rumors circulated recently to the effect that both Kaiser and Phelps-Dodge were discussing acquisition with Okonite. On July 16 our assignment with respect to investigating the possible acquisition of Okonite was discussed with Mr. Edwin R. (Rex) Williams, Vice President (Special Situations) of Chase Manhattan Bank.

Okonite is a client of Chase and its account is under the supervision of Mr. Earle Allen, Vice President, Commercial Department, handling all accounts in the states of New York and New Jersey, with the exception of New York City proper. Mr. Allen was brought into the meeting and today visited Mr. Albert F. Metz, Chairman of the Board of Okonite at the company's headquarters in Passaic. The purpose of the meeting was to discuss with Mr. Metz, as his banker, the recent publicity given to possibility of the sale of Okonite and to ascertain validity of these rumors.

Mr. Allen told Mr. Metz, who is a close personal friend of his, that another client of the Chase is in a position to discuss acquisition with Mr. Metz if management was seriously entertaining any thought of selling the company.

Mr. Metz very emphatically assured Mr. Allen that Okonite was not seeking an acquisition with any other company, that in his opinion rumors of this sort were cast forth more to stir up a little action. Although the company's sales had fallen off along with the rest of the industry and there had been abnormal break-in expenses in connection with the new plant they had acquired from Studebaker in New Brunswick, New Jersey, things were beginning to work out, the new plant was operating satisfactorily, and the company was in no way in need of acquiring financial strength through merger or any other way. He told Mr. Allen that if there is any change in management's thinking with respect to a possible sale or merger, he would certainly advise the Chase of this immediately and would be very glad to discuss this with the Chase at that time.

WCH:iz
cc—F. W. Ohles, R. E. Pierce.

(Copy)

[fol. 5812] Memorandum from Corporate Finance Department

June 23, 1958.

To: File
From: W. C. Huebner
Subject: Simplex Wire and Cable Company

An interview with John C. Toulmin, Senior Vice President of the First National Bank of Boston, was had Friday a.m., June 20. The meeting was arranged by F. W. Ohles through Donald L. Miller, Vice President, for the purpose of discussing Simplex Wire and Cable Co.

1st Boston is the banker for Simplex but, despite this, has relatively little information about either the company or its management. Everett Morss runs the company very tightly and does all the bank contact work himself. About nine months ago Toulmin suggested consideration of his estate problem and the need of establishing a market for the stock. At that time Morss was not interested.

Mr. Toulmin said that he would again contact Everett Morss on the desirability of obtaining a marketable security. If the reaction is favorable, he will then sound him out with respect to an exchange of stock with a good company. It is planned to do this the coming week (last in June) and advise me of the results.

Although Mr. Morss (age 58) is not now concerned about his estate, other members of the family are and this may have a bearing on Mr. Morss' outlook. Mr. Toulmin was advised of the confidentiality of our request and he agreed to respect it.

WCH:ah
cc—F. W. Ohles.

(Copy)

[fol. 5813] Memorandum from Corporate Finance Department

July 25, 1958.

To: File
From: Mr. W. C. Huebner
Subject: Triangle Conduit & Cable Corporation

On July 22nd I discussed over the phone with Schuyler Van Vechten, Director of Triangle, our interest on behalf of an unnamed client in the acquisition of Triangle. There was a Board meeting yesterday, July 24th, and Mr. Van Vechten brought this matter to the attention of the Board. He called this morning to give me the reaction of the Board.

It was unanimously decided not to pursue this possible acquisition. Incidentally, Van Vechten, who is Vice President of Lee Higginson Corporation, appears to be the only outside director on the Board. Both Mr. McAuliffe and Mr. Slater, Chairman and President respectively, are definitely not interested in being part of a large organization even though continuing to run Triangle as a subsidiary. The present management is very well satisfied with the company as it is now operating and much prefers to continue as an independent company.

After passing on this decision and reaction of the Board, Mr. Van Vechten went on to comment that the company sales for the first six months of 1958 were $26,000,000 vs. $28,000,000 for the first six months of 1957. Last year had been a very good year for the company with total sales of $56,300,000. However, a very good July and August are in prospect and the company expects to substantially better the 1957 results over the second half. Revenues for the full year 1958 are currently estimated by management at $65,000,000. The inference was given that Triangle could not hope to obtain a fair value for the company despite the favorable outlook during off year in the industry. Present book value of the stock is stated to be about $30,000,000 whereas management apparently feels it is worth $50,000,000. It may be that this wide discrepancy between management's thinking as to value and book value plays an important part in their reluctance to consider any merger possibility. I pointed

out to Mr. Van Vechten that we had participated in many merger and acquisition plans and that in all these fair value was the criterion for establishing terms rather than book value.

Although the Board had firmly refused any consideration of merging, Mr. Van Vechten thanked us for our interest in the company and said that he would definitely keep me informed of any change in management thinking.

WCH:es
cc:Messrs—F. W. Ohles, R. E. Pierce.

(Copy)

[fol. 5814] Memorandum from Corporate Finance Department

July 22, 1958

To: File
From: W. C. Huebner
Subject: Triangle Conduit & Cable Corporation

This company has had close banking ties with the Chase Manhattan Bank ever since its establishment in Brooklyn in 1916, although it is now located in New Brunswick, New Jersey. Mr. John R. Lynch, Assistant Treasurer, Borough Hall branch, has been the officer in charge of this account for Chase Manhattan. Mr. Joseph G. Slater who was recently made President of Triangle is a friend of Mr. Lynch who contacted him in connection with our interest as to the availability of Triangle for acquisition. Mr. Lynch informed Mr. Slater that he was making this inquiry on behalf of Ebasco Services.

Mr. Schuyler Van Vechten, Vice President, Lee Higginson Corporation, is also a Director of Triangle and we were referred to him by Mr. Slater via Mr. Lynch. Mr. Slater also advised Mr. Lynch that management was not interested at this time in selling the company. This morning I called Mr. Van Vechten and outlined for him generally the conditions under which it was proposed to acquire Triangle and the criteria laid down by our client in selecting a company for acquisition. These were:

—Competent management of high integrity.
—A well engineered product of high quality.
—Our client was not experienced in this field and it was essential that present management of Triangle would continue to run the company and be satisfied with any arrangement.
—Our client preferred that the acquisition be made through an exchange of stock.
—Our client is not looking to make a bargain acquisition. Wanted to arrange a fair deal for Triangle. However, it was essential that the deal be fair also to our client.

Mr. Van Vechten said it would be difficult to obtain any decision without knowledge of our client. He did agree, however, that it may be possible to determine if there was any interest on the general grounds outlined to the point of willing to discuss terms of a sale. At this point our client would be willing to disclose itself but for good reasons did not wish it known that it was seeking such a company until such time as it was necessary to do so.

Mr. Van Vechten indicated that 1958 sales would be on the order of $65,000,000 versus 1957 sales of $56,000,000 and inquired if our client was of sufficient size, say sales in excess of $100,000,000 a year, to be able to acquire Triangle. I told him that they were and its resources were sufficient to acquire Triangle for cash if such would seem necessary. Mr. Van Vechten opined that our client obviously was big enough.

There is to be a board meeting of Triangle on Thursday, July 24. Mr. Van Vechten will discuss this proposal at the board meeting and will advise me on Friday, July 25 as to reaction of the board.

WCH:iz
cc—F. W. Ohles, R. E. Pierce.

(Copy)

[fol. 5815] Memorandum from Corporate Finance Department

July 24, 1958.

To: File
From: Mr. W. C. Huebner
Subject: Walker Bros. of Conshohocken, Pa.

On May 27, 1958 Mr. John Rae visited his friend, Donald P. Horsey, Vice President of the Philadelphia National Bank and Manager of the Conshohocken branch, for the purpose of discussing Walker Bros., its management and the possibility that it might be available for acquisition. As a result of this meeting it appeared that an offer might be entertained by the owner-management. On July 10th I talked to Mr. Horsey more specifically and told him that a client of ours was definitely interested in acquisition through an exchange of stock of Walker Bros. Mr. Horsey is an outside director of Walker Bros. and has had a long business and personal association with the Company and the Walker family. He suggested that this matter be broached to the Board of Directors at the next meeting on July 22nd.

The decision of the Board was discussed with Mr. Horsey over the telephone today. In short, management is not now interested in any offer, no matter how favorable, involving the sale of the Company. Mr. Hervey S. Walker, Chairman of the Board, and his family are the sole shareholders of this Company. Despite the fact that he is 79 years of age he does not feel the need of establishing a market for his stock and feels that his estate is in good order. Mr. Horsey is of the opinion that this was a very firm refusal on the part of Mr. Walker but that other factors, such as any failing health on Mr. Walker's part, might change his viewpoint.

WCH:es
cc—Messrs F. W. Ohles, R. E. Pierce.

[fol. 5816] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 402

August 4, 1958.

Confidential and Personal
Mr. Philip T. Coffin, General Sales Manager
Aluminum Company of America
Alcoa Building
Pittsburgh 19, Pennsylvania

Dear Mr. Coffin:

Enclosed is a memorandum on the fifth of the six situations we were investigating.

Mr. Rudd said that he had read with interest the article in the New York Times with reference to possible acquisition of Okonite by Phelps-Dodge and also rumors to the effect that Kaiser and possibly Reynolds were interested in Okonite. In his own mind he may be associating the bank's approach to him with one of these companies.

Sincerely yours, Walter C. Huebner, Assistant Manager.

WCH:iz
Encl.
bc—F. W. Ohles, R. E. Pierce.

[fol. 5817] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 403

cc—Messrs F. W. Obles/W. C. Huebner

Confidential

January 9, 1959.

Memorandum from
Corporate Finance Department

To: F. C. Gardner
From: R. L. Schlesinger
Subject: Summary of Alcoa Assignment

On May 19, 1958, the Aluminum Company of America asked for assistance in acquiring a company in the utility electric cable field. The Alcoa officials who came to New York and made the request were Ralph V. Davies, Vice President, Director and General Sales Manager, and Phil Coffin, Manager of the Utilities Sales Division. Later, in Pittsburgh, Frank L. Magee, President, and Matt Stanley, Assistant Treasurer were met also.

Certain criteria were laid down to guide our investigation:

Company must serve the utility industry
Product line be well engineered
Quality of production of high standard
Management must be compatible with Alcoa's, capable and of high integrity
Management to remain with company
Prefer acquisition through an exchange of stock and must obtain control, preferably 100%
If possible, location to be near Ohio River
Not interested in companies already affiliated with other primary metal producers

Phase I—Industry Pattern

The industry was studied to determine the companies engaged in this business and their relative position. There are about 120 companies in the field, including many subsidiaries and divisions of integrated metal companies.

Phase II—Selective Study

Upon completion of Phase I, a meeting was held with the client and a group of companies was selected for further review. Analysis was made in particular to determine their reputation as to technical ability and quality of management, financial position, and general availability. These companies were, in order of preference by Alcoa:

1. Okonite Company
2. Simplex Wire & Cable Co.
3. Triangle Conduit & Cable Corp.
4. Walker Brothers
5. Kerite Company
6. Crescent Insulated Wire & Cable Co.

Most of the other companies in the field, other than Rome Cable and General Cable, were either very small, divisions of integrated companies, or did not possess attractive fea- [fol. 5818] tures. Rome Cable was not included in the list because Alcoa had contacted it in October 1957. General Cable was also excluded because Alcoa was familiar with their management troubles and was averse to acquiring this headache.

Phase III—Approach

Okonite was selected for first approach. A. F. Metz, Chairman of the Board, was contacted. After considerable delay due to his nonavailability and other reasons, Metz agreed to a tentative meeting in late September of last year. Shortly prior to the meeting, it was announced that Kennecott was to acquire Okonite and this subsequently occurred. We believe that Okonite had an understanding with Kennecott while Metz was having telephone discussions with us.

Meanwhile our discussions with board members and bankers of the other companies had indicated lack of interest. Alcoa had acquisition discussions with Rome in 1957. They have recently been resumed. We have been in frequent contact with Alcoa during the current negotiations, and have furnished our preliminary views as to relative values and recommended course of action.

The death of the principal stockholder of Walker Broth-

ers of Conshohocken, Pa., occurred late last Fall. In December, we had discreet discussions with the trustee of the estate. Considerable time will have to elapse before further interest is developed.

We are in process of a second approach to Simplex of Cambridge, Mass. through the First National Bank of Boston. In the first approach Simplex was not aware of Ebasco's interest and John Toulmin, Senior Vice President of the bank simply discussed the possible sale of the Company with Everett Morss as a friend and banker.

At no time during any of our probing or discussing have we indicated that we represent Alcoa.

RLS:ac

[fol. 5819] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 405

Memorandum from
Corporate Finance Department

August 12, 1958.

To: W. C. Huebner
From: R. L. Schlesinger
Subject: MEFA

Mr. Philip Coffin telephoned concerning the item in the Wall Street Journal today indicating that Okonite and Kennecott are close to a share for share stock swap. Coffin indicated that, while it, of course, might only be a rumor, they were very surprised and even shocked to read it. He would like Okonite to know that before they make any final move, Coffin's company would like to sit down and talk with Metz and his associates concerning this matter. They believe that their diversity of interests and products offer considerable to Okonite.

Coffin suggested that we contact Chase Manhattan to relay this on to Okonite.

Earle Allen, Vice President—Commercial Department of Chase, was on vacation so spoke to Rex Williams and Wal-

ter Dahmer. They promised to contact Metz of Okonite immediately and to report back to us no later than tomorrow morning.

RLS:iz
cc—F. W. Ohles

[fol. 5820] In United States District Court

Plaintiff's Exhibit 406

Memorandum from
Corporate Finance Department

October 17, 1958.

To: File
From: Mr. R. L. Schlesinger
Subject: Triangle Conduit & Cable Co., Inc.

Telephoned Mr. Davies of Alcoa today and gave him our views and steps taken concerning Triangle in the light of the Okonite acquisition by Kennecott.

On a previous contact with Triangle through Mr. Van Vechten, a Director of Triangle and a partner of Lee Higginson, we have been advised that Triangle was not interested in joining an integrated company (or any other company). Van Vechten was contacted by Mr. Huebner today to generally discuss the matter again. Van Vechten indicated that there might be some slightly increased interest on the part of Triangle but was not at all sure and would bring the matter up at a Board meeting which would be held before the end of October.

It was suggested to Mr. Davies that Mr. Huebner and myself visit McAuliffe and Slater, Chairman and President respectively of Triangle, at New Brunswick, N. J. to discuss the matter with them. This would be done after we are advised of the Board's views as indicated during their meeting this month. Van Vechten promised to telephone us after the meeting and prior to his departure for Europe around the 1st of November.

Davies agreed that it would be desirable for us to visit

the Triangle people. In the meantime he is expecting a visit on October 20 from representatives of Rome Cable basically on another matter but expects to discuss this same area of interest during the meeting. I mentioned to Davies that there would seem to be no objection in pursuing both companies at the same time and he agreed. I mentioned to Davies that in view of Alcoa's past problems with Rome that an independent study by Ebasco or some other firm might be desirable to speed any possible progress. Emphasized to Davies that this suggestion was by no means a promotional effort.

The way the matter stands now seems to involve a visit by Ebasco representatives to Triangle, if they are willing, sometime around November 1. Davies was advised that there might be a gap of some ten days before he hears from us again.

RLS:es

[fol. 5821] Triangle

Gold, Sec.	36,000
Hohl V.P.	26,000
Mc Auliffe, Chairman	216,000
Mc Kay, V.P.	4,100
Menger, V.P.	250
Slater, J. G., Pres.	24,000
Slater, J. M. Treas.	206
Van Vechten, Director	200
	306,756 (22.6%)
Total outst—about	1,359,000

[fol. 5822] Stock Ownership Information—Triangle Conduit and Cable

E. C. Gold—Secretary & Director
As of 1/2/58 owned 35,600 shares
As of 11/57 owned 31,000 shares
As of 1/2/58 gift of 400 shares to relatives
Henry D. Hohl—Vice Pres. (Prod.) & Director
As of 11/57 owned 25,940 shares
John E. McAuliffe—President & Director
As of 11/57 owned 216,100 shares
Clyde V. McKay—Vice Pres. & Asst. to Pres.
As of 11/57 owned 4,100 shares
Carl S. Menger—Vice Pres. (Sales)
As of 11/57 owned 250 shares
Joseph G. Slater—Exec. V. P., Treas. & Director
As of 11/57 owned 24,000 shares
J. M. Slater—Treasurer
As of 5/6/58 owned 206 shares

[fol. 5823]

Schuyler Van Vechten—Director (c/o Lee Higginson)
As of 11/57 owned 200 shares

[fol. 5824] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 408

cc F. W. Ohles/W. C. Huebner

October 29, 1958.

Memorandum from
Corporate Finance Department

To: File
From: R. L. Schlesinger
Subject: Rome Cable Corporation

Mr. Davies of Alcoa telephoned after his meeting today with Herbert Dyett of Rome Cable to advise us of what transpired at the meeting. Dyett is prepared to accept 8/10ths of a share for each share of Rome stock. He is leaving for Florida and would like Alcoa's views telephoned to him down there. Told Davies that in our judgment Dyett's offer was outside of any range of reasonableness. Davies said he was returning to Pittsburgh this afternoon and he would appreciate learning our progress on Triangle. Told him I would contact him as soon as possible and that in the meantime we would work up some figures on the Rome matter.

October 30, 1958.

W. C. Huebner received a phone call from Van Vechten, Director of Triangle. Van Vechten indicated that our approach to Triangle had been discussed at length at Triangle's Board of Directors meeting on Oct. 28. Triangle again indicated their lack of interest in this matter. Their confidence in their own future was indicated in the extra dividend (5¢) declared at the Board meeting.

Telephoned Davies and reported the status of the Triangle matter. Mentioned that although it is indicated that a further move in that direction in their behalf was inadvisable, it would not necessarily completely close it out indefinitely.

Discussed Rome matter again. Suggested that he give Dyett a fast answer indicating lack of interest in the 8/10ths offer but willingness to consider a reasonable offer. Davies

agreed completely and said he would telephone Dyett in Florida tomorrow. Davies believes Dyett's offer is a firm one and not subject to negotiation. Replied to him that he would have to be the best judge of this since he dealt with Dyett in person but it did seem to us that Dyett was maneuvering for at least the offer made by Alcoa a year ago (322,000 shares of Alcoa). Told Davies that based on the quick look we had made, in our judgment their previous offer was generous. Mentioned that of course we did not consider possible benefits to Alcoa through acquisition. Davies seemed to agree that their last offer was on the generous side.

Told Davies we had briefly looked into the matter from the standpoint of an offer ranging from 4/10th to 8/10th of a share. Within this range and using a price of 85 for Alcoa with 558,000 shares of Rome common stock outstanding, the following data were obtained:

[fol. 5825]

	Exchange Bases				
	.4	.5	.6	.7	.8
Shares Alcoa Issued (000)	223	279	335	391	446
Value @ 85 ($000)	18,955	23,715	28,475	33,235	37,910
Value pres. sh. Rome ($)	33.97	42.50	51.03	59.56	67.94
Return on Investment at $2 million earn. of Rome (%)	10.6	8.4	7.0	6.0	5.3
Alcoa div. requirement @ $1.20	268	335	402	469	535

Suggested to Davies that we approach Walker Bros. and Kerite in that order although both indicated lack of interest on previous contacts. Davies approved of this.

W. C. Huebner contacted Donald P. Horsey of the Philadelphia National Bank, the one outside director of Walker Bros. Horsey advised that Hervey Walker, Chairman of the Board of Walker Bros. and largest stockholder, had just died and that Horsey was named one of the trustees of his estate. He indicated that there probably would be no interest in any possible acquisition by another company—at least not for two years. He indicated further that Walker's estate was liquid and furthermore there are competent people running the company. This last development has not yet been reported to Mr. Davies.

RLS:ah

This report is mandatory under authority of the Defense Production Act of 1950, as Amended.

BUDGET BUREAU NO. 41-R1621.4
APPROVAL EXPIRES DECEMBER 31, 1960

Form BDSAF-122
(1-7-9)
R

Report for month of

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
and
BUSINESS AND DEFENSE SERVICES ADMINISTRATION

(Please correct if name or address has changed)
Form BDSAF-122

ALUMINUM PRODUCERS AND IMPORTERS
MONTHLY REPORT OF RECEIPTS, SHIPMENTS, AND STOCKS

TO: Bureau of the Census, Washington 25, D.C.
ATTN: Industry Division

GENERAL INSTRUCTIONS

Two (2) copies of this report shall be filed at the above address each month, not later than the tenth (10th) day following the month covered by the report, by: integrated producers; non-integrated producers; smelters; other producers of secondary ingot, including reclaimers producing deoxidizing and chemical grades, and foundries which purchase and melt scrap; importers; foil fabricators; powder manufacturers; and forging companies. Distributors are not required to file this form. A report need not be filed for any month in which the total shipments are less than 10,000 pounds. In such case, please indicate by checking in the box following this paragraph and return the form without completing.

☐ Less than 10,000 pounds.

SPECIFIC INSTRUCTIONS

Section I - TOTAL RECEIPTS AND SHIPMENTS

Columns (c) and (d) - Receipts
Producers should report in thousands of pounds the weight of products listed in Column (a) which was received from imports and from other sources, separately, for use in producing products listed. Report metal actually received, including metal received under toll arrangements. If you operate both as a producer and as a distributor, receipts for resale should be excluded. Smelters should not include ingot from reclaimers as receipts of ingot. Smelters producing non-aluminum-base alloys, e.g. zinc-base, should not include as receipts the pig or ingot used in producing such alloys.

Column (e) - Shipments
Report in thousands of pounds the weight of products in Column (a) shipped to all customers, including shipments to outside companies and companies in which you have an interest; shipments within your company for fabrication beyond the shapes listed in Column (a); and shipments made under toll arrangements. Do not include shipments to GSA in Section I; but report these as a separate item in Section II. If you operate both as a producer and as a distributor, omit shippents of shapes purchased for resale. Report the product shipped in its most advanced form as listed in Column (a). Do not report as a shipment the stock you produce which is required to produce that product, for example, a company making both redraw rod and wire should report wire out not the redraw rod from which the wire was produced. A company making both forging stock and forgings should report forgings as shipments but not the stock from which the forgings were produced. Foundries purchasing and melting scrap should report as shipments the ingot equivalent of scrap purchased and used in the foundry operation.

Section II - SHIPMENTS ON RATED ORDERS

Columns (a) and (b) - Products and Product Code
Report product codes and designations of products shipped on rated orders, according to list in Section I. Companies supplying metal to foil producers, powder manufacturers and forging plants for military orders should not report rated shipments of such metal as A-E orders but as AF, AP, and Forging Stock orders, respectively; foil producers, powder manufacturers and forging plants will report rated shipments of their products as A-E orders.

Column (c) - Allotment Symbols
Show the allotment symbols (A-1 and 1-digit and AN numbers) used by your customers in placing orders against which you have shipped during the month. AN 9000 is the symbol used by distributors in replacing in inventory material shipped by them on rated orders. Show shipments to GSA as a separate item.

Column (d) - Shipments
Report the weight in thousands of pounds of each product shipped against individual ratings.

Section III - INVENTORIES OF SCRAP, PRIMARY PIG AND INGOT, AND SECONDARY INGOT

Report weight in thousands of pounds of inventories at end of month of (1) purchased scrap or scrap received on toll including ingot received from reclaimers, (2) primary pig and ingot, unremelted, (3) secondary ingot, including toll, unremelted.

Certification - The undersigned company and the official executing this certification on its behalf hereby certify that the information contained in this report is correct and complete to the best of their knowledge and belief.

Name of company | Signature of authorized official

Date | Title

The U. S. Code, Title 18 (Crimes and Criminal Procedure), Section 1001, formerly Section 80, makes it a criminal offense to make a wilfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction. The individual company information reported on this form is for use in defense mobilization activities. The unauthorized publication or disclosure of individual company information is prohibited by law, and persons having access to such information are subject to fine and imprisonment for unauthorized disclosure.

USCOMM-DC 6700-P

Section I - TOTAL RECEIPTS AND SHIPMENTS (*Report in thousands of pounds*) [1]

Product (a)	Product code (b)	Receipts from imports [2] (c)	Other receipts (d)	Shipments (e)
Extrusion ingot (billet)	130			
Other primary pig, ingot, and molten metal	120			
Other secondary ingot	110			
Sheet and plate (.006" and over)				
Non heat-treatable	011			
Heat-treatable	012			
Foil (under .006"), including foil in lamination	020			
Rolled and continuous cast, rod and bar [3]	030			
Wire, bare, conductor and nonconductor	040			
ACSR and aluminum cable, bare	050			
Wire and cable, insulated or covered	055			
Rolled structural shapes	060			
Extruded shapes, alloys other than 2,000 and 7,000 series	071			
Extruded shapes, alloys in 2,000 and 7,000 series	072			
Drawn tube, alloys other than 2,000 and 7,000 series	073			
Drawn tube, alloys in 2,000 and 7,000 series	074			
Welded tube, non-heat-treatable	075			
Welded tube, heat-treatable	076			
Powder and paste				
Atomized	100			
Flaked	101			
Paste	102			
Forgings (including impact extrusions)	150			

[1] Report aluminum and aluminum alloy content only.
[2] Report only imports made through regular importers.
[3] 3/8" and over, maximum diameter across flats.

Section II - SHIPMENTS ON RATED ORDERS (*If more space is required, report on blank pages and attach.*)

Product (a)	Product code (b)	Allotment symbols (c)	Shipments (*Thousands of pounds*) (d)

Section III - INVENTORIES OF SCRAP, PRIMARY PIG AND INGOT, AND SECONDARY INGOT (as of end of month)

Item No.	Item	Amount (*Thousands of pounds*)
[illegible]	Scrap (purchased or received on toll including ingot received from reclaimers)	
[illegible]	Primary pig and ingot, unremelted	
[illegible]	Secondary ingot	

Company

Name and title of official to be contacted | Telephone No. | Date

Form [illegible]-123 (1-7-59)

USCOMM-DC 8700-P

[fol. 3828] IN UNITED STATES DISTRICT COURT

2643

PLAINTIFF'S EXHIBIT 410

Form approved Budget Bureau No. 41-R1503.7

This report is required under Section 705 of the Defense Production Act of 1950, as amended.

Report for quarter of

FORM BDSAF-84
(2-15-52)

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
COLLECTING AND COMPILING AGENT FOR
BUSINESS AND DEFENSE SERVICES ADMINISTRATION

COPPER CONTROLLED MATERIALS
PRODUCERS PROGRAM REPORT
BRASS MILLS AND COPPER WIRE MILLS

Name and address of company (Street, City, Zone, State)
(Please correct if name or address has changed)
Form BDSAF-84

RETAIN THIS FILE COPY

TO: Bureau of the Census, Washington 25, D.C.
ATTN: Industry Division, Ref: BDSAF-84

INSTRUCTIONS

File in duplicate with the above address not later than the 15th of the month following the quarter of report. Report all weights in thousands of pounds (000 omitted). Show total metal weight for all products, except for copper wire mill products, which are to be reported in copper content. Companies having both brass mill and wire mill operations will file a separate report for each operation. Please read instructions attached to "File Copy" before preparing this form.

Type of operation (Check one) ☐ Copper wire mill ☐ Brass mill

Section 1 - COPPER AND COPPER-BASE ALLOY CONTROLLED MATERIALS SHIPMENTS AND UNFILLED ORDERS
Report all figures in thousands of pounds - metal weight (Copper content for wire mill products)

Item No.	Item (a)	Product Code	Leave blank (For BDSA Use Only)	SHIPMENTS	DELIVERY ORDERS Total (b)	Other than ACM (c)	ACM (d)
1	Total copper wire mill products (Sum of items 1a, b and c)	70					
1a	Wire, uninsulated, bare, tinned, and/or alloy coated	71					
1b	Insulated wire and cable Communication wire and cable	74					
1c	Other insulated wire and cable	76					
2	Total brass mill products (Sum of items 3 through 9)	05					
3	Copper-base alloy Sheet	10					
4	Military cups and discs	15					
5	Rod	20					
6	Tube	30					
7	Unalloyed Sheet	40					
8	Rod	50					
9	Tube	60					
10	Unfilled orders						

Please complete form and sign certification on reverse

USCOMM-DC 7080-P&C

[fol. 5829]

Section II - AUTHORIZED CONTROLLED MATERIALS SHIPMENTS BY DMS ALLOTMENT NUMBER

Report all figures in thousands of pounds - metal weight - *(Copper content for wire mill products)*

Item No.	Allotment number	Code	Copper wire mill products (70)	BRASS MILL PRODUCTS						
				Alloy				Unalloyed		
				Sheet (10)	Military cups and discs (15)	Rod (20)	Tube (30)	Sheet (40)	Rod (50)	Tube (60)
11	A-1.....	3011								
12	A-2.....	3012								
13	A-3.....	3013								
14	A-6.....	3016								
15	A-7.....	3017								
16	All other "A" series allotment numbers	3019								
17	Total A series *(Sum of Items 11 through 16)*	3010								
18	Total B series	3020								
19	Total C series	3030								
20	Total D series	3040								
21	Total E series	3050								
22	For BDSA Use									

Remarks

Certification - The undersigned company and the official executing this certification on its behalf, hereby certify that the information contained in this application or report is correct and complete to the best of their knowledge and belief.

Name of company — By — Signature of authorized official

Date — Title

The U.S. Code, Title 18 (Crimes and Criminal Procedure), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction. The individual company information reported on this form is for use in defense mobilization activities. The unauthorized publication or disclosure of individual company information is prohibited by law, and persons having access to such information are subject to fine and imprisonment for unauthorized disclosure.

[fol. 3830]

GENERAL INSTRUCTIONS

This report is required under the authority of Section 705 of the Defense Production Act of 1950, as amended.

1. Brass mills whose average monthly shipments of brass mill products (excluding shipments of intermediate shapes) was more than 200,000 pounds (metal weight) during the last six months of 1952 and copper wire mills whose average monthly shipment of copper wire mill products (excluding shipments of intermediate shapes) was more than 100,000 pounds (copper content) during the last six months of 1952 shall file a report on this form in *duplicate (2)* by the *15th* of the month following the period of report with the Bureau of the Census, Washington 25, D.C., Industry Division, REF: BDSAP-84.

2. This form shall be filed for each calendar quarter. The period of report is the calendar quarter just completed.

3. Shipments - Include all controlled materials orders shipped: by you for your own account; by other copper controlled materials producers for your account; or by you under toll arrangements for the account of controlled materials consumers. Include transfer of finished products from your company's mill to its fabricating plant(s). Exclude from this report actual shipments of controlled materials on toll basis to other producers of controlled materials. Also exclude transfer of products from your company's mill to mill stocks located elsewhere, for example, at depots. Include, however, shipments from your mill stocks at depots and warehouses to customers.

4. Unfilled Orders - Include all delivery orders for controlled materials (finished copper-base mill products as shown in paragraph 9 below) that have been accepted or acknowledged and have been scheduled for future production or delivery and for which controlled materials have not been shipped as of the close of business on the last day of the period covered by this report.

5. Unless otherwise directed by the Copper Division, companies operating more than one plant may file separate reports covering the operations of each plant, or may file a consolidated report covering all of their plants. Do not file both ways. If a company operates more than one plant, indicate under "name of company" on the report whether it is "individual" or "consolidated." Companies operating more than one plant are requested not to change method of filing without prior approval of the Copper Division.

6. Check (✓) in the space provided on the form the type of operation performed by your company.

7. In reporting weights, show total metal weight for all brass mill products; show copper content for wire mill products. Report all weights in thousands of pounds to the nearest thousand (000 omitted). *Example:* 6,849 as 7; 6,499 as 6; 720 as 1; amounts less than 500 pounds require no entry.

8. Do not include in this report copper raw materials, or brass mill or copper wire mill intermediate shapes. Include only brass mill products (including anodes, rolled, forged, or sheared from cathodes) and copper wire mill products, as listed in paragraph 9 below.

9. Separate information should be filed for each copper or copper-base alloy product that you produce. The following categories are classed as products for the purpose of this report.

Wire mill:
- a. Copper wire mill products.
  - Wire, uninsulated, bare, tinned, and/or alloy coated.
  - Insulated wire and cable:
    - Communication wire and cable.
    - Other insulated wire and cable.

Brass mill:
- a. Copper-base alloy sheet, plate, rolls, and strip, including anodes; but excluding strip for capping and discing for military ammunition.
- b. Military ammunition cups and discs, brass (net weight).
- c. Copper-base alloy rod, bar, wire, and shapes.
- d. Copper-base alloy pipe and seamless tubing.
- e. Unalloyed copper sheet, plate, rolls, and strip, including anodes.
- f. Unalloyed copper rod, bar, wire, and shapes, including anodes; but excluding copper wire mill products.
- g. Unalloyed copper pipe and seamless tubing.

Abbreviated classifications appear on the Form as follows:

Brass mill:
- a. Alloy sheet.
- b. Military cups and discs.
- c. Alloy rod.
- d. Alloy tube.
- e. Unalloyed sheet.
- f. Unalloyed rod.
- g. Unalloyed tube.

SPECIFIC INSTRUCTIONS

SECTION I

SHIPMENTS - Delivery Orders

Column (b) - Total. - Report in this column for items 1 through 9 the sums of items in columns (c) and (d). These sums represent the total shipments made on Authorized Controlled Materials orders and on delivery orders other than Authorized Controlled Materials orders during the period of report in accordance with the classification of copper-base mill products in column (a).

Column (c) - Other than ACM Delivery Orders. Report in this column for items 1 through 9 all shipments made on non-ACM orders for copper and copper-base alloy controlled materials.

Column (d) - ACM Delivery Orders. Report in this column for items 1 through 9 the totals of all Authorized Controlled Materials shipments against DMS allotment numbers extended to you by your customers, by toll consumers of controlled materials and by distributors. Do not include orders that have been cancelled. Entries in this column for items 1 and items 3 through 9 shall be the totals for all data for allotment numbers for each "Product" in Section II.

Items 1 through 9 - Enter data on the appropriate lines according to the classification of mill products shipped. Brass mills will enter for item 2 the sum of data reported for items 3 through 9.

UNFILLED ORDERS - Delivery Orders

Item 10 - Unfilled Orders - Report on this line all delivery orders for controlled materials (finished copper-base mill products as shown in paragraph 9 under General Instructions) that have been accepted or acknowledged and have been scheduled for future production or delivery and for which controlled materials have not been shipped as of the close of business on the last day of the period covered by this report.

Column (b) - Total. Report in this column for item 10 the sum of data in columns (c) and (d).

Column (c) - Other than ACM Delivery Orders. Report delivery orders other than Authorized Controlled Materials delivery orders, that have been accepted or acknowledged and have been scheduled for future production or delivery and for which controlled materials have not been shipped as of the close of business on the last day of the period covered by this report.

Column (d) - ACM Delivery Orders. Report in this column for item 10 all ACM delivery orders that have been accepted or acknowledged and have been scheduled for future production or delivery and for which controlled materials have not been shipped as of the close of business on the last day of the period covered by this report.

SECTION II

1. Report in this section Authorized Controlled Materials Shipments. Enter opposite each allotment number in the appropriate "Product" column the total of all shipments of the "Product" bearing that allotment number.

2. ACM shipments bearing program identification symbols A,B,C,D, and E should be totaled for each "Product" and entered for appropriate items in column (d), Section I.

NOTE: You should not receive nor report those ratings with a DO prefix, such as DO-A-1. The DO prefixed rating applies to orders for products and materials other than controlled materials (see DMS Regulation No. 1.) DMS means Defense Materials System.

Plaintiff's Exhibit 421a
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
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ALUMINA AND BAUXITE

BY R. C. WILMOT

a chapter from

MINERAL FACTS AND PROBLEMS, 1960 EDITION

[fol. 5832]

UNITED STATES DEPARTMENT OF THE INTERIOR • Fred A. Seaton, Secretary

BUREAU OF MINES • Marling J. Ankeny, Director

This publication is a chapter from Bulletin 585, MINERAL FACTS AND PROBLEMS, 1960 edition. The complete volume, covering all mineral commodities, may be purchased from the Superintendent of Documents, Washington 25, D.C. at a date to be announced later.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. - Price 10 cents

[Vol. 5833]

ALUMINA AND BAUXITE

By R. C. Wilmot[1]

ALUMINA (Al_2O_3), the raw material for producing aluminum, comprises one-seventh of the earth's crust. Although bauxite is the only commercial ore of alumina, other potential sources of alumina are almost unlimited.

SUMMARY

World consumption of alumina in 1958 was estimated at 8 million tons; nearly 57 percent was consumed in North America and 38 percent in Europe. The consumption of alumina in the United States in 1958 was about 3.9 million tons, and by 1975 annual consumption may be 12 million tons.

World bauxite production in 1958 was estimated at 20.7 million tons, of which 57 percent was produced in the Western Hemisphere. Over 90 percent of the bauxite consumed in the United States is used in alumina production and the remainder by abrasive, chemical, refractory, and other industries. Bauxite consumption in the United States was 7 million tons in 1958 and by 1975 consumption may be 25 million tons.

Although the United States produces essentially all of its alumina requirements and is the world's largest consumer of bauxite, less than 20 percent of its bauxite requirement is produced domestically. The domestic bauxite reserve, which occurs mainly in Arkansas, is estimated at 50 million tons averaging about 52 percent Al_2O_3. The reserve is too small to permit production to be expanded significantly. The total world reserve of bauxite at the end of 1958 was estimated at 3.2 billion tons, with the largest deposits in Guinea, Australia, Jamaica, Hungary, Ghana, and Surinam.

As a result of improvements in technology it has been possible to reduce the grade of ore used in alumina plants. In 1930 ores used in the United States averaged 60 percent alumina, but by 1958 ore averaging as little as 50 percent alumina was being used. The average grade of ore treated will probably continue to decrease gradually, and successful application of processes now being tested would result in some plants using materials containing less than 35 percent alumina.

Bauxite, an ore containing hydrated aluminum oxide minerals such as gibbsite, boehmite, or diaspore, is formed by weathering processes acting on alumina-bearing rocks. The largest deposits occur in tropical or subtropical climates and are at or near the surface. Most bauxite is mined by open-pit methods, but bauxite is also recovered by underground mining methods in the United States and in Europe.

Assurance of an adequate and dependable long-range supply of alumina requires discovery of new sources and the solution of numerous mining and metallurgical problems. A challenging problem is the development of a commercial process for producing alumina from domestic low-grade materials. Problems of the Bayer process include the need to improve its efficiency and development of methods for utilizing tailings. There is insufficient information on quantity, grade, and type of potential alumina resources, and exploration is handicapped by lack of a rapid method of analyzing for alumina. Mechanical beneficiation of low-grade bauxites is hampered by the high loss of alumina in removing iron and silica.

[1] Commodity specialist.

536452—60

BACKGROUND

SIZE, ORGANIZATION, AND GEOGRAPHIC DISTRIBUTION OF THE INDUSTRY

World alumina consumption in 1958 was estimated at about 8 million tons, of which 40 percent was consumed in the United States, 38 percent in Europe, and 17 percent in Canada. Usually, alumina plants are in or near the consuming country. Most alumina production facilities of the world are owned by aluminum producing companies.

World bauxite production in 1958 was estimated at 20.7 million tons, of which 57 percent was produced in the Western Hemisphere. Major producing countries in the Western Hemisphere are Surinam, British Guiana, and Jamaica. Production was begun in Jamaica in 1952, and by 1957 that country was the world's leading producer with an output of 4.6 million tons.

The capacity and location of the United States alumina plants, their sources of bauxite, and the aluminum plants that consume most of the alumina production are shown in figure 1. Approximately 95 percent of alumina shipments in 1958 went to the aluminum industry; the remainder was shipped to abrasive, refractory, chemical, or other plants. Harvey Aluminum, Inc., when in full production, will import about 100,000 short tons of alumina a year from Japan.

Six alumina plants used about 93 percent of the bauxite consumed in 1958. The remaining 7 percent was consumed by about 150 widely distributed companies for abrasive, refractory, chemical, and other uses. Three of the four alumina producers are vertically integrated from the mine through production of semifabricated aluminum. The fourth company uses bauxite purchased from a foreign source. In 1958 six independent companies produced bauxite in the United States on a small scale, mainly for specialty uses. All ore from Alabama and Georgia, some from Arkansas, and part of the South American imports, which total approximately 600,000 tons a year, is consumed directly in the form of bauxite without passing through an intermediate alumina production stage.

Bauxite exports represented less than 1 percent of the new supply.

DEFINITION OF TERMS, GRADES, AND SPECIFICATIONS

Alumina is aluminum oxide, Al_2O_3, prepared by calcining $Al_2O_3 \cdot 3H_2O$ at approximately 2,000° F. Naturally occurring forms include corundum, emery, ruby, and sapphire. In the commercial form it is a fine white powder containing about 0.5 percent impurities. A typical analysis of alumina used in the production of aluminum follows:

Chemical composition:	Percent
Silica (SiO_2)	0.02
Iron Oxide (Fe_2O_3)	.02
Titanium dioxide (TiO_2)	.008
Phosphorus pentoxide (P_2O_5)	Nil
Potash (K_2O)	Nil
Sulphur trioxide (SO_3)	Nil
Soda (Na_2O)	.45
Calcium oxide (CaO)	.02
Lead (Pb)	Nil
Alumina (Al_2O_3)	Bal.
Ignition loss and water absorption:	
Loss on ignition (1,000° C.)	2.67
Water absorption (loss dry-basis)	3.16
Screen analysis (Tyler mesh):	
+48	Nil
−48+100	.5
−100+200	53.5
−200	46.0
−325 (wet on original sample)	12.0

Activated alumina is a highly porous and granular form of aluminum oxide having preferential adsorptive capacity for moisture from gases, vapors, and some liquids. When saturated, it can be reactivated by the controlled application of heat within the temperate range of 350° to 600° F. to drive off the moisture. It is used as a drying agent, catalyst, or catalyst carrier.

Tabular alumina, also Al_2O_3, is prepared by heating $Al_2O_3 \cdot 3H_2O$ to slightly below the fusion point of alumina (3,700° F.). It is used in refractories, in insulators, and as a filler in plastics.

Bauxite is the term used for ores containing monohydrate or trihydrate aluminum oxide minerals, used primarily in the production of alumina. Most of the aluminum oxide (Al_2O_3) is present as gibbsite, boehmite, or diaspore. Major impurities in the ore are iron oxides, aluminum silicates, and titanium oxides.

There are three types of bauxite. The Surinam or trihydrate type is mainly gibbsite ($Al_2O_3 \cdot 3H_2O$) and usually contains 50 percent or more alumina, 2 to 15 percent silica, and 5 to 15 percent iron oxide. The European or monohydrate ($Al_2O_3 \cdot H_2O$) type is composed of boehmite or diaspore. A typical European-type ore analyzes 55 percent alumina, 4 percent silica, and 10 to 20 percent iron oxide. The Jamaica or mixed type is a mixture of monohydrate and trihydrate minerals. It contains about 50 percent alumina, 1 to 2 percent silica, and 20 to 30 percent iron oxide.

Crude bauxite, or bauxite as mined, contains amounts of free moisture ranging commonly from 5 to 25 percent and, in domestic ores, averaging about 15 percent.

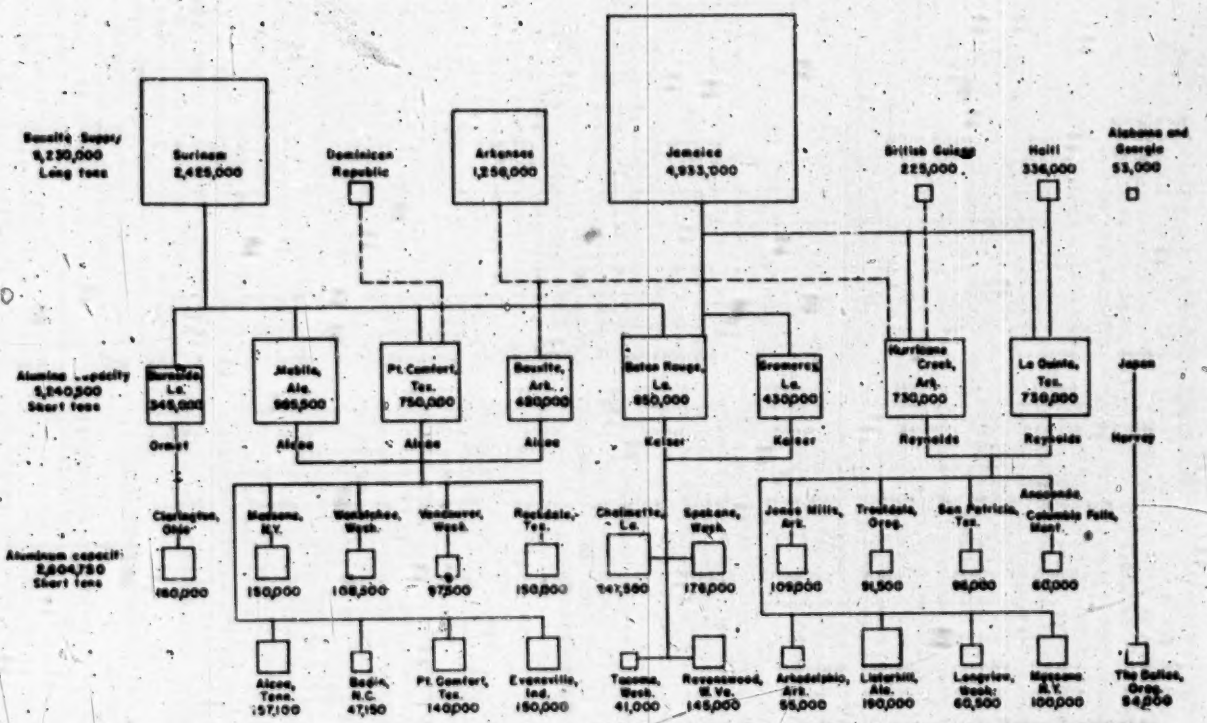

FIGURE 1.—Bauxite Supply and Alumina- and Aluminum-Plant Capacities in the United States in 1958 (Includes Plants Under Construction).

Bauxite specifications vary with plant and ultimate use. Table 1 gives the chemical analyses of bauxites used by the metallurgical, abrasive, chemical, and refractory industries. National stockpile specifications for all grades except chemical have been established (*3*).[1]

TABLE 1.—*Chemical analysis of typical bauxites by grade*

[Percent]

Grade	Al_2O_3	SiO_2	Fe_2O_3	TiO_2
Metallurgical	85-88	5-15	4-20	
Abrasive	Min. 85	Max. 5	Max. 6	Min. 2.5
Chemical	Min. 85-88	Max. 5-12	Max. 2	
Refractory	Min. 85-91	Max. 1.5-4.5	Max. 3	Max. 2.5

[1] Most of the remainder represents water of crystallization.

Red mud, the residue that results after alumina is extracted from bauxite by the Bayer process, consists largely of a complex sodium aluminum silicate and iron oxides. In the combination process the red mud is the feed to a subsequent lime-soda sinter step. The residue from the combination process is called brown mud or sinter mud and contains calcium silicates and iron oxides but little sodium aluminum silicate.

TECHNOLOGY

GEOLOGY AND EXPLORATION (*7*)

The commercial production of alumina is derived almost entirely from the hydrated oxides of aluminum contained in bauxite. Potential nonbauxitic sources are the aluminum sulfates such as alunite formed from hydrothermal solutions; the aluminum silicates such as the feldspars formed by igneous intrusions the aluminum silicates such as the andalusite-sillimanite series formed in schist belts by metamorphism; and the hydrated aluminum silicates such as clay formed in beds by the processes of weathering and sedimentation.

Bauxite is formed by the weathering of alumina-bearing materials such as feldspars or clays. Ideal conditions, most likely to occur in wet tropical or subtropical climates, are nearly continual rainfall, constant warm temperatures, and relatively good drainage over a long period of time (*1, 16*). The formation of hydrated aluminum silicates or hydrated aluminum oxides is strongly influenced by the degree of acidity or alkalinity of the weathering solutions. The Arkansas bauxite deposits were formed by weathering of nepheline syenite intrusions during the period between the formation of the Midway marine clays and the deposition of the Saline formation of the Wilcox group of continental sediments. Some later transported deposits were formed in the unconsolidated clays and sands near the syenite stocks.

Bauxite forms on a wide variety of rocks. European and Jamaican bauxites are frequently found in the sinkholes on the erosion surfaces of limestones. Indian bauxites are associated with basalts, and the bauxites of Western Africa and the Guianas in South America are associated with the weathering of schistose rocks. Many of the largest deposits are of the Pliocene or later ages and are covered by little, if any, overburden.

Prospecting is done along the unconformable surfaces on which the weathering interval was suitable for the formation of bauxite. There is no rapid method of chemical analysis for alumina, but differential thermal methods have been developed for quick approximations of the kaolinite and gibbsite content of samples.

Since bauxite forms by weathering, the ore body, which may be buried by normal geological processes, is usually nearly horizontal and close to the surface. Initial drilling is done at 400- to 4,000-foot intervals and development drilling at 50- to 200-foot intervals, depending on the depth and continuity of the deposit.

MINING

Open-pit mining accounts for 80 percent of the bauxite produced in the United States, also accounts for most of the bauxite produced in the rest of the world except Europe. In Arkansas, stripping is done by draglines, shovels, and carryalls. Stripping ratios of as much as 10 feet of overburden to 1 foot of ore are used and a ratio of 15 to 1 is considered feasible. Several pits in Arkansas have been mined to depths of more than 100 feet, and about 200 feet is estimated to be the present economic limit for large ore bodies. The pits stand well for unconsolidated rocks, but slumping does occur. Bauxite deposits in Jamaica lie at the surface, and stripping is limited to vegetation and topsoil (*11*). In Surinam, as much as 80 feet is stripped by draglines, hydraulic giants, or dredges (*22*).

Underground mining accounts for more than 80 percent of French bauxite production and is widely used in other parts of Europe including the U.S.S.R. European deposits frequently are in steeply folded limestone beds, and the ore-shoot pattern is typical of sinkhole deposition. Room-and-pillar or shrinkage stoping is used, depending on size, dip of the ore body, and condition of the back.

The flat-lying underground deposits of the United States are worked by room-and-pillar or longwall methods. The unconsolidated lig-

[2] Italicized numbers in parentheses refer to items in the bibliography at end of chapter.

nitic clays and sandstones of the back are weak and must be supported by a cap of bauxite about 2 feet thick. A modified longwall method, which retreats by mining diamond-shaped rooms along a cave line, has been developed by Reynolds Mining Co. for use in its Hurricane Creek mine in Arkansas. Using this method, average recoveries of the ore mined were about 80 percent, although in soft parts of the ore body recovery may be as low as 50 percent.

Restoration of mined-out open-pit areas to usefulness is required in Jamaica and is becoming increasingly important in other areas. Subsidence where bauxite was extracted underground is of minor importance today but may become more serious in the future.

BENEFICIATION

Bauxite is often washed to remove silica or clay minerals. The high-iron ores of Surinam are concentrated by jigging or heavy-medium separation.

In submarginal bauxites the iron oxides, clay minerals, and part of the titanium minerals are often so finely dispersed through the ore that physical methods have not produced successful separations.

During World War II a pilot plant was operated by the Bureau of Mines at Bauxite, Ark., to test various ore-dressing procedures, including gravity, flotation, and magnetic methods (*20*). Beneficiation by magnetic techniques to eliminate iron is practiced on a limited scale on bauxite for nonmetallurgical uses (*5*).

PROCESSING

Although research on the extraction of alumina has continued for many years, virtually all of the commercially produced alumina is obtained by a process patented by Karl Bayer in 1888 (German Patent 43,977) for use on bauxite. A number of modifications and improvements have been made in the process to adapt it to various types of bauxite. The process involves a caustic leach at elevated temperature and pressure, followed by separation of the resulting sodium aluminate solution and selective precipitation of the alumina. There are two principal variations of the Bayer process: (1) The European Bayer, in which the approximate conditions of leaching are a pressure of 210 p.s.i., a temperature of 390° F., a caustic concentration of 400 grams per liter, and a digestion time of 2 to 8 hours to effect solution of the monohydrate mineral boehmite; and (2) the American Bayer, in which a pressure of about 60 p.s.i., a temperature of about 290° F., a caustic concentration of 170 grams per liter, and a digestion time of ½ to 1 hour are used to dissolve the trihydrate mineral gibbsite (*3, 18, 19*). The American process is used for treating trihydrate bauxites, because it requires less evaporation and lower temperatures and is more adaptable to continuous digestion.

In both processes the pregnant solution is separated from the red mud tailings by countercurrent decantation and filtration. The liquor is cooled until it becomes supersaturated, then seeded with crystals of aluminum trihydrate. About one-half of the alumina in solution is precipitated in a 36- to 96-hour period. The precipitate is then filtered, washed, and calcined at 2,000° F. to obtain the final product. Caustic soda is regenerated in the precipitation step and, together with the unprecipitated alumina, is recycled to the digesters. For some nonmetal uses the alumina is left in the trihydrate form or is only partly calcined.

The finely divided residue resulting from leaching contains Fe_2O_3, TiO_2, and a complex sodium aluminum silicate compound. This compound represents a loss of soda and alumina, and the quantity discarded in the residue is related to the silica content of the bauxite. Approximately 1.1 units of alumina and 1.2 units of soda are lost for each unit of silica in the ore. Bauxite must contain less than 8 percent silica for economic treatment by the Bayer process.

Approximately 4 long dry tons of bauxite is required to produce 2 short tons of alumina, which will yield upon electrolysis slightly more than 1 short ton of aluminum. The materials other than bauxite required in the Bayer process are soda ash; lime for causticizing the soda ash; and fuel oil, gas, or coal (*2*).

Crude bauxite from the mines usually is crushed to about 2-inch size in hammermills, gyratories, or jaw crushers. Free moisture, but not the water of crystallization, is removed from the ores by drying when they are to be transported considerable distances. Bauxite from Surinam and British Guiana is dried to less than 3 percent free moisture. Bauxite from Jamaica and Haiti, after drying, may still contain as much as 15 percent free moisture to prevent dusting when the ore is transported. Further treatment depends upon the end use. Ores for refractory uses are calcined in rotary kilns at 2,500° to 2,900° F. and for abrasive uses at 1,700° to 2,400° F. to remove water of crystallization.

Bauxite with more than 8 percent silica is treated by the combination process (*3*), which first became commercial as a result of the reduced supply of imported high-grade bauxite during World War II. In this process, bauxite containing 12 to 15 percent silica is first subjected to a Bayer leach. The resulting red

mud, which contains the complex sodium aluminum silicate compound, is sintered with limestone and soda ash, then leached with water to recover alumina and soda. The brown mud residue has a composition, on a dry basis, somewhat similar to that of Portland cement.

The additional cost required in capital investment, raw materials, and processing by the combination method is partly offset by higher recoveries of alumina and soda and partly by lower mining costs. A major advantage of the combination process is the decreased need for selective mining, as high-silica bauxite, previously regarded as unsuitable for alumina production, can be used. The upper limit of silica for use in this process is now about 15 percent; however, in practice, bauxite containing as high as 25 percent silica is mined and blended with low-silica ore in proportions that will give a feed material of approximately 12 to 13 percent silica. The combination process is used in the two plants in Arkansas and in plants in the U.S.S.R. and China (*21*).

In 1952 the American Bayer process was modified to treat the high-iron, low-silica bauxite of Jamaica. The major modifications resulted from difficulties in filtration of the red mud slurry and from the small amount of boehmite in the ore (*19*).

In the U.S.S.R., alumina is extracted from nephelite flotation concentrate containing about 30 percent alumina, obtained as a byproduct of apatite from deposits in the Kola Peninsula (*21*). The process used is a variation of the lime-soda sinter method, but no soda is added as it is already present in the feed.

In Norway alumina is extracted commercially from high-iron bauxites by the Pedersen smelting process. In this process, bauxite, limestone, coke, and iron ore are smelted in an electric furnace to produce pig iron and a calcium aluminate slag containing 30 to 50 percent alumina. The slag is leached with sodium carbonate solution, and the alumina trihydrate is precipitated by carbon dioxide. During World War II the process was also used at a Swedish plant to treat andalusite.

During World War II the U.S. Government erected four demonstration plants to test the following alkaline and acid processes:

1. Laramie, Wyo.—Anorthosite calcined with limestone and soda ash; sinter leached with soda solution to extract sodium aluminate; alumina trihydrate precipitated by carbon dioxide and calcined to alumina (*23*).

2. Harleyville, S.C.—Clay sintered with limestone; sinter leached with sodium carbonate solution to form sodium aluminate; alumina trihydrate precipitated by carbon dioxide and calcined to alumina.

3. Salt Lake City, Utah.—Alunite roasted, then leached with sulfuric acid solution; alumina and potassium sulfate recovered from the alum.

4. Salem, Oreg.—Calcined clay leached with ammonium bisulfate to form an alum; converted to aluminum hydroxide and calcined to alumina.

After the war the plants were shut down before the processes had been adequately tested. In 1952 to 1954 the plant at Laramie was reactivated by the Bureau of Mines and successfully operated at an output of 30 tons of alumina a day. The cost of producing alumina from anorthosite or other aluminum silicates, at the rate of 1,000 tons a day, was estimated to be one-fourth to one-half again as much as the cost of producing alumina from bauxite.

By 1956 all the Government-erected plants had been sold to industry to be used for other purposes.

USES

More than 90 percent of the alumina production is consumed by the aluminum industry. Alumina also is used for abrasive, refractory, or chemical applications in which a high degree of purity is desirable. Its minor uses include production of the nose cones of missiles, artificial sapphires, and thread guides for textile plants.

Over 90 percent of the bauxite consumed in the United States is used by 6 alumina plants and the remainder by about 130 abrasive, chemical, refractory, and other plants. Fused bauxite is used in bonded or coated abrasives or as abrasive grain. Since 1949 the refractory industry has used increasing quantities of bauxite as a substitute for diaspore clays. Aluminum sulfate and other aluminous chemicals are produced from bauxite for treating water and sewage, dyeing, tanning leather, and sizing paper. Bauxite is also used in the production of high-alumina cement, in low-density insulating materials, as an adsorbent or catalyst by the oil industry, and as a flux in making steel and ferroalloys.

BYPRODUCTS

Most bauxites contain small quantities of gallium and vanadium, which dissolve in the Bayer process liquors. Gallium is recovered in the United States by one company, and vanadium is recovered in a French operation. In Norway iron is produced as a byproduct of the Pedersen process. In the U.S.S.R. potash, soda, and cement are produced as byproducts in recovering alumina from nepheline syenite.

RESERVES (*3, 7, 13, 21*)

The earth's crust averages 15 percent alumina, but the commercial ore (bauxite) usually contains more than three times this proportion.

The world bauxite reserve of 3.9 billion tons, as estimated in 1956, is shown by country in table 2. The reserve is sufficient to last 100 years at the 1956 rate of production.

The world-reserve figure has approximately doubled since 1950. Part of the increase resulted from an extension of areas under investigation. In Guinea, other parts of West Africa, Jamaica, and Australia discoveries have totaled hundreds of millions of tons.

The ability to use lower grade material has also resulted in lower cutoff grade and has been another factor in increasing estimates of reserves. As an illustration, ore used in the United States in 1950, whether of domestic or foreign origin, averaged about 60 percent alumina and 2 percent silica. By 1957 one-half the ore used in the United States contained about 50 percent alumina and at least one-fifth averaged 12 percent silica.

The United States bauxite reserve, totaling 50 million tons and averaging 52 percent Al_2O_3 and 10 percent SiO_2, is 97 percent in Arkansas and 3 percent in Georgia and Alabama.

The potential resources shown in table 2 are essentially bauxite and bauxitic clays that typically analyze 32 to 45 percent alumina. Other immense sources, not included in the table and containing less than 32 percent alumina, are nepheline syenite, anorthosite, clays, kyanite, and shales.

The United States potential resource includes bauxitic clays and bauxitic laterites. The resource of bauxitic clays, associated with the bauxite reserves in Arkansas, is estimated at 140 million tons with an average analysis of more than 35 percent alumina. Large deposits of bauxitic laterite in Oregon contain 35-percent alumina, less than 10 percent silica, and about 30 percent iron oxide.

Several hundred million tons of low-grade bauxitic laterite has been discovered in Hawaii on the islands of Kauai, Maui, and Hawaii. The Bureau of Mines and the Geological Survey have made preliminary studies to evaluate this material.

TABLE 2.—*Estimate of world bauxite reserves and potential resources, December 1956*

[Million tons]

Country	Reserve	Potential resources
North America:		
Costa Rica	[1]	[1]
Dominican Republic	[1]	[1]
Haiti	[1]	[1]
Jamaica	150	700
Panama	[1]	[1]
United States	50	200
Total	200	900
South America:		
Brazil	25	175
British Guiana	20	70
French Guiana	[1]	25
Surinam	250	250
Venezuela	[1]	10
Total	300	530
Europe:		
Austria	1	1
France	70	100
Greece	24	[2]
Hungary	11	12
Italy	25	30
Rumania	7	[2]
Spain	[3] 100	[2]
U.S.S.R.	150	175
Yugoslavia	[1]	[1]
Total	671	326
Asia:		
China	25	[3] 500
Federation of Malaya	15	6
India	250	125
Indonesia	15	10
Iran	[1]	15
Pakistan	[1]	5
Saravak	5	5
Turkey	10	30
Total	145	1,320
Africa:		
Cameroons	[1]	50
Ghana	250	[2]
Guinea	650	2,600
Nyasaland	[1]	60
Total	900	2,710
Oceania:		
Australia	200	400
Pacific Islands, Fanuga, Manus	3	3
Total	203	403
Grand total	3,324	4,977

[1] Not available.
[2] Included low-grade bauxites.
[3] Principally diaspore.

Source: United States Geological Survey.

SOURCES OF STATISTICAL INFORMATION

Statistical information on stocks and production of alumina and shipments of alumina classified by recipient industry are collected annually by the Bureau of Mines. The Bureau also collects data on the consumption of alumina by the aluminum industry.

Statistical information on domestic bauxite is collected and published periodically by the Bureau of Mines and the Bureau of the Census. Other sources of information include special studies presented in the technical press, reports of aluminum producers and investment companies, and reports by other agencies such as the Federal or State Geological Surveys. The Bureau of Mines publishes quarterly reports and a comprehensive annual report.

Information on foreign bauxite consumption is almost wholly lacking, and data on alumina production and trade in foreign countries are incomplete.

PRODUCTION, CONSUMPTION, AND FOREIGN TRADE

Table 3 shows domestic alumina production and shipments to consuming industries by producers. From 1954 through 1958, shipments to the aluminum industry represented 95 percent of the total shipments. Before 1958, United States foreign trade in alumina was relatively small.

TABLE 3.—*Production and shipments of alumina in the United States, calcined equivalent*

[Thousand short tons]

Year	Production	Shipments		
		For aluminum use	For other	Total
1948–53 (average)	1,812	[1] 1,822	(2)	(2)
1954	2,986	2,811	115	2,926
1955	3,197	3,013	120	3,133
1956	3,444	3,240	154	3,394
1957	3,443	3,222	179	3,401
1958	2,188	2,985	147	3,132

[1] Consumption 1948–52; shipments 1953.
[2] Not available.

United States production, imports, and consumption of bauxite are shown in tables 4 and 5 and world production in table 6.

Exports of bauxite, 1949 to 1958, inclusive, ranged from 18,000 to 139,000 tons, averaging about 56,000 tons. The principal recipient was Canada, and part of the export was returned to the United States in the form of abrasives.

SELF-SUFFICIENCY

Before 1958 practically all the United States alumina requirements were met by domestic production. However, in 1958 one company with requirements of slightly more than 100,000 tons per year, representing 3 percent of United States needs, began importing alumina from Japan.

Table 4 shows United States self-sufficiency in bauxite for recent years. Since about 1920 there has been a declining trend in self-sufficiency, and by 1958 domestic production accounted for only 14 percent of the total new supply. The domestic reserve of bauxite is sufficient to maintain an annual production of approximately 1.5 million tons for several decades; any increase in demand must be supplied by imports.

TABLE 4.—*United States supply and self-sufficiency of bauxite*

[Thousand long tons]

Year	Domestic production (dry basis)	Imports (crude and dried) [1]					Percent self-sufficiency
		Jamaica	Surinam	British Guiana	Other [2]	Total	
1949–53 (average)	1,516	[3] 623	2,462	130	592	3,817	29
1954	1,366	1,717	2,086	175		4,088	29
1955	1,708	2,178	2,602	343		4,952	27
1956	1,744	2,373	2,796	269	30	5,470	24
1957	1,498	2,672	2,707	301	819	7,998	17
1958	1,311	4,983	2,530	225	330	7,919	14

[1] Only small quantities of undried bauxite were imported.
[2] In 1949–53 Indonesia, in 1956 Guinea, and in 1957 and 1958 Haiti, were the principal other sources.
[3] Average for 2 years only, as 1952 was the first year of commercial production.

TABLE 5.—*United States consumption of bauxite by industries*

[Thousand long tons, dry basis]

	1949–53 (average)	1954	1955	1956	1957	1958	
						Quantity	Percent
Alumina	3,444	4,946	6,288	7,140	6,988	6,811	92.6
Abrasive	202	225	266	277	318	186	2.6
Refractory		66	64	84	82	69	.9
Chemical	180	180	183	189	199	229	3.1
Other	51	22	89	61	86	59	.8
Total	3,951	5,439	6,989	7,751	7,683	7,354	100.0
Bauxite consumed in aluminum production, percent	79.1	84.5	85.6	85.1	83.4	87.5	

TABLE 6.—*World production of bauxite*

[Thousand long tons]

Country	1949–53 (average)	1954	1955	1956	1957	1958
Australia[1]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
British Guiana	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
U.S.S.R.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
France	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dutch Guiana	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
United States	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Hungary[2]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Yugoslavia	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Italy	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Indonesia	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Malaya	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Greece	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
India	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Ghana (exports)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rumania	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Japan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other countries[3]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
World total (estimate)	11,100	16,000	17,000	18,000	20,100	20,700

[1] Dry equivalent of crude ore.
[2] Average for 1949–52.
[3] Estimate.
[4] Includes estimate for Rumania.

Surinam, Jamaican, and Refractory grade bauxites and crude aluminum oxide abrasives are in group I of the list of strategic and critical materials for stockpiling. Government stocks have been acquired, and at the end of 1958 the status of the inventories was as follows:

1. Surinam—quantity acquired substantially equals or exceeds the basic objective.
2. Jamaica—quantity on hand is sufficient to complete the basic and maximum objectives.
3. Refractory—quantity acquired substantially equals or exceeds the basic and maximum objectives.
4. Crude aluminum oxide—quantity acquired substantially equals or exceeds the basic and maximum objectives.

Abrasive-grade bauxite is listed in group II, and in 1958 none was under procurement.

DEFENSE PROGRAM

In order to meet the requirements of the aluminum industry, alumina plants were built by the Government during World War II. The construction of alumina plants was encouraged during the Korean hostilities through issuance of accelerated tax amortization certificates and guaranteed market contracts for aluminum.

During World War II, the bauxite reserve in the United States was more than doubled as a result of an extensive exploration program undertaken by the Federal government and industry. Other government programs assisted the sharp expansion in domestic bauxite production from less than 0.5 million tons in 1940 to an alltime high of 6.2 million tons in 1943. During the Korean hostilities, bauxite mining operations in Jamaica and Surinam were increased with government assistance.

PRICES AND COSTS

The cost of alumina at reduction plants in 1949 was reported as 3.48 to 3.65 cents a pound of aluminum (*18*). Since an average of 1.91 pounds of alumina is required to produce 1 pound of aluminum, the cost of alumina was about $36 to $39 a ton. The value of shipments of alumina and bauxite, as reported by producers, is shown in table 7.

The price of bauxite sold on the open market is largely based on alumina content and impurities present. As most bauxite is either consumed by the mining companies and their affiliates or purchased under long-term contracts, average quoted prices are not a reflection of a strongly competitive market but are largely nominal.

TABLE 7.—*Average values of bauxite and calcined alumina*

Year	Bauxite, per long dry ton		Calcined alumina per short ton[4]
	Domestic[1]	Imported[2]	
1949–53 (average)	[illegible]	[illegible]	[illegible]
1954	[illegible]	[illegible]	[illegible]
1955	[illegible]	[illegible]	[illegible]
1956	[illegible]	[illegible]	[illegible]
1957	[illegible]	[illegible]	[illegible]
1958	[illegible]	[illegible]	[illegible]

[1] Average value of mine production.
[2] At port of shipment, as reported to the Bureau of the Census.
[3] Average value of shipments.
[4] 1958 only.

TAXES AND TARIFFS

A State severance tax of $0.10 per short wet ton is levied on bauxite mined in Arkansas. Bauxite produced in Jamaica is subjected to royalties and taxes totaling about $2, and in Surinam these total about $2.50 per long dry

ton. Domestic producers are granted a depletion allowance of 23 percent on income from domestic production and 15 percent on income from foreign production.

United States duties of 0.25 cent per pound of alumina used for producing aluminum, $0.50 per long ton on crude and dried bauxite, $1 per ton on calcined bauxite used for refractories, and 15 percent ad valorem on calcined bauxite for other uses were suspended for a 2-year period until July 16, 1960. The 0.25 cent per pound duty on alumina or aluminum hydroxide imported for other uses was not suspended.

TRANSPORTATION

Alumina produced in the South Central United States is transported usually in trainload lots, to the reduction plants. Freight to the Pacific Northwest is about $12 a short ton. Alumina is also transported by barge up the Mississippi River. The free-flowing properties of dry alumina are utilized when loading or unloading by hopper, conveyor, or pneumatic methods.

Approximately 60 percent of the world bauxite supply is produced in the tropics. The aluminum content of most of this ore is transported considerable distances in the form of ore, alumina, or metal to the principal markets in the North Temperate Zone.

Methods of transporting bauxite have been improved through development of such equipment as 35-ton trucks with heated bottoms to minimize sticking, aluminum gondolas, and ships and piers that are designed to make the greatest possible use of belt conveyors for loading and unloading. New shallow draft ships, which can navigate the Surinam rivers with a full load, do not require a stop at Trinidad to top off the cargo.

RESEARCH

During World War II an extensive research program aimed at developing methods for recovering alumina from low-grade ores was undertaken by the Bureau of Mines. Methods for upgrading low-grade bauxites (those with high-silica and/or high-iron content) were investigated. Acid and alkaline processes for extracting alumina were tested and the most promising methods investigated on a pilot-plant scale. During this period other Government and private organizations conducted research on similar processes.

Current Bureau of Mines research includes a fundamental study of the reactions in the alkaline sinter process, an evaluation of acid and alkaline processes to serve as a guide for further research, and a study of methods for upgrading Arkansas bauxites and recovering the alumina from Hawaiian bauxite and Oregon laterite. Research on mining techniques is underway in Arkansas.

All six companies producing aluminum have laboratories in which research is in progress on improving present processes for recovering alumina or developing methods for recovering alumina from noncommercial materials. Anaconda Aluminum Co. has built a 50-ton-per-day pilot plant for testing an acid process for recovering alumina from Idaho clays. North American Coal Corp. and Strategic Materials Corp. are investigating, jointly, an acid process for recovering alumina from low-grade ores and coal-mine wastes. In addition, studies at some laboratories are directed toward expanding the use of alumina by the refractory, abrasive, petroleum, and other industries.

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ALUMINUM

BY R. A. HEINDL

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ALUMINUM

By R. A. Heindl[2]

NAPOLEON III had tableware made of aluminum but he also recognized that such a light metal had military potential and through financial assistance encouraged experimental research on its production. Today tableware and military applications represent only a small part of the total aluminum consumption.

SUMMARY

The discovery of a commercial process for the electrolytic recovery of aluminum, late in the 19th century, opened a new chapter in the world's industrial history. Growth of the primary aluminum industry in the United States has been so rapid that the quantity produced annually now exceeds that of any other nonferrous metal. Since 1955 aluminum production in the United States has exceeded 1.5 million tons annually. Aluminum is of great importance in the aircraft industry, and efficient, competitive operation of many other industries requires a continued supply of the light metal.

The basic process for producing aluminum, developed independently by Hall and Héroult nearly 75 years ago, is by electrolysis of high-purity aluminum oxide in a bath of molten cryolite. Research in reduction cell design and development of larger cells has led to economies in power and manpower requirements. There has been much research on other processes for recovery of the metal, but none has proved more economical.

Except for a few years immediately before World War II the United States has been the world's leading producer of aluminum and accounted for more than 40 percent of world output in 1958. The output of Canada, the second largest producer, represented an additional 17 percent of the total. The capacity of the domestic primary industry has always been nearly equal to demand. For the past 10 years U. S. imports have accounted for an average of 12 percent of the total supply of crude and scrap aluminum; and 81 percent of the bauxite used in 1958 was imported.

The recovery of secondary aluminum, from 1954 to 1958, averaged 16 percent of the apparent consumption of primary and secondary aluminum. New scrap is the source of nearly 80 percent of the secondary metal recovered.

The primary aluminum industry expanded sharply under the impetus of World War II and the Korean hostilities—partly with the aid of Government funds and incentives. In 1940 there was one domestic primary aluminum producer, by 1958 there were six, three of which were completely integrated from the mine to aluminum fabricating plants. Much of the primary production is consumed in semifabricating plants owned by the producers.

Since approximately 20 percent of the cost of aluminum is electric energy, the aluminum industry has until relatively recent times, built plants near sources of low-cost hydroelectric power. However, since World War II, demand for power in industrially developed countries has increased sharply and competing industries can pay more than the aluminum industry for power. The domestic aluminum industry turned first to hydroelectric power, second to natural gas, then to lignite, and in 1957 new aluminum smelters were built near large coal deposits. Aluminum producers in many foreign countries have constructed plants in relatively isolated and thinly populated areas where hydroelectric power could be made available.

The progressive research, development, and sales policies of the aluminum producers have resulted in the displacement of many materials from their historical market by aluminum. The relatively stable price of aluminum has been an important factor in the increased usage of the metal. Industries which consume major quantities of aluminum are: Building and construction, transportation, consumer durables, containers and packaging, electrical equipment, and machinery and equipment. As applications for aluminum are developed and current markets are expanded, production and

[1] Italicized numbers in parenthesis refer to items in the bibliography at the end of this chapter. Alumina, bauxite, and the recovery of alumina from nonbauxitic raw materials are discussed in the Alumina and Bauxite Chapter.

[2] Assistant chief, Branch of Light Metals.

consumption of this versatile metal are expected to continue to expand at a greater rate than the national economy.

Maintenance of an adequate aluminum supply requires assured sources of alumina and electrical energy. Continuation of research on reactions in the electrolytic cell may result in a decrease in power and manpower requirements. Alloy and product research will lead to the development of new uses, such as automobile engine blocks, which would consume large quantities of aluminum.

BACKGROUND

Recognizing that alumina was the oxide of a metal, Sir Humphry Davy, in 1808, named the metal "alumium" which he later change to "aluminum." Later the spelling "aluminium" came into general use and is still used in many countries. In the United States the simpler spelling "aluminum" was adopted.

Davy's attempts to isolate the metal were unsuccessful, but in 1825 Hans Christian Oersted produced aluminum by treating aluminum chloride with potassium amalgam. Frederick Woehler, some years later, produced an impure powdered aluminum using potassium as the reducing agent. Henri Ste. Claire Deville, in France, using sodium metal as the reducing agent, produced the first commercial quantities of aluminum in 1854. Although much research was done on lowering the cost of the sodium, aluminum was never produced by this method at a price competitive with other nonferrous metals. In 1857 aluminum was $27 a pound and the price was reduced to $17 by 1859.

In 1885 less than 300 pounds of aluminum was produced in the United States, but the discovery of an electrolytic process in 1886 by Charles Martin Hall in the United States and independently by Paul Héroult in France opened the way for a new industry. Using this new process, by 1895 production had increased to 900,000 pounds and prices had decreased from $10 to $0.59 a pound. Now, nearly 75 years following the discovery of the process, equipment has undergone considerable change and refinement, but the Hall-Héroult electrolytic process still is used. In 1958, when primary aluminum production was more than 1.5 million tons, the price of ingot averaged 26.9 cents a pound.

Beginning in 1954 and continuing through 1958, production of primary aluminum in the United States has exceeded that of any other nonferrous metal. The United States has been the world's leading aluminum producer except during the pre-World War II period, 1934 to 1940, when for 5 years Germany was the leading producer. Since 1942 Canada has been the second largest producer. Estimates for 1958 indicate that production in the U.S.S.R. is approaching that of Canada.

The Aluminum Company of America (Alcoa), owning bauxite, alumina, and aluminum producing facilities, was the only domestic producer from 1886 to 1940.

SIZE AND ORGANIZATION OF INDUSTRY

At the end of 1958 the primary aluminum industry was composed of six companies. Three of these companies, representing more than 85 percent of the U. S. productive capacity, were vertically integrated from mining through production of semifabricated shapes.

Figure 1 illustrates the organization of the domestic industry and shows plant locations, capacity, and plants under construction at the end of 1958. Table 1 summarizes this information.

TABLE 1.—*Primary aluminum productive capacity by companies, Dec. 31, 1958*

Company	Number of aluminum reduction plants	Annual capacity, thousand tons	Percent of total
Aluminum Company of America (Alcoa)	7	798	36.4
Reynolds Metals Co.	6	601	27.4
Kaiser Aluminum & Chemical Corp.	4	537	24.5
Anaconda Aluminum Co.	1	60	2.7
Harvey Aluminum, Inc.	1	54	2.5
Ormet Corp.	1	144	6.5
Total	20	2,194	100.0

Harvey Aluminum, Inc. and Ormet Corp. (a subsidiary of Olin Mathieson Chemical Corp. and Revere Copper and Brass, Inc.) produced primary metal for the first time in 1958, but Harvey, Olin, and Revere produced semifabricated shapes from purchased ingot prior to that year.

At the end of 1958 the world capacity to produce primary aluminum, shown in table 2, was estimated as 4.9 million short tons.

TABLE 2.—*World primary aluminum productive capacity*

Country or continent	Annual capacity	
	Thousand tons	Percent of total
United States	2,194	45.2
Canada	885	17.6
Europe	767	15.8
Asia	108	2.2
U.S.S.R. and Iron Curtain countries	846	17.4
Others, including South America, Africa, and Australia	76	1.6
Total	4,854	100.0

PLATE 1.—Bauxite Supply and Alumina- and Aluminum-Plant Capacities in the United States in 1959 (Includes plants under construction).

GEOGRAPHIC DISTRIBUTION OF THE INDUSTRY

The aluminum reduction industry is a major consumer of electric power and uses approximately 3 percent of the domestic electric power generated. In order to maintain its competitive position, large quantities of low cost dependable electrical energy are a necessity for this industry. Before 1950 plants were built near sources of low-cost hydroelectric power such as the Niagara Falls area, the Tennessee Valley area, and the lower Columbia River area of the Pacific Northwest. However, aluminum consuming and other industries entered these areas, and in some instances the cost of power from new facilities was increased. Since 1950, in addition to situating plants in the limited number of places where new hydropower supplies became available, the industry has built several large plants where natural gas, lignite, or bituminous coal for thermally generated electric power are available. New plants in the Ohio River Valley are near the markets and can take advantage of lower water freight rates (*9, 11*).

As indicated by figure 1, alumina, the basic raw material for the primary aluminum smelters, is produced in the South Central United States in Arkansas, Texas, Louisiana, and Alabama. The reduction plants are more widely dispersed. See table 3.

TABLE 3.—*Geographic distribution of aluminum reduction plants*

Location	Number of aluminum reduction plants	Annual capacity, thousand tons	Percent of total
Pacific Northwest	8	699	31
New York, Ohio, and West Virginia	3	335	15
Arkansas and Louisiana	3	411	19
Alabama, Tennessee, and North Carolina	3	294	13
Texas	3	365	17
Total	20	2,104	100

Completion of new facilities under construction in 1959 will result in new capacity in Indiana and increased capacity in New York, Ohio, Texas, and West Virginia.

DEFINITION OF TERMS, GRADES, AND SPECIFICATIONS

Pig.—Metal as initially produced by a primary reduction plant, taken directly from the reduction cell and cast into a convenient form. Pig is cast in a wide variety of sizes but the usual commercial size is 50 pounds, with a 99.5 percent guaranteed minimum aluminum content.

Ingot.—A cast form suitable for working or remelting that has been poured from either a melting or alloy furnace. The common commercial size is 30 pounds and the aluminum content is 99.5 plus percent.

Potline.—A number of reduction cells or pots, usually 100 to 150, connected in electrical series.

Super-purity aluminum.—Contains a minimum of 99.99 percent aluminum.

Aluminum Alloys.—Generally divided into two major groups: Wrought and casting. Table 4 gives the chemical composition for two alloys of each type. Unalloyed metal usually contains 99.5 percent aluminum and small quantities of iron and silicon. Even when no alloying elements have been added, the quantity of impurities present has to be controlled carefully. Metal with over 99.5 and up to 99.85 percent aluminum is available at costs up to 3 cents per pound more than standard commercial metal. It is used where superior electrical conductivity or corrosion resistance is required. Purities higher than 99.85 percent are necessary for certain applications.

There are several acceptable methods of designating aluminum alloys. However, a 4-digit code for wrought alloys was adopted by The Aluminum Association in October 1954. The first digit indicates the major alloying ingredient. If the first digit is 1 the alloy has

TABLE 4.—*Chemical analysis of some aluminum alloys, in percent* [1]

Type and number	Cu	Fe	Si	Mn	Mg	Zn	Ti	Cr	Other elements	
									Each	Total
Wrought 1100 [2, 3]	0.20	Fe+Si 1.0		0.05		0.10			0.05	0.15
Wrought 2024 [4]	3.8–4.9	1.50	0.50	0.30–0.9	1.2–1.8	0.25		0.10	0.05	0.15
Casting 43	0.10	0.8	4.5–6.0	0.30	C.05	0.20	0.20		0.05	0.15
Casting 108	3.5–4.5	1.0	2.5–3.5	0.30	0.03	0.20	0.20			0.50

[1] Values are maximum unless shown as a range; aluminum is remainder.
[2] Aluminum minimum—99.00 percent.
[3] Replaces commercial designation 2S.
[4] Replaces commercial designation 24S.

a minimum aluminum content of 99.00 percent. Digits 2 to 8 in the first position designate copper, manganese, silicon, magnesium and silicon, zinc, and other element, respectively; 9 is an unused series.

If the alloy has a minimum aluminum content of 99.00 percent; the second digit indicates special control on impurities and the last two digits indicate the minimum aluminum content figures to the right of the decimal point. Thus, 1030 indicates 99.30 percent minimum aluminum content without special control on individual impurities.

When the first digit is 2 through 8, indicating a major alloying ingredient, the second digit indicates alloying modifications and the last two digits identify the alloy; usually by the commercial code number previously used to designate the same alloy. Thus, 2014, formerly alloy 14S, contains copper as the major alloying ingredient with no alloy modification.

Additional letters, O and F, and letters H and T with numbers, may follow the alloy digits and designate the temper of the alloy.

No uniform system has been adopted by the industry for designating casting alloys. These alloys may be designated by American Society for Testing Materials numbers, U.S. Federal Specifications, Society of Automotive Engineers, commercial, and individual company symbols.

TECHNOLOGY

PRIMARY ALUMINUM *(16, 17, 19)*

Primary aluminum is produced exclusively by the electrolysis of alumina in a molten cryolite bath. Purity of the alumina used must be greater than 99.0 percent. The electrolytic reduction cell consists of a carbon-lined box containing a pad of molten aluminum which serves as the cathode, a carbon anode, and an electrolyte of molten cryolite in which the alumina is dissolved. Small quantities of aluminum fluoride are used in the electrolyte to combine with Na_2O, an impurity in alumina, to form artificial cryolite, and the melting point of the bath is lowered by the addition of small quantities of fluorspar. The anode may be either one large block of carbon or a number of small blocks of carbon. The alumina is reduced to aluminum at the cathode, and carbon is oxidized to carbon dioxide at the anode. The overall reaction may be written:

$$Al_2O_3+2C \rightarrow 2Al+CO_2+CO$$

The carbon lining, which contains the molten aluminum, is built into a steel shell. Typical dimensions of the shell are 20 feet long, 10 feet wide, and 3 feet deep. It is lined first with refractory insulation. The insulation is then lined with carbon blocks, joined by carbon cement, or a monolithic lining is prepared by baking carbon paste in place. The carbon lining usually must be replaced after 3 to 4 years.

The carbon anodes are consumed at a rate of about 1 inch of vertical length per 24 hours of operation and the method of replacement is important in regard to overall costs. There are two methods of replacing anode carbon through: (1) Soderberg continuous anodes and (2) prebaked anodes.

In the Soderberg anode a reinforced rectangular steel shell, open at the top and bottom, is suspended above the furnace. Carbon paste or briquets of coke and pitch are added periodically as the anode is consumed. Current enters the anode through rows of pins inserted into the carbon mass either vertically or horizontally. The heat of the bath and the heat resulting from the electrical resistance of the carbon bake the paste or melt and bake the briquets so that at a point approximately 20 inches above the bath the carbon becomes a hard monolithic mass. The steel pins, in addition to conducting current, support the carbon mass. As the carbon descends through the hopper and is consumed, the lowest pins are periodically withdrawn and replaced at higher levels in the anode box. The optimum anode-cathode distance is maintained by raising or lowering, simultaneously, the pins which are baked into the lower part of the carbon block. Inasmuch as the pad of molten metal builds up at approximately the same rate as the anode is consumed this adjustment is usually made only when metal is withdrawn from the cell.

In the prebaked anode system sets of 16 to 24 prebaked carbon blocks are used. The size of the blocks varies from plant to plant; in one plant the blocks are 20 inches wide, 31 inches long, 12 inches high, and weigh about 400 pounds. The blocks are supported in the bath by steel stubs or rods which conduct the current to the carbon. These stubs are inserted into a hole in the top of the finished block and anchored in place by casting molten iron around the stub. The blocks are raised or lowered separately to maintain proper position with respect to the bath and are replaced individually as they are consumed (7).

The Soderberg system requires less labor and, with the exception of moving the steel pins, is a continuous method of feeding anode carbon. The prebaked system results in better electrical efficiency in the reduction cell but requires fabricating and rodding facilities not used in the Soderberg system.

The molten bath or electrolyte may be as deep as 14 inches, but the anode is usually only 2 inches from the pad of molten aluminum. The resistance of the bath is sufficient to maintain an optimum operating temperature of

950° to 1,000° C. At this temperature the alumina dissolved in the bath varies from 6 to 10 percent. When the alumina concentration drops to 2 percent, the electrical resistance of the cell increases sharply and the voltage drop across the cell increases from 5 volts to 30 or 40 volts. The phenomenon is known as the "anode effect." As soon as this condition occurs, the crust of frozen cryolite on top of the bath is broken and more alumina is added to the cell which then returns to normal operating condition.

Every 1 to 3 days the molten aluminum is removed from the cell by aspiration. Cast iron pots with airtight lids and downward sloping spouts are used. The molten metal is blended with other batches and then may be fluxed, alloyed, cast, or if the fabricating facility is nearby, transported molten to the fabricating plant.

Plants constructed since 1950 have much larger cells than were used in older plants. These cells utilize currents from 65,000 to 125,000 amperes, with the majority of plants having 80,000- to 100,000-ampere cells. The voltage drop across a single cell is 4.5 to 5.0 volts and across a potline 600 to 800 volts.

The larger cells require less manpower per pound of aluminum produced, but special problems are encountered in cells designed to use 100,000 and more amperes. The large currents cause powerful magnetic fields in the metal and bath, resulting in violent agitation. This agitation causes a fog of aluminum to be dispersed in the bath which increases the possibility of reversing the reduction reaction. Another detrimental effect is that the molten metal piles up toward the negative leads causing a variation in the anode-cathode spacing. Moreover, localized thermal effects may distort the carbon lining (*4*).

Current efficiency varies from 85 to 90 percent; losses are principally due to physical losses of metal and reoxidation of aluminum by carbon dioxide. Owing to the electrical resistance the voltage efficiency is only 40 percent with heat being lost by radiation, and in the exhaust gases, in tapped metal, and in electrodes removed from the cell. As a result the overall energy efficiency is about 35 percent. About 7.5 to 8.5 kw.-hr. is required in the cell per pound of aluminum metal produced. Total plant requirements are less than 10 kw.-hr. per pound.

Table 5 summarizes the raw materials used in producing one pound of aluminum.

To prevent pollution of the atmosphere, gases from the cells are passed through a collection system which removes alumina, carbon, and fluorides.

TABLE 5.—*Raw materials and energy required to produce one pound of aluminum*

	Unit	Quantity
Alumina	Pound	1.93
Cryolite	do	0.02–0.03
Aluminum fluoride	do	0.02–0.03
Fluorspar	do	0.003
Anode carbon	do	0.55
Cathode carbon	do	0.02
Electrical energy	kilowatt-hour	7.5–8.5

The relatively low tensile strength of commercially pure aluminum limits its use in heavy durable products. However, by alloying, cold rolling, or heat treating, aluminum alloys with strengths approaching those of mild steels have been developed. There are more than 100 commercially-available aluminum alloys and several new alloys usually are developed each year. The alloys offers a wide variety of combinations of mechanical strength, ductility, electrical conductivity, and corrosion resistance. A small addition of manganese increases the strength of wrought aluminimum. Magnesium and silicon, together or separately, give aluminum alloys with good corrosion-resistance and strengths. Copper and zinc are used to produce alloys with high strength-to-weight ratios. Small quantities of other metals such as nickel, chromium, titanium, and tin are sometimes added for grain refinement or to impart special characteristics.

The production of super-purity aluminum requires a second electrolytic step in which a cell, known as the Hoopes cell, with three molten layers is used. The bottom layer is the anode, a relatively impure aluminum alloyed with copper to increase its density. The intermediate layer in the conventional Hoopes cell is molten cryolite with barium fluoride added to give it a density greater than that of pure aluminum. The top layer, which serves as the cathode, is molten super-purity aluminum.

Direct smelting of aluminum-silicon alloys from clay has been investigated. High-purity clay is used to minimize contamination of the alloy by iron and titanium. An electric furnace with graphite electrodes has been used with a carbon reductant, which may be coke, charcoal, sawdust, hogged fuel, or mixtures of these materials. At operating temperatures pure aluminum would volatilize or react with oxides of carbon. This is prevented by the addition of silicon which alloys with the aluminum and promotes absorption of the aluminum vapors (*3*).

Methods for recovering commercial grade aluminum from Al-Si alloys have been investigated. Experimental procedures have included

leaching the alloy with a molten metal such as zinc in which the aluminum dissolves and the silicon and impurities are relatively insoluble. The zinc is then distilled from the dissolved aluminum. In the subhalide process a crude aluminum alloy is treated with $AlCl_3$ at approximately 1,000° C. to produce $AlCl$. The reaction is reversed by lowering the temperature; pure aluminum condenses and the $AlCl_3$ vapors are recycled.

Many other methods of recovering aluminum have been proposed (*8, 16*). Such processes include the treatment of alumina with aluminum sulfide and carbon at an elevated temperature; hydrogen reduction of alumina at pressures above 100 atmospheres and temperatures above 400° C.; reaction between alumina and aluminum carbide at 1,980° C.; and electrolytic reduction of complex alumino-organic compounds such as $NaF.2Al(C_2H_5)_3$.

SECONDARY ALUMINUM (3, 15)

Much aluminum scrap is processed into secondary aluminum ingot without preliminary treatment. New scrap requires little or no sorting, and manual sorting of old scrap is too expensive to be widely practiced. Scrap in the form of borings and turnings is dried and the oil removed by burning. Tramp iron is removed by magnetic separators. Dross and foil also usually require treatment before being melted. From 40 to 95 percent of the scrap is recovered as metal. Low recoveries are obtained from drosses and skimmings; high recoveries from segregated sheet and clips.

Most scrap is melted in 5- to 25-ton capacity reverberatory furnaces operated on a 24-hour cycle. Important advantages of this type of furnace are its ease of mechanical charging, low flux consumption, and a melt loss of only 2 to 5 percent. The molten aluminum is protected from surface air oxidation by a layer of flux, which usually contains sodium chloride, potassium chloride, and cryolite. Other salts which may be included are calcium chloride and sodium fluoride. The melt may be refined by passing chlorine gas through the molten metal or by using reactive salts such as aluminum fluoride or soduim silicofluoride in the flux. Nitrogen is introduced to degas the melt and bring the dross and oxides to the surface.

Some scrap processing plants have dust- and fume-collecting equipment. Electrostatic precipitators and Venturi scrubbers apparently are effective in removing volatile alkali chlorides and fluorides as well as particles of aluminum, magnesium, and silicon from the exhaust gases. In small, intermittent operations, furnaces may be in the open or poorly hooded and therefore can be contributors to air pollution (*1*).

Secondary smelters consuming aluminum scrap produce specification wrought and casting alloys. Casting alloys account for most of their production. Once the scrap has been melted alloying ingredients or primary aluminum are added to bring the melt to specification.

USES (5)

Aluminum is used in many products because of its low density, high electrical or thermal conductivity, resistance to corrosion, low neutron absorption cross-section, nontoxicity, malleability, reflectivity, nonmagnetic and nonsparking properties, or high strength-to-weight ratio. In many applications aluminum is in direct competition with copper, steel, magnesium, lead, wood, plastics, rock wool, or fiberglass.

Shipments of aluminum are usually divided into three major categories: (1) Wrought products, such as rolled, extruded and forged shapes, (2) cast products, and (3) products for dissipative uses in which the metal loses its identity as in its use as an alloying ingredient in nonaluminum base alloys, a deoxidizer in the production of steel, or in the production of aluminum chemicals. Net shipments, classified as wrought or cast products, are shown in table 6. In addition, nearly 325,000 tons of ingot was shipped to Government stocks in each year 1957 and 1958, and it is estimated that 100,000 tons has been consumed annually in dissipative uses.

More than 25 percent of the aluminum consumed domestically is used for construction in such items as siding, roofing, curtain walls, flashing, insulation, windows and screening, and builders' hardware.

The transportation industry is also a major consumer of aluminum accounting for more than 20 percent of total consumption. The high strength-to-weight ratio of aluminum makes it valuable in any carrier, but this factor has been most important in aircraft. In buses and truck trailers it often accounts for 15 to 40 percent of the total weight of the vehicle. Since 1945, railroad equipment manufacturers have greatly increased their use of aluminum for trim and accessories. A few "all aluminum" passenger and freight cars have been built.

During the 1920 decade a number of automobiles used large quantities of aluminum, but the price and supply of aluminum were such that as automobile production increased and steel technology improved, the use of aluminum in automobiles gradually decreased until 1946 when only about 7 pounds of aluminum were used per automobile. Since then, this decreasing trend has been reversed. In 1955 an

TABLE 6.—*Net shipments of aluminum wrought and cast products by producers*

[Short tons]

(Bureau of the Census)

	1949–53 (average)	1954	1955	1956	1957	1958
Wrought products:						
Plate, sheet, and strip	548, 039	582, 538	771, 362	784, 059	608, 251	476, 517
Rolled structural shapes, rod, bar, and wire	168, 419	180, 641	183, 976	210, 600	199, 548	172, 917
Extruded shapes, tube billets, and tubing	152, 048	256, 650	387, 546	396, 202	394, 787	410, 836
Powder, flake, and paste	15, 440	23, 452	17, 840	14, 210	14, 094	12, 814
Forgings			35, 172	37, 833	32, 132	25, 352
Total	883, 946	1, 043, 281	1, 395, 896	1, 442, 904	1, 338, 812	1, 298, 436
Castings:						
Sand	90, 993	78, 277	82, 741	85, 890	71, 996	58, 719
Permanent mold	81, 181	107, 204	149, 174	122, 711	116, 163	92, 800
Die	82, 607	122, 645	177, 602	188, 115	186, 793	146, 300
Other	3, 919	3, 401	(1)	(1)	(1)	(1)
Total	258, 700	311, 527	410, 390	397, 291	375, 909	298, 228
Grand total	1, 142, 646	1, 354, 808	1, 806, 288	1, 840, 195	1, 714, 721	1, 596, 664

[1] Withheld because estimates did not meet publication standards of the Bureau of the Census owing to the associated standard error.

average of 30 pounds per car was used and the 1959 models contain an average of 57 pounds of aluminum per car. Major aluminum components in automobiles are pistons, automatic transmission parts, and trim. One automobile manufacturer in the United States late in 1959 began producing a car powered by an engine made largely from aluminum.

Only in the past 25 years have marine applications of aluminum become important. During this period alloys with high mechanical strength and high corrosion resistance have been developed, and the problem of bimetallic corrosion has been largely eliminated by proper insulation. Approximately 2,000 tons of aluminum was used in the superstructure, decks and deckhouses, stack enclosures, bulkheads, and lifeboats of the SS United States. Many small pleasure craft are fabricated almost entirely from aluminum.

More than 15 percent of the total quantity of aluminum consumed goes into consumer durable goods including refrigerators, air conditioners, washing machines, furniture, utensils, and small appliances.

Ten percent of the aluminum consumed is used in the electrical and communications industries. In most instances aluminum cable with steel reinforcing has displaced copper for cross country transmission lines. It is estimated that aluminum conductors account for 90 percent of all new transmission lines in the United States. Aluminum conductor is also used in urban distribution lines and service drops.

Aluminum containers and packaging including foil, caps and closures, and collapsible tubes account for nearly 10 percent of total aluminum consumption.

Its use in machinery and equipment, in the chemical and metallurgical industry, and miscellaneous uses consume approximately 20 percent of the total aluminum supply.

Super-purity aluminum has a number of applications including its use as a catalyst for producing high octane gasoline, as an electrical capacitor foil, and in consumer products such as automobile and appliance trim and costume jewelry.

SUBSTITUTES

Aluminum has replaced many materials that can now be considered as substitutes for aluminum. If aluminum supplies were curtailed, or the price increased, steel and stainless steel, magnesium, zinc, titanium, lead, copper, plastics, fiberglass, or wood could be substituted for aluminum in applications where these materials have been used previously. Steel, stainless steel, magnesium, and zinc can be substituted for aluminum in the automotive industry. Magnesium could replace aluminum for certain components in commercial aircraft, and stainless steel and titanium may replace aluminum in jet aircraft. Fiberglass, titanium, and wood may be substituted for aluminum in small boats. Copper could replace aluminum in electrical applications and lead foil or plastics could serve as substitutes in packaging.

The increase in aluminum consumption has resulted, in part, from the decrease in the price of aluminum in relation to other metals. Historically a 1 percent decrease in the ratio of the price of aluminum to the composite price of copper, lead, and zinc has increased aluminum consumption by 1.4 percent.

SECONDARY SOURCES AND RECOVERY

The recovery of secondary aluminum, from 1954 through 1958, as reported to the Bureau of Mines, averaged 16 percent of the apparent consumption of primary and secondary aluminum. The scrap from which secondary aluminum is recovered is designated as either "new scrap" or "old scrap." New scrap is generated from (1) fabricating operations such as alloying, stamping, forging, extruding, machining, and casting and (2) rejected semifabricated and manufactured items. Old scrap is aluminum that has been used in end products and is collected for metal recovery after the products are worn out or discarded. New scrap consumption and metal recovery data are based on quantities treated outside of the generating plant and do not include "run-around" scrap consumed in the generating plant.

New scrap is the source of nearly 80 percent of the secondary aluminum recovered. The relatively small recovery from old scrap reflects the fact that the aluminum industry is a new and growing industry. Moreover, the high ratio (4:1) of new to old aluminum scrap shows that old aluminum-containing products are not being replaced as rapidly as new ones are going into use. The tonnage of aluminum in use represents a growing reservoir of old scrap for the future.

Consumers of scrap aluminum are divided into four major categories: (1) Secondary smelters, (2) primary producers and fabricators, (3) foundries and miscellaneous manufacturers, and (4) chemical plants. The secondary smelters accounted for 72 percent of the scrap consumed from 1954 through 1958. During this period smelters produced an average of 270,000 tons of secondary aluminum ingot annually. Much of this was consumed in the production of castings.

As indicated by the data in table 7, small quantities of aluminum are recovered from nonaluminum-base alloy scrap and some of the aluminum recovered is consumed in the production of such alloys and also in aluminous chemicals.

RESERVES

Reserves and resources of bauxite are tabulated in the Alumina and Bauxite Chapter.

TABLE 7.—*Aluminum recovered from scrap processed in the United States, by kind of scrap and form of recovery*

[Short tons]

	1957	1958
KIND OF SCRAP		
New scrap:		
Aluminum-base	288, 682	224, 983
Copper-base	124	64
Zinc-base	326	240
Magnesium-base	228	141
Total	289, 360	225, 428
Old scrap:		
Aluminum-base	71, 655	62, 995
Copper-base	115	105
Zinc-base	275	653
Magnesium-base	414	374
Total	72, 459	64, 127
Grand total	361, 819	289, 555
FORM OF RECOVERY		
As metal	9, 218	7, 924
Aluminum alloys	346, 775	277, 197
In brass and bronze	397	217
In zinc-base alloys	2, 880	2, 001
In magnesium alloys	320	242
In chemical compounds	2, 229	1, 974
Grand total	361, 819	289, 555

SOURCES OF STATISTICAL INFORMATION

Data on production, shipments, stocks, and value of primary aluminum are obtained monthly from all domestic producers by the Bureau of Mines. Alumina consumption is obtained annually. The Bureau also canvasses, on a monthly basis, secondary smelters and other scrap consumers to determine stocks and receipts of scrap from which monthly consumption is calculated. Production of ingot by secondary smelters is calculated from their monthly reports of stocks and shipments. Coverage of the secondary aluminum industry is estimated at more than 80 percent. Data on the operations of the members of the Aluminum Smelters Research Institute are obtained from that association. The data on both primary and secondary aluminum are published monthly and annually; the secondary data include an estimate for full coverage of the industry.

The Bureau of the Census collects and publishes monthly data on net shipments of aluminum wrought and cast products. The Bureau of the Census also obtains monthly information on imports and exports of all forms of aluminum. The 1954 Census of Manufacturers included statistics on employment, materials consumed, electric energy purchased, and expenditures for plant and equipment.

With the exception of 1 year, data on aluminum consumption are incomplete. In 1952, under the Controlled Materials Plan, aluminum suppliers were required to report quantities of metal shipped to different segments of the consuming industries. Since then The Aluminum Association has published, semiannually by percent, shipments of wrought products, sand castings, and permanent mold castings to different major uses, as reported by its members. Although coverage is limited to members of the Association which represent about 80 percent of the wrought products producers and a much smaller part of the casting industry, the breakdown for wrought products and sand castings is believed to be representative of the entire industry. The statistics on permanent mold castings are believed not to be representative of the entire aluminum permanent mold casting industry.

PRODUCTION, CONSUMPTION, AND FOREIGN TRADE

In 1900 aluminum was produced in only four countries, and output totaled 7,500 tons. By 1958 there were 25 producing countries having a total production of 3.9 million tons. The United States with a production of 1,566,000 tons accounted for 40 percent of the 1958 world total. Since 1900 the output of the domestic primary aluminum industry has increased at an average rate of 11 percent per year compared to an increase in the Gross National Product of 3 percent per year. From 1951 to 1956 domestic production doubled, and since 1954 aluminum output has been greater than that of any other nonferrous metal.

Figure 2 illustrates the increase in domestic aluminum production since 1940. Table 8 gives the sources of the U. S. aluminum supply, crude and scrap, during the decade 1949 through 1958.

From 1949 to 1958 imports have accounted for an average of 12 percent of the total supply of crude and scrap aluminum. Canada, which supplies much of the world with aluminum, accounted for more than 85 percent of the U. S. imports during the same decade. Only 1.4 percent of the total U. S. supply has been exported during the 10-year period.

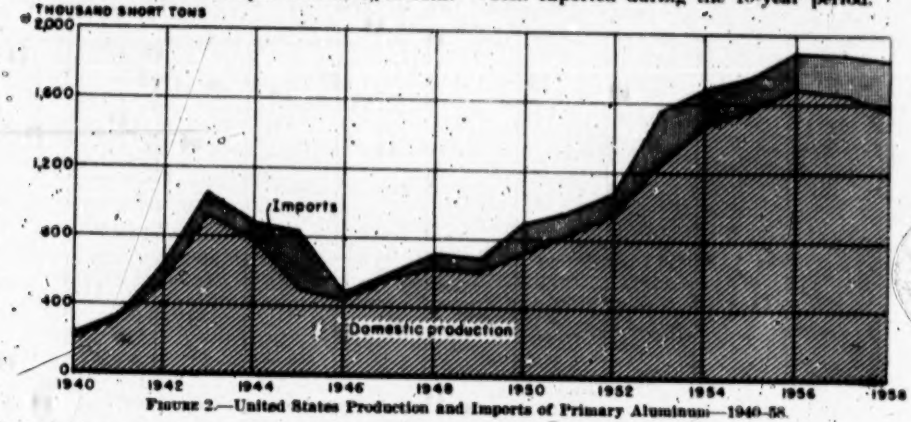

FIGURE 2.—United States Production and Imports of Primary Aluminum—1940–58.

TABLE 8.—*Sources of aluminum supply—crude and scrap*

[Short tons]

Year	Primary production	Recovery from scrap [1]		Imports [2]	Total supply	Exports [2]
		Old	New			
1949–53 (average)	869, 662	69, 550	208, 475	190, 248	1, 337, 935	4, 168
1954	1, 460, 565	59, 989	232, 052	228, 611	1, 981, 217	39, 448
1955	1, 565, 721	76, 372	259, 622	214, 418	2, 116, 133	22, 430
1956	1, 678, 954	71, 673	268, 095	239, 794	2, 258, 516	52, 014
1957	1, 647, 709	72, 459	289, 360	236, 802	2, 246, 330	45, 454
1958	1, 565, 557	64, 127	225, 428	264, 252	2, 119, 364	69, 726

[1] The 1954–58 data not strictly comparable with previous years, as the figures are recoverable aluminum content whereas previous years were recoverable aluminum-alloy-content.
[2] Crude metal (ingot, pig, slabs, etc.) plus ingot equivalent (wt. × 0.9) of scrap.

TABLE 9.—*World production of aluminum*

[Thousand short tons]

Country	1949–53 (average)	1954	1955	1956	1957	1958
United States	870	1,461	1,566	1,679	1,648	1,566
Canada	452	558	612	620	557	646
U.S.S.R.[1]	243	375	475	500	550	605
Iron curtain countries[1]	[2] 33	85	130	143	141	176
France	93	132	142	165	177	186
Germany, West	75	142	151	162	170	151
Norway	52	68	79	101	105	134
Japan	38	59	63	73	75	93
Italy	49	63	68	70	73	71
Austria	31	53	53	65	62	63
Cameroon					8	35
Switzerland	27	29	33	33	34	34
United Kingdom	33	35	27	31	33	30
Other countries	[3] 22	35	45	78	92	100
Total	2,018	3,095	3,460	3,720	3,725	3,890

[1] Estimated.
[2] Average for Czechoslovakia 1953 only; East Germany 1950–53.
[3] Average for Brazil 1951–53.

TABLE 10.—*World production of aluminum by continents*

[Percent]

Continent	1949–53 (average)	1954	1955	1956	1957	1958
North America	65.5	65.2	62.9	61.8	59.2	56.9
Europe	32.2	32.3	34.4	35.1	36.9	38.0
Asia	2.2	2.4	2.6	2.7	3.1	3.6
Africa					.2	.9
South America	.1	.1	.1	.2	.3	.3
Oceania–Australia				.2	.3	.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 11.—*Apparent consumption of aluminum in the United States*

[Short tons]

Year	Primary sold or used by producers	Imports (net)[1]	Recovery from old scrap	Recovery from new scrap	Total apparent consumption
1949–53 (average)	864,432	196,869	69,550	208,475	1,329,326
1954	1,478,740	196,103	[2] 59,989	[2] 232,052	1,966,884
1955	1,571,845	203,385	[2] 76,372	[2] 259,622	2,111,224
1956	1,591,478	196,277	[2] 71,673	[2] 268,095	2,127,523
1957	[3] 1,579,063	195,644	[2] 72,459	[2] 289,360	2,136,526
1958	[4] 1,590,978	211,616	[2] 64,127	[2] 225,428	2,092,149

[1] Crude and semicrude. Includes ingot equivalent of scrap imports and exports (wt. × 0.9).
[2] Not strictly comparable with previous years' data. The 1954–58 data are recoverable aluminum content; previous years' data are recoverable aluminum-alloy content.
[3] Includes 324,311 tons shipped to the Government.
[4] Includes 325,126 tons shipped to the Government.

World production of primary aluminum is given in table 9. In 1958 Canada was the second largest producer, but this position was being challenged by the U.S.S.R. The rapid growth of the U.S.S.R. industry is illustrated by the fact that construction of the first aluminum plant in that country was not started until 1930.

In mid-1958 domestic primary aluminum producers expressed concern over the increased availability of aluminum from the U.S.S.R. on world markets and the undiminished importation of aluminum to the United States when the domestic industry was operating at only 70 percent of capacity. By the year's end exports of aluminum from Iron Curtain countries to the free world had decreased to the normal level.

Statistical information on the consumption of aluminum in the United States by industries

or by end products is incomplete. Total apparent consumption of aluminum, calculated from primary production and primary producers' stock changes, net imports of crude, semicrude and scrap, and recovery from scrap, is shown in table 11. These consumption figures do not allow for stock changes at any consumption level, at secondary smelters, nor for metal going to Government stocks.

SELF-SUFFICIENCY

As indicated in the previous section an average of only 12 percent of the U. S. aluminum supply was imported during 1949 to 1958. The capacity of the domestic industry always has been approximately equal to the demand. Domestic supplies of economically competitive bauxite are limited, and bauxite imports in 1958 accounted for 86 percent of the total ore supply. (For further details see the Alumina and Bauxite Chapter.)

STRATEGIC CONSIDERATIONS

Aluminum is on Group I of the list of strategic and critical materials for stockpiling. Government stocks have been acquired, and at the end of 1958 the inventory approximately equaled or exceeded the basic and maximum objectives.

In view of the stockpile position, the fact that the major import source is Canada, the geographic dispersion of the industry, and a 35 percent increase in domestic production capacity since 1955, the strategic position of primary and secondary aluminum, exclusive of ore supplies, is good.

DEFENSE PROGRAM

Under the impetus of both World War II and the Korean hostilities, domestic primary aluminum capacity expanded sharply. During these periods (1941–45 and 1951–52) aluminum came under the Controlled Materials Plan and the metal was distributed under a system of priorities.

Primary production capacity was 245,000 tons in 1940 and owned by one company, Alcoa. By 1943 capacity was increased to 1,164,000 tons including 668,000 tons belonging to the Government and 80,000 tons owned by Reynolds. Peak wartime production of 920,000 tons was reached in 1943, and then as supplies exceeded demand, production dropped to a postwar low of 410,000 tons in 1946. After the war Government plants, which were not economically competitive, were sold and converted to nonaluminum uses. Those which could be operated competitively were sold to Alcoa, Reynolds, or Kaiser (then Permanente Metals Corp.). After disposal of the Government plants, domestic primary aluminum capacity was 680,000 tons.

The pattern of the industry was unchanged from 1946 until the Korean hostilities. From 1951 through 1954 inclusive, 613,000 tons of Government-aided capacity came into production. Expansion during this period differed from World War II expansion in that none of the facilities were owned by the Government and all were located near electric power sources, which would permit economic operation of the plants in peacetime. The Government issued accelerated tax amortization certificates and entered into market guarantee contracts with the companies. Market guarantee contracts with Aloca and Kaiser expired late in 1958, and the contract with Reynolds was scheduled to expire by mid-1959. The expiration date of the remaining contract with Harvey Aluminum, Inc., was indefinite, but it will probably end in 1963. During 1957 and 1958, under these guarantees, the three largest producers shipped 647,000 tons of aluminum to the Government.

PRICES AND COSTS

The aluminum industry's price policy probably has been an important factor in the rapidly increasing usage of the metal by many consuming industries. While prices of other major nonferrous metals have increased between 100 to 150 percent from 1939 to 1959, the price of aluminum ingot increased only 34 percent during the same period. The average price of aluminum ingot in 1925 was 28.2 cents a pound and gradually decreased to the World War II price of 15.0 cents a pound. The first increase was in 1948, but the 1925 price was not approached until August 1957 when the postwar high of 28.1 cents a pound was reached. At the end of 1958 the price of ingot was 26.8 cents a pound.

Primary aluminum prices are relatively stable. Sharp fluctuations in the supply-demand balance are reflected in changes in scrap and secondary ingot prices. When aluminum was in short supply in 1955, the average price of two widely used alloys produced from scrap was 5 cents a pound more than the price of primary ingot.

One company reported the following mill costs (in cents a pound of pig) for 1953 (*18*):

Raw materials (includes alumina at cost including transportation and alloying materials)	4.71
Energy (for reduction only)	2.93
Manufacturing costs	6.43
Total	14.07

Transportation costs on shipments of pig, general administrative expense, and selling expense brought the total cost to 16.20 cents a

pound of pig. The average price of pig in the United States in 1953 was 19.7 cents a pound.

TARIFF

The Tariff Act of 1930 established an import duty of 4 cents a pound on crude aluminum. This was reduced to 3 cents in 1939. Pursuant to the General Agreement on Tariffs and Trade the duty was reduced to 2 cents a pound in 1948 and to 1½ cents in June 1951. Further negotiations under the agreement in 1956 resulted in three periodic reductions to the 1.25 cents a pound tariff that became effective July 1958. At that time the duty on typical aluminum manufactures was 3.5 cents a pound plus 17 percent ad valorem.

TRANSPORTATION

Much of the aluminum produced in the Pacific Northwest has been shipped to consuming areas east of the Mississippi River. The proximity of the new plants in the Ohio River Valley to the consuming areas results in lower transportation costs. Movement of alumina, by rail, from the alumina plants in the South Central United States to the consuming plants in the Northwest and Northeast represents a considerable item of cost.

GOVERNMENT POLICIES

As described in the section, Defense Program, the Government, through direct financing or incentives, has encouraged expansion of the aluminum industry from the mine through semifabricating facilities. Government programs have focused on promotion of a competitive industry and have resulted in the entry of new producers and assured that part of the production from new facilities will be made available to nonintegrated consumers of crude aluminum. Government policies relating to the development of power in agricultural areas have also had a profound effect on the formation and location of the industry.

RESEARCH

To hold markets won by displacing traditionally used materials and to continue to expand into new fields and applications, the aluminum industry, in 1958, spent more than $25 million on research and product development. This expenditure included research on bauxite and alumina production and utilization.

Industrial research covers the entire field of metal production, from the reduction cell, through the development of alloys and casting techniques, the study of protective and decorative finishes, and detailed investigations of end use applications of the metal. The producers develop technical data for their own use, as well as for the use of their customers.

Over the years, intensive efforts to improve the efficiency of the reduction step have resulted in significant decreases in power and manpower requirements. In 1938 power requirements were 10 to 11.5 kw.-hr. per pound of metal produced. Plants built since 1950 require only 7.5 to 8.5 kw.-hr. per pound. Manpower requirements have decreased from nearly 100 manhours per ton in 1939 to 24 manhours in 1954.

The industry's continuing alloy research program has resulted in the development of alloys with increased strength at elevated temperatures, increased electrical conductivity and improved corrosion resistance. Anodizing processes have been developed to protect and color aluminum surfaces. Methods of surface treatment and new basic materials have been developed in recent years to increase the commercial application of aluminum products protected by vitreous enamels.

From 1955 to 1959 the aluminum industry directed a major part of its end product development effort toward the automotive industry. The success of the effort was shown by the increased use of aluminum in automobiles and recent adoption of an air-cooled aluminum engine by one manufacturer. Applications in architecture and home building and packaging and containers also have been the subject of intensive investigation.

The Bureau of Mines at the Northwest Electrodevelopment Experiment Station, Albany, Oreg., began research late in 1951, under a cooperative agreement with Apex Smelting Co. of Chicago, to develop a smelting technique for producing aluminum-silicon alloy in a 3-phase ferroalloy-type arc furnace. A mixture of hogged fuel and coke proved to be promising as a reducing agent. Based on the work at Albany, the National Metallurgical Corp., a subsidiary of Apex Smelting Co., installed a commercial-size furnace for the production of silicon at Springfield, Oreg.

Subsequently, the Bureau conducted independent smelting research on the use of wood chips and coke in an arc furnace to smelt aluminum silicates containing 20 to 55 percent alumina, as a means of recovering aluminum from nonbauxitic sources. The early phases of this research have been described (*3*).

The Bureau of Mines was also investigating methods for producing commercial-grade aluminum from the crude aluminum-silicon alloys made by carbothermic reduction of domestic clays. One method involved leaching the crude alloy with molten zinc to selectively dissolve the aluminum, which was then recovered by distillation of the zinc.

The Bureau has also initiated research on the

fundamental physical chemistry of fused salt electrolysis in the aluminum reduction cell. The cathode and anode processes in the electrolysis of the fused cryolite bath were being studied and pertinent physical, chemical, and thermodynamic data obtained.

Plaintiff's Exhibit 421c

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COPPER

BY A. D. McMAHON

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COPPER

By A. D. McMahon[1]

COPPER has been associated with the progress of civilization since prehistoric times, possibly as long ago as 6000 B.C. However, the acceleration in growth of world demand from 10,000 to 4 million tons annually has occurred in the past 150 years as a result of the development of electrical power and expansion of the brass and bronze industry.

SUMMARY

The progressive expansion of copper production in the United States began with the discovery of large deposits of native copper near Lake Superior in Michigan about 1845. Extensive ore bodies were found in Arizona, Montana, New Mexico, and Utah in the last half of the 19th century, and today the mining districts in these States account for approximately 85 percent of the Nation's mine production, which grew from 730 tons of recoverable copper in 1850 to about 1 million tons annually since 1955.

Copper mining, smelting, and refining in the United States are largely controlled by 4 companies; and, of the 30 large fabricators of raw copper, the plants handling over 50 percent of the total volume of business are owned or controlled by the large copper producers. They have completely integrated operations from the mines to the finished copper and copper-alloy products. The large copper deposits outside the United States are similarly controlled; Chile's production is derived mostly from three mines owned by two American companies; Northern Rhodesia's output comes from four large mines; one company controls Belgian Congo's several mines which are worked as a unit; and three mines account for nearly three-quarters of Canada's output.

Copper ores occur in many types of deposits associated with igneous, sedimentary and metamorphic rocks. Porphyry copper deposits make up most of the world's reserve and are mined principally by open-pit or block-caving methods. In 1958 open-pit mining accounted for 76 percent of the ore mined and 71 percent of the copper produced in the United States.

Most of the present copper production is derived from sulfide ores beneficiated by flotation. This process has been highly perfected for the sulfide minerals, but only a measure of success has been attained on copper carbonates, and flotation of the copper silicates remains to be solved.

Smelting sulfide concentrate involves producing a matte and slag in a reverberatory furnace and then oxidizing the sulfur and iron in the matte in a converter to release copper metal. Impurities in the copper are removed by electrolytic or fire refining.

Leaching followed by cementation or electrolysis is the process used to recover copper from oxide ores—carbonates and silicates. Recovery of copper from mixed oxide-sulfide ores is more difficult but is accomplished by ferric sulfide leaching or leach-precipitation-flotation. About 9 percent of the U.S. production of copper comes from ores treated by hydrometallurgical methods.

Copper is widely used because it has high electrical conductivity, high heat conductivity, good corrosion resistance, and because it is strong, yet malleable and ductile and can be alloyed readily with many other metals to acquire or impart desirable characteristics. Nearly half of the copper consumed is used in virtually pure metallic form, primarily by the electrical industry in manufacturing generators, motors, electric locomotives, switchboards, telephone and telegraph equipment, light and power lines, and other items. Most of the remainder is used in manufacturing brass, bronze, and other copper alloys. During war, copper's chief uses are for military materiel requirements and for essential industrial production. Aluminum serves as a substitute for copper and its alloys in a number of electrical, mechanical, and decorative applications; stainless steels, copper clad metals, and plastics have also replaced copper for some uses.

Progress in conservational practices have been made possible by technological advances in mining, metallurgy, and equipment design. One of the most important measures is the reclamation of copper from scrap that provides nearly one-fourth of the U.S. supply.

[1] Commodity specialist.

In the United States the price of copper quoted by the principal producers fell from an alltime high of 46 cents a pound in July 1956 to 25 cents in January 1958. The quotation moved up 1½ cents in July 1958, indicating some market strength. Reestablishment of the copper excise tax July 1, 1958 and effective cuts in mine production halted the decline in price. By October 24, copper was quoted at 29 cents.

Mine production in 1958 was at the annual rate of 979,000 tons. Production and consumption of copper usually follow the general trend of the economy. Planned expansion at established mines and development of new properties continued, indicating that producers are confident in the long-term outlook for an increased demand. Consumption of new copper in the United States is expected to parallel population increase. Copper consumption for new uses will be offset by further encroachment of aluminum and other substitutes. Reports of planned foreign power projects, industrial expansions, and development of backward areas indicate substantial future increases in foreign requirements for copper.

The major problems facing the copper industry today are in the marketing and utilization fields, which involve development of new uses, price, competitive metals, competitive foreign production, and conservation in mining and processing.

The United States has been the largest copper producing and consuming country in the world for many years. Before World War II, production exceeded domestic consumption, but the large war and postwar requirements resulted in a prolonged shortage even though about one-fourth of the total supply was provided by imports. Spurred by Defense legislation, the principal producers increased capacity to reach a supply-demand balance in early 1956. A downturn in U.S. demand beginning about the middle of 1956 led to cutbacks in mine production in 1957 and 1958 to equalize output with consumption. There was no slackening in foreign demand however, and world production reached an alltime high in 1957.

Chile, Canada, Mexico, Peru, Northern Rhodesia, and the Belgian Congo provide approximately 85 percent of the U.S. receipts of foreign copper. The copper excise tax which had been suspended by Acts of Congress since April 30, 1947, except for a short period (July 1, 1950–April 1, 1951), became effective July 1, 1958 at 1.7 cents per pound. Because of the easier supply situation, export controls on refined copper were removed in September 1956, and 1958 exports rose to the highest level since 1929.

The world reserve of copper, in terms of metal content, is estimated at 170 million tons of copper. The principal resources accounting for 93 percent of this total are in 7 countries: Chile, Peru, United States, Northern Rhodesia, Belgian Congo, U.S.S.R., and Canada. The large quantity of copper in use and recoverable in the form of scrap provides an additional dependable reserve of available copper; in the United States this source is estimated to be about 30 million tons.

BACKGROUND

Copper was probably the second metal used by man, gold was the first. The very early history of copper is obscure, but according to the theories of some archaeologists and anthropologists, its first appearance was associated with the Neolithic civilization during the late Stone Age. Discovery is believed to have been about 6000 B.C. The early age of copper probably had its greatest development in Egypt. Definite records have been found of the working of the copper mines on the Sinai Peninsula by King Seneferu about 3800 B.C., and the discovery of crucibles at these mines indicates that the early art of extracting the metal included some refining.

Little is known about ancient copper mining, although it is certain that both open-cut and underground mining was practiced. The most important copper-ore deposits were in Sinai, Syria, Baluchistan and Afghanistan, Caucasia and Transcaucasia, the Taurus region, Cyprus, Macedonia, Iberia, and Central Europe. The copper in use among the Sumerians of southern Mesopotamia (3500–3000 B.C.) was obtained from Asia Minor (where certain ores contain the same impurities as are found in metal relics) which also supplied the Assyrians much later. The production peaks in this region fall between 2400–2000 B.C. and 1500–1200 B.C.

Copper was worked in many parts of Egypt from Dynasty III (2800 B.C.) onward. About 10,000 tons was produced over 1,500 years; thereafter Egypt became dependent upon imports from Cyprus and Armenia. In Cyprus, copper mining began about 2500 B.C. The mines were operated successively under the dominion of the Egyptians, Assyrians, Phoenicians, Greeks, Persians, and the Romans. The same deposit produced 37,000 tons of copper in 1958.

European copper mines belonging to the Bronze Age are known in Austria, Germany, France, Spain, Portugal, Greece, and Tirol (Tyrol). In Tirol, the mines of Mitterberg

seem to have been worked from about 1600 B.C. in the Bronze Age to the Hallstatt period of the Iron Age, about 800 B.C. Probably the most important copper deposits in Europe were those of Spain and Portugal including the outstanding Rio Tinto ore body which is still being mined. In Britain copper deposits found in Anglesey, Cornwall, Devon, and Shropshire are of historical interest, having been developed by the Romans after the great invasion of 43 A.D.

The Copper Age in the Americas probably dawned between 100 and 200 A.D. Although some bronze appeared about this time in South America, a so-called Bronze Age was not evident, and both North and South America passed more or less directly from Copper into the Iron Age. Copper was first produced in the American Colonies in 1709 at Simsbury, Conn.; the Spaniards are credited with finding the copper-producing area of southwestern New Mexico about 1800; and a significant ore body (Ely mine) was discovered in Orange County, Vt., in 1820. However, it was not until after the discovery of the Northern Michigan ore deposits in the early 1840's that production in the United States exceeded a few hundred tons a year. Extensive ore bodies were found in Montana and Arizona during 1860–80. Smelter output from domestic ores increased from 728 tons in 1850 to 30,240 in 1880. The first of the large low-grade porphyry ore bodies, at Bingham, Utah, was brought into production by the Utah Copper Co. (later absorbed by the Kennecott Copper Corp.) in 1906. The ore dressing methods and procedures of flotation that were developed to process successfully tremendous quantities of low-grade copper ores encouraged search for and development of other porphyry deposits that account for most of the domestic copper reserve.

SIZE AND ORGANIZATION OF THE INDUSTRY

The value of copper output in the United States is second only to iron among metals. The United States has been the largest copper-producing country in the world since 1883, except for 1934 when Chile ranked first. In 1958, the United States produced 26 and 25 percent, respectively, of world mine and smelter production. Other principal copper-producing countries were Chile, U.S.S.R., Northern Rhodesia, Canada, and Belgian Congo in that order. Countries of the western hemisphere produced 53 percent of the world's total mine output.

The primary copper industry of the United States is composed of approximately 200 companies engaged in the production and sale of copper. The principal segments of the industry—mining, smelting, refining, fabricating, and marketing—are dominated in varying degrees by a few large vertically integrated companies.

Twenty-five mines produced 97 percent of the domestic copper output in 1958; the 5 largest produced 52 percent, and the 10 leading mines furnished 76 percent. The balance was supplied by small copper mines and producers of other ores, which contained recoverable byproduct copper. Three companies, Kennecott Copper Corp., Phelps Dodge Corp., and The Anaconda Co., usually account for about three-fourths of the annual domestic mine production. Kennecott and Phelps Dodge are by far the largest producers and supply about 35 percent and 25 percent, respectively, of the total each year. The principal copper-mining companies in the United States in 1958 were:

Company	Recoverable copper content of ore mined (short tons)	Percent of U.S. total
Kennecott Copper Corp.	318,000	32
Phelps Dodge Corp.	253,000	26
The Anaconda Co.	113,000	12
San Manuel Copper Corp.	78,000	8
International Smelting & Refining Co.	42,000	4
White Pine Copper Co.	41,000	4
Miami Copper Co. (including Copper Cities)	31,000	3
Magma Copper Co.	31,000	3
Total, above companies	905,000	92
Total, United States	979,000	

Copper-smelting capacity (exclusive of the Lake smelters in Michigan) in the United States in 1958 totaled approximately 8.6 million tons of charge. Four companies control about 90 percent of this capacity. Copper-smelting companies and their approximate percentage of the total U.S. smelting capacity are:[1]

Company	Percent of total capacity (tonnage)
Phelps Dodge Corp. and Phelps Dodge Refining Corp.	31
Kennecott Copper Corp.	28
American Smelting & Refining Co.	13
The Anaconda Co.	12
International Smelting & Refining Co.[1]	4
San Manuel Copper Corp.	4
American Metal Climax, Inc.	3
Magma Copper Co.	3
Tennessee Copper Co.	1
Total	100

[1] A subsidiary of The Anaconda Co.

Lake-smelter capacity in 1958 totaled 157,000 tons, as follows:

	Short tons
Calumet & Hecla, Inc.	100,000
White Pine Copper Co.	45,000
Quincy Mining Co.	12,000

Electrolytic copper refining capacity in the United States in 1958 was about 1,762,000 tons. Three companies dominate this section of the copper industry and control almost 80 percent of the annual capacity.

Refining companies and their approximate percentages of the U.S. electrolytic refinery capacity in 1958 are:

Company	Percent of total U.S. capacity
American Smelting & Refining Co.	27
Phelps Dodge Corp.	27
International Smelting & Refining Co.[1]	14
Kennecott Copper Corp.	12
American Metal Climax, Inc.	8
The Anaconda Co.	8
Inspiration Consolidated Copper Co.[2]	3
Cerro de Pasco Corp.	1
Total	100

[1] A subsidiary of The Anaconda Co.
[2] 38 percent controlled by The Anaconda Co.

Kennecott Refining Corporation was constructing an electrolytic refinery near Baltimore, Md., in 1959, it will have an annual capacity of 200,000 tons.

About 10 percent of the primary refined copper produced in the United States is fire refined in Michigan, New Mexico, Texas, and New Jersey from crude materials produced in Michigan, New Mexico, and Arizona, and from foreign crude materials.

There are about 30 large copper fabricating companies in the United States making sheet, strip, wire, rods, pipe and other extruded and rolled shapes. Twelve of these companies handle over 50 percent of the total volume of business and are owned or controlled by the large copper producers, giving them completely integrated operations from the mines to finished copper and brass products. The following fabricating companies are controlled by these companies.

Fabricating company	Controlled by
Chase Brass & Copper Co.	Kennecott Copper Corp.
Kennecott Wire & Cable Division, The Okonite Co.	Kennecott Copper Corp.
American Brass Co.	The Anaconda Co.
Anaconda Wire & Cable Co.	The Anaconda Co.
Phelps Dodge Copper Products Corp.	Phelps Dodge Corp.
Revere Copper & Brass Co., Inc.	American Smelting & Refining Co.
General Cable Corp.	American Smelting & Refining Co.
Wolverine Tube Corp.	Calumet & Hecla, Inc.
C. G. Hussey & Co.	Copper Range Co.
New Haven Copper Co.	Tennessee Corp.
Titan Metal Manufacturing Co.	Cerro de Pasco Corp.
Lewin Mathes Co.	Cerro de Pasco Corp.

The larger independent fabricators not now controlled by the major producers include:

Bridgeport Brass Co.
Bristol Brass Corp.
Chicago Extruded Metals
Olin Mathieson Chemical Corp.
Mueller Brass Co.
Reading Tube Co.
J. A. Roebling's Sons Div., the Colorado Fuel & Iron Corp.
Rome Cable Corp.
Scovill Manufacturing Co.
Triangle Wire & Cable Co., Inc.
Volco Brass & Copper Co.

GEOGRAPHIC DISTRIBUTION OF THE INDUSTRY

Copper is widely distributed in nature, and almost every country has some copper-ore deposits; 22 countries each mined over 10,000 tons of recoverable copper in 1958, and about 20 other countries recorded some output. In spite of the wide distribution, there are relatively few large copper mining areas in the world.

Most of the copper produced in the United States comes from five Western States. Chile's production comes principally from three mines; Northern Rhodesia's output from four large mines; Belgian Congo's production from properties of one company, and three mines supply about 75 percent of Canada's output.

Concentration mills and smelters are usually near the principal mines and some process custom ores from smaller producers. There are eight smelters in Arizona; one each in Utah, Montana, Nevada, New Mexico, and Tennessee, one in Texas, and one each at seaports in Washington, New York, and New Jersey.

About 55 percent of the electrolytic refining capacity is accounted for by five refineries on the Atlantic Coast in New York City, Carteret and Perth Amboy, N.J., and Baltimore, Md.; five electrolytic refineries in Arizona, Washington, Montana, Utah, and Texas provide the remainder. Three Michigan plants fire-refine Lake copper, and fire-refined copper is also produced in New Mexico, Texas, and New Jersey.

Most of the major copper-fabricating plants (brass and wire mills) are in the Connecticut Valley area. Two California plants were

placed in operation in 1957. Secondary smelters are far less concentrated, and about 3,000 foundries and miscellaneous users of copper materials are scattered throughout the United States.

For many years before World War II, U.S. smelting and refining capacity was excessive for treating domestic materials, and the excess capacity was used to treat substantial quantities of foreign crude materials. Since the war, foreign producers have made great progress in building their own reduction plants. In 1958 there were approximately 95 primary smelters and refineries in 25 foreign countries.

DEFINITION OF TERMS, GRADES, AND SPECIFICATIONS

There are three basic classes of commercial copper that arise from the high affinity of molten copper for oxygen, and the methods employed for its control. They are designated as Tough Pitch Copper, Oxygen-Free Copper, and Deoxidized Copper. Several types of each class of commercial copper are available in refinery shapes, and wrought and cast products. Eighteen such types are recognized by the American Society for Testing Materials in its Classification of Coppers. This classification is shown in table 1 and the terms used are defined as follows:

TABLE 1.—*Classification of coppers*

Designation	Type of copper	Forms in which available							
		From refiners				From fabricators			
		Wire bars	Billets	Cakes	Ingots and ingot bars	Flat products	Pipe and tube	Rod and wire	Shapes
Cath	Electrolytic cathode	Available in cathodes only.							
		Tough pitch coppers							
ETP	Electrolytic tough pitch	X	X	X	X	X	X	X	X
FRHC	Fire-refined high conductivity tough pitch		X	X		X	X		
FRTP	Fire-refined tough pitch		X	X		X	X	X	X
ATP	Arsenical tough pitch								
STP	Silver bearing tough pitch	X			X			X	X
SATP	Silver bearing arsenical tough pitch								
CAST	Casting				X				
		Oxygen-free coppers							
OF	Oxygen-free without residual deoxidants	X	X	X		X	X	X	X
OFP	Oxygen-free, phosphorus bearing		X	X				X	X
OFPTE	Oxygen-free, phosphorus and tellurium bearing								
OFS	Oxygen-free, silver bearing	X	X	X		X		X	X
OFTE	Oxygen-free, tellurium bearing								
		Deoxidized coppers							
DHP	Phosphorized, high residual phosphorus	X	X	X		X	X	X	X
DLP	Phosphorized, low residual phosphorus		X	X		X	X		
DPS	Phosphorized, silver bearing								
DPA	Phosphorized, arsenical								
DPTE	Phosphorized, tellurium bearing							X	X

Electrolytic copper is that refined by electrolytic deposition. *Fire-refined copper* is refined by using a furnace process only. *Tough-pitch copper* is electrolytic or fire-refined copper cast in refinery shapes and containing a controlled quantity of oxygen in cuprous oxide. *Oxygen-free copper* is refined copper cast under a deoxidizing atmosphere that eliminates all cuprous oxide without using metallic or metalloidal deoxidizers. *Deoxidized copper* is refined copper freed from cuprous oxide through use of metallic or metalloidal deoxidizers.

High conductivity copper has a minimum conductivity of 100 percent I.A.C.S. in the annealed condition. *Casting copper* is fire-refined tough-pitch copper, usually derived from secondary metal and cast into ingot and ingot bars only for use in making foundry castings, but no wrought products. *Phosphorized copper* is a general term applied to copper deoxidized with phosphorus. It is the most commonly used deoxidized copper. *Arsenical copper, phosphorus bearing copper, silver bearing copper, tellurium bearing copper.*—Copper containing the designated element in

amounts as agreed upon between the supplier and the consumer. Any of these alloyed coppers can be produced as tough-pitch, oxygen-free, or deoxidised varieties. Table 1 shows the ones commonly supplied.

Several refinery shapes are made depending partly on the end use of the copper.

Wire bar is a refinery shape for rolling into rod (and subsequent drawing into wire), strip or shape. Wire bars are approximately 3½ to 5 inches square in cross-section, usually from 38 to 54 inches in length, and weighing from 135 to 420 pounds. They are tapered at both ends when used for rolling into rod for subsequent wire drawing and may be unpointed when used for rolling into strip. *Cake* is used for rolling into plate, sheet, strip, or shape. It is rectangular in cross-section of various sizes and ranges from 140 to 4,000 pounds or more in weight. The refinery shape used primarily for tube manufacture is termed billet. It is circular in cross-section, usually 3 to 10 inches in diameter and in lengths up to 52 inches; weight from 100 to 1,500 pounds. *Ingot and ingot bars* are employed for alloy production (not fabrication). Ingots usually weigh from 20 to 35 pounds and ingot bars from 50 to 70 pounds. Both usually are notched to facilitate breaking into smaller pieces and are used for remelting. Unmelted flat plate produced by electrolytic refining is called *cathode*. The customary size is about 3 feet square and about ½ to ⅞ inches thick, weighing up to 280 pounds.

Copper is graded principally according to its chemical composition and electrical resistivity. Specifications adopted for selected American Society of Testing Materials (ASTM) designations are as follows:

B4—42 Lake copper wire bars, cakes, slabs, billets, ingots and ingot bars (must originate on the northern peninsula of Michigan).

(a) Low resistance lake copper—minimum purity of 99.900 percent, silver being counted as copper.

	Resistivity, maximum international ohm (meter, gram)
Wire bars	0.15328
Cakes, slabs, and billets:	
When specified for electrical use at time of purchase	.15328
Other uses	.15694
Ingots and ingot bars	.15694

(b) High resistance Lake copper—minimum purity of 99.900 percent, silver and arsenic being counted as copper. Lake copper, having a resistivity at a temperature of 20° C. (68° F.) greater than 0.15694 ohm (meter, gram), shall be known as "high resistance lake."

B5—43 Electrolytic copper wire bars, cakes, slabs, billets, ingots and ingot bars—minimum purity of 99.900 percent, silver being counted as copper.

	Resistivity, maximum international ohm (meter, gram)
Wire bars	0.15328
Cakes, slabs, and billets:	
When specified for electrical use at time of purchase	.15328
Other uses	.15694
Ingots and ingot bars	.15694

B115—43 Electrolytic cathode copper—minimum purity of 99.90 percent, silver being counted as copper. The copper shall have a resistivity not to exceed 0.15328 international ohms per metergram at 20° C. (annealed).

B170—47 Electrolytic copper, oxygen-free, wire bars, billets, and cakes—minimum purity of 99.92 percent, silver being counted as copper. The copper in all shapes shall have a resistivity not to exceed 0.15328 ohms (meter, gram) at 20° C. (annealed).

B72—55T Fire-refined casting copper—must conform to the following requirements as to chemical composition:

	Grade A percent	Grade B percent
Copper plus silver, minimum	99.75	99.50
Arsenic, maximum	.0075	.10
Antimony, maximum	.012	.012
Bismuth, maximum	.008	.008
Iron, maximum	.010	.010
Lead, maximum	.100	.80
Nickel, maximum	.10	.10
Oxygen, maximum	.10	.10
Selenium, maximum	.040	.040
Sulfur, maximum	.01	.01
Tellurium, maximum	.014	.014
Tin, maximum	.025	.05

B216—49 Fire-refined copper for wrought products and alloys—must conform to the following requirements as to chemical composition. (No resistivity specifications.)

	Percent
Copper plus silver, minimum	99.88
Arsenic, maximum	.012
Antimony, maximum	.008
Selenium plus tellurium, maximum	.025
Nickel, maximum	.05
Bismuth, maximum	.008
Lead, maximum	.004

COPPER-BASE ALLOY TERMS

Copper and copper-base alloys comprise a series of metals that include all the alloys which are at least 40 percent copper and where the amount of copper is not less than the amount of any other constituent. There are essentially four well-known kinds of copper-base alloys, e.g. brass, bronze, nickel-silver, and cupro-nickel. Modern nomenclature for certain compositions departs from the original concept that brasses are copper-zinc alloys and bronzes principally copper and tin. Metallurgical research has developed important new alloys and necessitated revision of many original, simple definitions.

Brass may be defined as any copper-base alloy containing zinc as the principal alloying constituent, with or without smaller quantities of other elements. Some of the alloys known as nickel-silver could be termed "brasses," but

these alloys also possess enough distinctive qualities to warrant separate classification. There are alloys that are definitely brasses by definition, yet have names that include the word "bronze;" for example, *commercial bronze* containing 90 percent copper and 10 percent zinc.

The term *bronze* is seldom used alone and the copper-tin alloys have come to be known as *phosphor bronze* because of the small residual phosphorus content. With a suitable modifier the term *bronze* also extends to various copper-base alloy systems where the principal alloying element is other than tin or zinc. These systems include *aluminum bronzes*, *beryllium bronzes*, and *silicon bronzes*.

Nickel-silver, formerly known as German silver, is a copper-alloy containing both nickel and zinc. Its name derives from its predominantly silvery color. *Cupro-nickels* are essentially copper and nickel, the nickel content usually 10, 20, or 30 percent. In addition to these, there are many special and proprietary alloys that include *aluminum-tin bronze*, *aluminum-silicon bronze*, *cadmium bronze*, *chromium copper*, *beryllium copper*, *leaded copper*, and *selenium copper*.

Copper-base alloys are also grouped in two classes according to specifications required in the processes of fabrication. These two classes are wrought alloys and casting or foundry alloys. The *wrought alloys* of copper are regarded as only those made by alloying the various components and casting into slabs, cakes, or billets for hot or cold rolling, drawing, extrusion, or forging. *Casting alloys* are made from a complex assortment of industrial nonferrous scrap by scientific selection, smelting, and refining processes. Many compositions suitable for casting in sand or permanent molds are entirely unfit for working operations.

TECHNOLOGY

GEOLOGY

Deposits of copper are found in a variety of host rocks under greatly varied structural conditions. The periods of their formation range from Precambian to Tertiary, embracing most of known geologic time.

Copper deposits are characteristically associated, both in time and place of formation, with igneous activity. With the Tertiary deposits, and less notable with earlier deposits, both extrusive and intrusive rocks are present. In most copper districts the igneous rocks are of intermediate composition (diorites and monzonites), with the quartzose and porphyritic phases in the intrusive bodies and corresponding compositions in the extrusive rocks.

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Most copper deposits are associated in origin with intrusive bodies, and the deposits tend to group around relatively small stocks or cupolas that are upward projections of batholiths. There is, however, a notable difference in the relation of different types of deposits to the stocks. In the United States the Tertiary copper deposits of the eastern Cordilleran region are in and grouped around the tops of stocks. Much of the copper occurs in the stocks, and most of it is within a few thousand feet of the stocks. The deposits of pre-Cambrian, Paleozoic, and part of those of Mesozoic Age are not so closely associated with exposed stocks. In fact, many of them are several miles from known intrusive bodies, and relatively little copper occurs in stocks. The difference seems to be due to the distance below the surface at which the igneous bodies are intruded and the copper deposits are formed.

Many of the Tertiary stocks were intruded near the surface, as they cut lavas of the same general age which were at most a few thousand feet thick. Solutions moving to the top of and outward from such bodies could not travel far before the change in heat and pressure would cause precipitation of copper minerals in or only a few thousand feet from the stock. Solutions from bodies that were far below the surface could travel farther from the source before loss of heat and decrease of pressure would cause precipitation of copper minerals; therefore, the deposits may be thousands of feet from their igneous source.

Copper occurs in many mineral combinations both in hypogene and supergene deposits. For hypogene deposits associated with igneous rocks, in which copper is the chief metal of economic value, there is not a very wide range in the temperature of deposition, but variations in physical and chemical conditions give corresponding variations in types of deposits. This does not imply that copper does not deposit over a considerable range of temperatures, because copper combined with iron as chalcopyrite or cubanite apparently deposits at a higher temperature than that combined with antimony as tetrahedrite or with sulfur as simple copper sulfide, chalcocite.

Copper deposits are commonly classified as porphyry, cupriferous pyrite, sedimentary, and vein deposits.

Porphyry copper deposits contain most of the world's estimated commercial reserve of copper. Porphyry is an igneous rock in which larger crystals are set in a finer groundmass. In the commercial sense the term *porphyry copper deposits* is not restricted to ore in porphyry but is applied to deposits characterized by huge size, uniform mineral dissemi-

nation, and low average copper content. Many porphyry copper deposits were formed by the secondary enrichment of lean primary sulfides brought about by weathering or other surficial processes and subsequent leaching and deposition of the copper at lower levels from descending surface waters. This action usually develops an upper leached zone containing oxide minerals underlain by an enriched section of higher grade sulfide ores. In most porphyry deposits the primary mineralization is of sufficient grade to constitute an ore of copper. The major porphyry copper deposits of the world are in Southwestern and Western United States, Chile, Peru, and U.S.S.R.; there are smaller deposits in Mexico and Canada.

In the Central African copper belt, the copper ores of Northern Rhodesia occur in *sedimentary deposits* underlain by metamorphic and igneous rocks and overlain by a thick series of younger sediments. The sedimentary beds have been strongly folded into a series of complex anticlines and synclines. The anticlines have been eroded and leave down folded basins of the synclines in the older underlying rocks where concentrations of copper minerals are found. Most of the orebodies consist of sulfide ore, but considerable oxidized ore occurs in certain sections. Belgian Congo deposits are similar to those of Northern Rhodesia except for tighter folding and more abundant faulting. The better known occurrences consist of oxidized ore near the surface but large sulfide deposits exist at depth.

Cupriferous pyrite deposits are usually lenticular or podshaped, contain pyrite and/or pyrrhotite, with chalcopyrite, and are found in crystalline schists or slates lying parallel with the foliation. Pyritic lenses were at one time the world's main source of copper; noted deposits are in Spain, Cyprus, Turkey, Sweden, and in the United States.

Vein deposits are the result of filling open fissures or of replacing wall rock along narrow cracks, thus forming workable ore bodies. The vein system at Butte, Mont., is characteristic of this type of deposit.

MINERALOGY

Copper is found in nature in numerous minerals and in various combinations with other elements. Some 165 copper minerals are known; however, only about 12 are commercially important and about 6 minerals are the source of over 95 percent of the copper mined. Occasionally enough of the minor minerals are found in some ores to be considered a source of copper, but usually they are associated with the major copper minerals.

The principal copper minerals are as follows:

Mineral	Composition	Specific gravity	Copper percent
Native: Native copper	Cu	8.9-8.9	100
Oxides:			
Cuprite	Cu_2O	6.0	88.8
Tenorite	CuO	6.5-6.5	79.9
Malachite	$CuCO_3.Cu(OH)_2$	3.9-4.03	57.3
Azurite	$2CuCO_3.Cu(OH)_2$	3.77	55.1
Chrysocolla	$CuSiO_3.2H_2O$	2.0-2.4	36.0
Antlerite	$CuSO_4.2Cu(OH)_2$	3.9	53.7
Brochantite	$CuSO_4.3Cu(OH)_2$	3.9	56.2
Atacamite	$CuCl_2.3Cu(OH)_2$	3.75-3.77	59.5
Chalcanthite	$CuSO_4.5H_2O$	2.208.2	25.4
Sulfides:			
Chalcocite	Cu_2S	5.5-5.8	79.8
Digenite	Cu_9S_5	5.5-5.6	78.1
Covellite	CuS	4.6-4.6	66.5
Chalcopyrite	$CuFeS_2$	4.1-4.3	34.5
Bornite	Cu_5FeS_4	4.9-5.4	63.3
Enargite	Cu_3AsS_4	4.43-4.45	48.3
Tetrahedrite	$Cu_8Sb_2S_7$	4.7-5.0	45.1
Tennantite	$Cu_8As_2S_7$	4.7-5.0	57.5

There are three important groups of copper-bearing minerals. Primary or hypogene minerals, or those deposited at considerable depth in the earth by processes related to igneous activity. Examples of these are bornite, chalcopyrite, enargite, etc. Oxidized copper minerals are formed by weathering of copper sulfides exposed by erosion. Cuprite, malachite, azurite, and chrysocolla are the chief minerals of the oxidized zones of copper deposits. Brochantite and atacamite are found in the upper portions of orebodies in arid regions. The third group is of secondary or supergene sulfides. These minerals are formed when copper is leached from sulfides exposed near the earth's surface, carried downward in solution, and precipitated near water level. The simple sulfides, chalocite and covellite, are members of this group, although not exclusively so, and other copper-bearing sulfides are occasionally placed in this category.

Native or elemental copper is commonly found in the oxidized zone of most of the principal copper deposits of the world, but usually in small quantities. In contrast to this usual occurrence, the great native copper deposits of the Lake Superior region in Michigan are now believed to be of hypogene origin. The deposits of the Lake Superior district and Corocoro, Bolivia, are the only ones of economic importance in which elemental copper is the chief ore mineral.

The copper minerals found most frequently at the surface are the green and blue copper carbonates and the green silicates. These colors are distinctive; however, a rock with a very small percentage of copper may be colored green. Cuprite, tenorite, native copper, atacamite, chalcanthite, and occasionally other rare copper minerals are found in outcrops; these minerals together with the carbonates and silicate minerals, are usually formed by the weathering of copper sulfides. Chalcopy-

rite and, to a smaller extent, bornite may exist in outcrops or in float, but when found at the surface in arid districts usually are in the form of kernels surrounded by alteration products.

PROSPECTING AND EXPLORATION

Surface prospecting often based on the distinctive coloration due to weathering of copper minerals is the method by which most of the world's present copper mines were discovered. However, the exploration responsible for the expansion of many mines to present day capacities resulted from costly geologic and geophysical investigations, exploratory drilling and underground workings.

Tracing float, trenching and test pitting are the usual surface prospecting methods used. Search for copper minerals that do not outcrop and lie at considerable depth is done by geophysical methods, drilling or shaft sinking. Geophysical prospecting utilizes the gravimetric, magnetic, electric, seismic and thermic properties of rocks and minerals, natural to the ground tested, or produced artificially. Geophysical surveys provided information that encouraged development of two outstanding deposits: (1) Pima mine in Arizona where the ore body lays beneath 200 feet of valley fill and (2) the buried Sherritt Gordon Lynn Lake nickel-copper deposit in Canada. Gravity surveys in an underground copper mine at Bisbee, Arizona partly supplanted exploratory crosscutting and diamond drilling.

Initial exploration to define limits and boundaries and show the importance of newly found deposits is usually accomplished by drilling. Three principal types of drills are employed; churn drills, core drills, and hammer or percussion drills. Diamond drilling is most widely used in exploration because of its speed, adaptability for directional drilling, and core recovery.

MINING

Both open-pit (or open-cut) and underground methods are used in mining various types of copper ore deposits. The choice of method depends on the size, grade, and depth of the ore body and relative mining costs for the required output. Open-pit mining is the most profitable method of exploiting thin flat beds of ore with shallow cover. Large bed-like masses and ore bodies with widely disseminated mineralization (known as porphyry ore) are mined by the open-pit power-shovel method if they lie close enough to the surface so the cost of removing the overburden is not excessive. If the overburden-to-ore ratio is too high, these deposits usually are mined by underground caving systems designed for low-cost mass production. An open-pit copper mine is shown in figure 1.

The general features of open-pit mining appear simple but good management and systematic work are essential. The shape and position of the ore body must be predetermined to allow planning of stripping disposal, approaches, benching design, pit slope, transportation, equipment and other necessities to promote handling a maximum amount of ore and waste. The advantages of the open-pit are: (1) The ease with which mine production can be increased or decreased; (2) the ease with which the mine can be shut down or started up; (3) more selectivity in mining; and (4) complete extraction of the ore. Drilling, blasting, loading, and transportation constitute the cycle of open-pit ore extraction, and improvements of all operations are problems of constant research. Recent advances include the use of rotary drills instead of churn drills for blast-hole drilling; use of the lower cost fertilizer grade ammonia nitrate explosive; the trend toward larger shovel dippers and larger trucks; and the installation at some mines of inclined belt conveyors and skips to remove ore from the pits.

A substantial portion of the world's copper production is mined from deep deposits by underground methods, other than block caving, which are adaptable to maximum extraction of ore from the various types of ore bodies with the greatest safety and at minimum cost. Most of the common underground methods, (square set, rill, shrinkage, top slicing, sublevel caving, cut and fill, long-hole, room and pillar, etc.) with variations are used in mining copper ores. Ore handling systems at large mines are almost completely mechanized and great tonnages of ore are moved at low cost with a minimum of labor. Advancements have been made in lowering transportation and other costs in some mines, making it possible to mine ore bodies or portions of ore bodies not considered economically recoverable a few years ago. Improved drilling equipment, muckers, slushers, haulage equipment, and underground conveyors have increased efficiencies at many copper mines. In some, transportation on haulage levels is controlled by a dispatcher who transmits messages to motormen over a mine telephone or radio system. Inter communication among motor operators is possible, preventing collisions and delays. One way traffic underground is a recent development contributing to reduction of accidents and efficiency in mine haulage.

The growth of open-pit mining since 1939 is shown in figure 2. In the United States

FIGURE 1.—An Open Pit Copper Mine. (Courtesy Kennecott Copper Corp.)

open-pit mining in 1958 accounted for 76 percent of the ore mined and 71 percent of the copper produced. The block-caving operation at San Manuel and the White Pine Copper Co.'s room-and-pillar system account for the slight percentage increase in production from underground mines since 1955.

BENEFICIATION

Processing sulfide ores of copper now provides and, in the foreseeable future, will continue to provide the bulk of the copper produced. The concentrators treating sulfide ores follow similar flowsheets employing crushing, grinding, classifying, flotation, thickening, and filtering (figure 3).

The flotation process for separating copper sulfide minerals from gangue material is far advanced and is used universally except at some small operations, which may employ gravity concentration using jigs or vibrating tables. Large concentrators following good milling practice recover about 90 percent of the copper in the concentrate. The typical copper concentrate, in the United States, contains 25 to 30 percent copper and sometimes gold, silver, molybdenum, and selenium.

Recovery of copper carbonate minerals, either alone or together with copper sulfides by sulfidation and xanthate flotation has been achieved with a certain degree of success, but flotation of the silicate minerals, dioptase and chrysocolla, remains to be solved. Numerous procedures for floating silicates have been reported, but the processes are uneconomic.

LEACHING

Approximately 9 percent of the U.S. production of copper is by hydrometallurgical methods. Leaching followed by cementation or electrolysis is the process used to recover copper from ores containing copper oxide minerals.

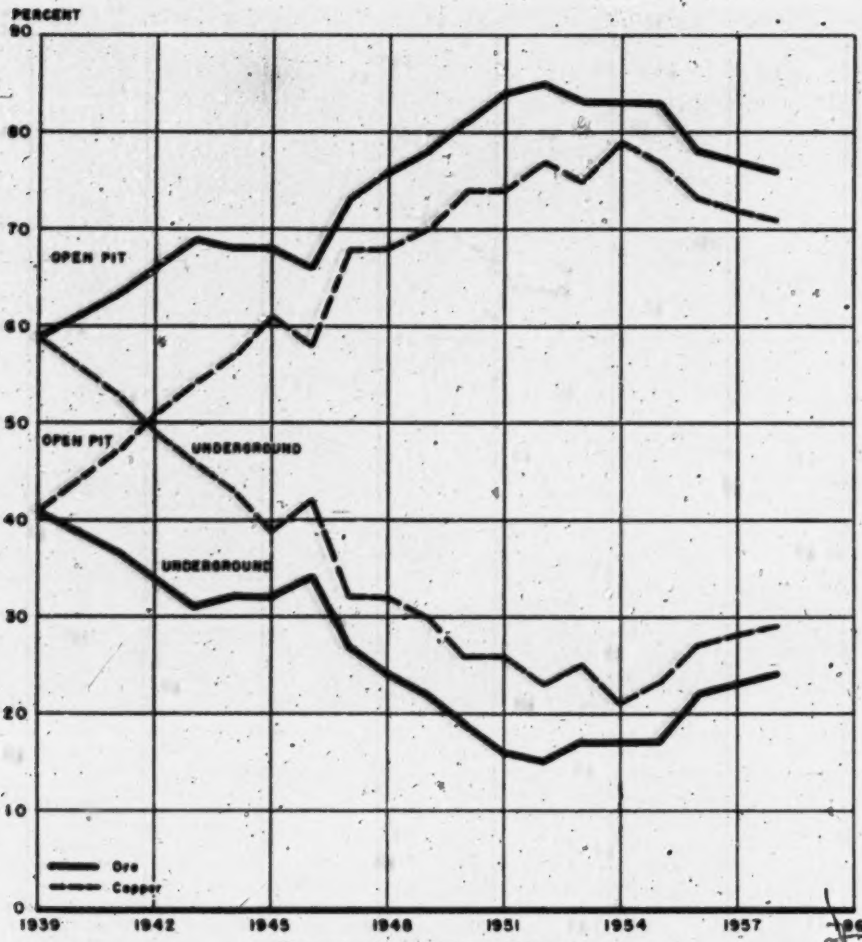

FIGURE 2.—Growth of Open-Pit Mining.

Oxidised copper minerals, such as the carbonates and silicates are readily attacked and the copper dissolved by a number of the more common acids and alkalies; the copper is precipitated from solution by electrolysis or by iron replacement of the copper, and in the case of ammonia leaching by simply boiling off the ammonia. The usual practice is to leach the ore with dilute sulfuric acid followed by recovery of the copper by cementation on scrap iron.

Leaching of mixed oxide-sulfide ores is more difficult. Ferric sulfate is an active solvent of most oxidised copper minerals and to an extent is effective on free copper sulfides. Complete extraction is possible on oxides and carbonates in comparatively short periods while sulfides are more slowly acted upon. To overcome the resistance of double sulfides, such as chalcopyrite and bornite, to this reagent, controlled roasting prior to leaching allows com-

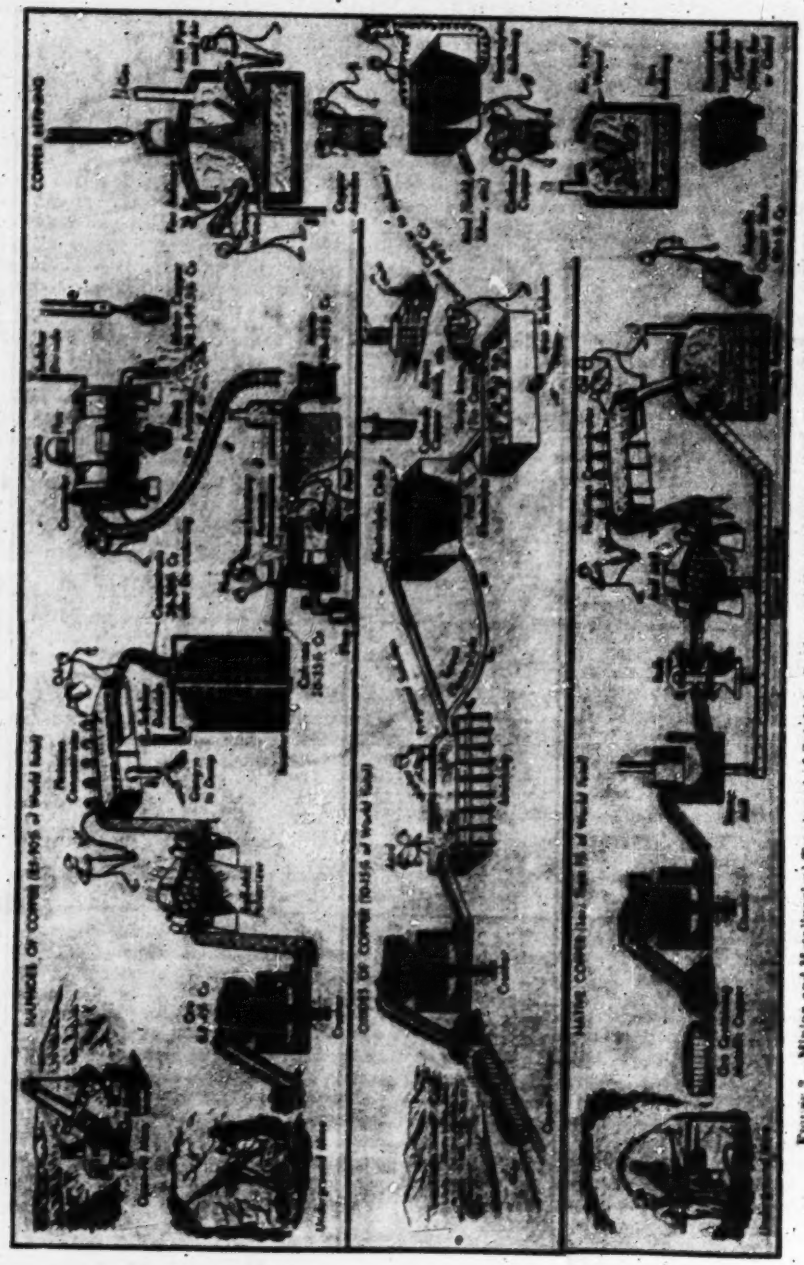

FIGURE 3.—Mining and Metallurgical Treatment of Sulphide, Oxide, and Native Copper Ores. (Courtesy Westinghouse Engineer)

mercial extraction. Acid-ferric sulfate leaching of mixed oxide-sulfide ores followed by electrowinning was for years standard practice by the Inspiration Copper Co. in Arizona, but recently the dual metallurgy process involving leaching followed by flotation concentration was begun. In this process leaching dissolves the recoverable oxide content of the ore, and part of the sulfide content. The washed and drained residue from this operation is then treated by flotation concentration to win the remainder of the recoverable sulfide copper content. Leach-precipitation-flotation of mixed ores has been employed on a commercial scale at one mill in Arizona and by The Anaconda Co. in Montana.

SMELTING AND REFINING

The smelting of sulfide copper ores or concentrates involves three major steps—roasting, reverberatory furnacing, and converting. Roasting removes a portion of the sulfur, as well as some of the volatile components like arsenic, antimony, and bismuth, and oxidizes some of the iron to ferrous oxide. Reverberatory smelting of the roasted material to copper matte is based on the strong affinity of copper and sulfur for each other, as compared with that of other metals and sulfur, and the relatively weaker affinity of copper for oxygen. In a reducing or neutral atmosphere and at smelting temperatures, copper and sulfur form the stable cuprous sulfide, Cu_2S. Excess sulfur, under reducing conditions, unites with iron to form a correspondingly stable ferrous sulfide, FeS. Cuprous sulfide and ferrous sulfide are miscible in all proportions in the liquid state. In the solid state they form an eutectic. The mixture whether liquid or solid, is known as copper matte. Excess iron, usually in the form of ferrous oxide, FeO, combines with silica and enters the slag as ferrous silicate.

The matte formed in the reverberatory furnace is transferred to a refractory lined vessel, known as a converter, where thin streams of air are forced through the molten mass. The rapid oxidation reaction converts the copper sulfide to copper and sulfur dioxide.

The iron sulfide of the matte reacts with the oxygen of the air to form iron oxide that combines with charged silica flux to form the converter slag. This slag contains appreciable copper and is returned and charged to the reverberatory furnace. The molten copper metal is transferred from the converter into a holding furnace from which it is cast as blister copper in anode slabs or cakes.

Furnace or fire refining of blister copper consists of oxidation, fluxing and reduction. The basis of this operation is the weak affinity of copper for oxygen as contrasted to that of the impurities. The practice is to introduce compressed air into the molten metal at 8 to 10 pounds pressure through iron pipes; metallic oxides of the impurities are formed that combine with added silica to form slag. The slag is skimmed continuously during the oxidizing period until no more slag forms and liquid cuprous oxide, Cu_2O, begins to form on the bath. Reduction of the cuprous oxide is accomplished by stirring the bath with green wooden poles. The reducing gases formed (CO, H_2 and hydrocarbons) by destructive distillation of the wood reduce the Cu_2O to metallic copper. The order in which impurities in copper are removed by oxidation in fire-refining methods is: Sulfur, zinc, tin, and iron. Lead, arsenic, and antimony in large quantities can be eliminated by fluxing. Some impurities, such as nickel, bismuth, selenium, and tellurium resist fire-refining treatments almost completely.

Electrolytic refining of copper is based on the selective action of the electric current. A copper anode and a cathode starting sheet are suspended in an electrolyte composed of copper sulfate and sulfuric acid. The copper dissolves from the anode and is deposited on the cathode. Most of the usual impurities such as gold, silver, platinum, and palladium precipitate out of solution and form anode mud which accumulates at the bottom of the electrolytic cell; others dissolve and become concentrated in the electrolyte and may be deposited or occluded on the cathode. Cathode copper has a minimum purity of 99.90 percent.

USES AND PROPERTIES

Copper has numerous valuable properties that, individually or in combination, give it a wide variety of uses. The properties of major significance are high electrical and thermal conductivity, ductility, malleability, formability, strength, and corrosion resistance. In addition, copper has a pleasing color, is nonmagnetic, and is easily finished by plating or lacquering; it can be welded, brazed and soldered satisfactorily. When it is desirable to improve certain of these basic properties and when such an improvement can be effected without sacrificing any required qualities for

a particular application, alloying often solves the problem. As a consequence, the popular commercial brasses, bronzes, copper-nickel alloys and nickel silvers have been developed.

The use of copper and its alloys is universal. They are practically synonymous with all things electrical and have myriad uses in construction, autos, aircraft, missiles, railroad equipment, marine equipment, appliances, machinery and equipment, scientific instruments, utensils and jewelry, cladding, and many other applications.

Approximately one-half of all copper consumed is for electrical applications, including power transmission, communications, electronics, electrical equipment, transportation, and complex weapons systems. Construction (homes, plants, office buildings), power generation and transmission are the largest users. Virtually all building wiring is copper, as are lines leading from power cables. The transmission of power continues to be a major market for copper even though aluminum is now used for most overhead high voltage lines; however, copper still dominates in high voltage underground lines. Power generation requires extremely large quantities of copper. Examples are heat exchangers, windings in motors, generators and transformers, magnet wire in control apparatus, and bus bars.

For communications, telephone and telegraph wire and cable are two of the biggest markets. Hundreds of components in radio sets and telegraph receiving and sending equipment are made of copper or its alloys; and coaxial cables employ a substantial amount of copper. Copper's excellent electrical conductivity has made it the major metal used in the expanding applications of printed circuits. Radio and TV sets provide the largest market but there is a great potential for the use of printed circuits in appliances, automobile instrument panels, and electronic computers.

The noncorrosive quality of copper and its alloys accounts for many uses in construction for roofing products, plumbing goods, builder's hardware, and functional decorative applications. Sheet roofing, gutters, downspouts and heads, flashing, fittings and accessories consume a large amount of copper. Copper and red brass are found frequently in plumbing items such as, tank lever lift arms, toilet tank trim, lavatory fittings, tub fittings, faucets, traps and drains, closet tank components, flush valves, piping and tubing, and other fixtures. Brass and bronze are popular for builder's hardware because they are decorative, noncorrosive, and easy to fabricate for such items as locks, door knobs and knockers, door stops, hinges, bolts, latches, and safety hasps.

Copper consumption in the automotive industry accounts for about 8 percent of the total for the United States. Volume uses are in radiators, heaters and defrosters, air conditioning units, bearings, bushings, carburetors, generators, oil lines, strainers, wiring, switches, and plating. Major uses take sheets, plates and wire; secondary uses, rods, bars, and foundry products. The average 1958 and 1959 autos consumed 40 to 50 pounds of copper.

For aircraft the maze of wiring in a plane's electrical system takes more copper than any other use in this industry. Some of the larger planes use from 600 to almost 2,000 pounds of copper in the electrical systems and mechanical components.

Copper is a minor, though essential, metal in the Nation's missile program. As in aircraft, the major use is in wiring systems.

Railroads use a large quantity of copper in diesel locomotives, passenger cars, and in switching and signal devices. The average Pullman car uses almost 2,000 pounds of copper tube in the water supply system, air brakes, heating system, air conditioning unit, condensers, evaporator and heat coils.

Tankers, cargo ships, pleasure craft, passenger liners, and naval vessels take advantage of copper and its alloys in a great variety of marine equipment. Naval brass is widely used for propeller shafting (because of its strength, torque resistance, machinability, and corrosion resistance); silicon bronze for fastenings and water tanks; soft and hard drawn copper for exhaust yokes, fuel lines, water lines, and piping (resistance to corrosion and leaks, workability, long life). The Navy's nuclear submarine Skipjack uses brass in capstans, torpedo tubes, diving gear, and valves; more than 48,000 feet of copper tube in hydraulic, air, and lubricating oil lines; and over 6,000 feet of cupro-nickel tube in auxiliary cooling lines, heat exchangers, lavatories, bilge pumps, and salt water service lines.

In the appliance field, manufacturers of washing machines, air-conditioning units, refrigerators, TV sets, and other units specify copper and its alloys for many components requiring materials that are electrically or thermally conductive, corrosion resistant and durable.

Large machinery and equipment, turbines, and heat exchangers take advantage of the properties of copper or its alloys in many ways. Specific uses are copper for motors, other electrical equipment and tubing; bronze for worm wheels, oil baffles, check valves, and levers; cupro-nickel for tubing; naval brass, muntz metal, and aluminum bronze for plates, sheets, bars, and weld wire.

TABLE 2.—*Copper use pattern in 1950 (President's Materials Policy Commission Report)*

	Short tons (thousands)	Percent of total
Electrical	368	22.0
Telephone and telegraph	67	4.0
Light and power	120	7.0
Wire cloth	10	.7
Other rod and wire	127	8.0
Ammunition	70	5.0
Automobiles and trucks	145	10.0
Building	265	15.0
Clocks and watches	7	.5
Copper-bearing steel	8	.5
Radiators and heating	9	.6
Radio and television	80	5.0
Railroads	35	2.0
Refrigerators	35	2.0
Shipbuilding	22	1.0
Air conditioning	30	2.0
Others	96	6.0
Manufactured for export [1]	131	10.7
Total	1,620	100.0

[1] Comprises the copper content of all mill products and all fabricated products which were exported, but does not include any raw copper exported as such.

Copper is used extensively in watches, clocks, microscopes, projectors, and many types of gages.

Solid copper, brass, and bronze are popular materials for utensils, jewelry, furnishings, and decorative items. They are used in the manufacture of such items as: Brass and bronze medallions; solid brass furnishings, such as towel bars, curtain rods, wall hooks, and soap dishes; copper, brass, and bronze jewelry; cookware; tableware; and bronze and brass plaques and signs.

BYPRODUCTS, COPRODUCTS, RELATIONSHIPS TO OTHER COMMODITIES

About 98 percent of the U.S. mine production of copper is recovered from copper ore; and the remainder from complex ores. In addition to copper, important quantities of byproduct, gold, silver, sulfuric acid, molybdenum, selenium, arsenic, and platinum-group metals are recovered. These byproducts or coproducts may be recovered at one or more of the various steps of concentration, smelting, and refining. About 40 percent of the 41 million pounds of molybdenum produced in 1958 was recovered as a byproduct largely from copper ores; of the 682,000 pounds of selenium produced in 1958, about 600,000 pounds was recovered from the electrolytic production of copper; and 496,000 tons of sulfuric acid was produced at copper plants (includes output of a lead smelter). In the five year period 1954–58 approximately 30 percent of the United States gold production and 28 percent of the silver production were derived from the processing of copper ores. Nearly one-half of the copper output in Canada comes from ores of the Sudbury district, Ontario, mined principally for nickel, and approximately 50 percent of the world's cobalt production in 1958 came from processing Belgian Congo copper ores.

SUBSTITUTES

Aluminum is the principal alternative material for copper as an electrical conductor. Price is one of several factors that influence its partial substitution for copper. Aluminum wire with a steel core (ACSR) has displaced copper for long-distance transmission lines. Other typical substitutions of aluminum for copper are in bus bars, fractional horsepower motor windings and lightbulb bases. There has been an accelerated shift to the use of steel for brass in shell cases.

Aluminum and stainless steels have also somewhat reduced the use of copper in the building industry. Technology has furthered substitution for copper by the introduction of the numerous clad metals, including copper clad, which use proportionately less metal than would solid copper. Printed electrical circuits have also come into the field as a substitute for copper wire and plastic tubing replaces copper in some automobiles and appliances and other uses.

A study of the use of copper and aluminum in 1954 compared with 1947, for selected product groups, was made by the Business and Defense Services Administration. Some of the major groups selected show the following changes: Power transmission equipment, copper rose 92 percent and aluminum 310 percent; radio and radio products, copper rose 74 percent and aluminum 261; engine electrical equipment, copper rose 39 percent and aluminum 556; metal stampings, copper dropped 27 percent while aluminum rose 25; telephone and telegraph equipment, copper dropped 11 percent while aluminum rose 170, and the grand total for all industrial groups, copper dropped 14 percent as aluminum rose 103 percent.

Adjustment to the new competing materials does not involve much more than a shift in the overall consumption pattern. It will make more copper available for those uses for which it is peculiarly fitted and for which substitutes are impracticable.

SECONDARY SOURCES AND RECOVERY

Secondary copper is that copper recovered from copper scrap, copper-alloy scrap, and other copper-bearing scrap materials as copper metal, as copper alloys without separation of the copper, or as copper compounds. Second-

ary copper is produced from new and old scrap, the two general classes of scrap copper.

New scrap is generated in manufacturing articles from primary or refined metal and consumed at a plant of different location from the plant of generation. Typical types of new scrap are defective finished or semifinished articles, clippings, punchings, turnings, borings, skimmings, drosses, and slag. New scrap consumed in the plant of generation is called *runaround* or *home* scrap.

Old scrap consists of articles that have been discarded after serving a useful purpose. Such articles may be worn out, obsolete, or damaged, and include discarded trolley wire, radiators, fired cartridge cases, used pipe, and lithographers' plates. Old scrap is largely collected by several thousand scrap dealers, who, for the most part, are unaffiliated with the primary copper producers.

The channels through which much of the reclaimed copper returns from the scrap dealers and fabricators to use are the secondary refiners, the brass and bronze ingot makers, and the brass mills.

Total secondary-copper production increased markedly during the past 25 years. From an average yearly recovery of 436,000 tons in 1933–37, output rose to 609,000 tons a year in 1938–42, and to 962,000 tons in 1943–47. In the 1948–52 period it dropped to 900,000 tons, and in the last 5-year period (1954–58) to 880,000 tons. Most of the secondary copper is recovered in ingot brass and bronze and other alloys; recovery of scrap as unalloyed represents less than one-third of the annual total.

Copper and copper-base alloy scrap is sorted and separated into its various classifications. The separation is made on the basis of color, hardness, magnetic properties, type of fabrication, reaction to acids and other reagents, and original source. Brass scrap is sorted piece by piece. Like materials are grouped, assayed, and stored according to composition and metallic content. Furnace charges are made up of weighted amounts of one or more types of scrap that will closely approximate the desired composition of the alloy to be cast. After the charge has been melted a sample of the bath is taken and refining, consisting of fluxing, oxidation and slagging is started. After refining calculated additions of virgin metals are made to adjust the analysis of the melt to specifications and the heat is tapped and poured into ingots.

A substantial quantity of clean copper scrap is remelted, cast into anodes and electrolytically refined. Other copper scrap is charged to reverberatories at primary smelters and is recovered as electrolytic or fire refined copper.

TABLE 3.—*Secondary copper produced in the United States*

[Short tons]

	1948–52 (average)	1954	1955	1956	1957	1958
Copper recovered as unalloyed copper	322,860	313,241	345,028	373,060	349,018	295,123
Copper recovered in alloys[1]	574,022	607,066	742,976	627,004	493,973	542,307
Total secondary scrap	895,995	920,307	988,004	935,064	841,997	797,388
From new scrap	442,884	425,941	474,419	482,173	397,206	386,021
From old scrap	454,181	497,066	514,584	452,490	444,892	411,367
Percentage equivalent of domestic mine output	101	101	99	94	77	81

[1] Includes copper in chemicals, as follows: 1948–52 (average), 16,419; 1954, 15,052; 1955, 14,552; 1956, 14,750; 1957, 14,345; 1958, 9,491.

RESERVES

Copper occurs widely but the five principal producing areas contain 93 percent of the world measured and indicated reserve. These are: (1) Chile and Peru, (2) Western United States, (3) Northern Rhodesia and Belgian Congo, (4) U.S.S.R. and (5) Canada. The measured and indicated world reserve is estimated, in terms of metal content, at 170 million tons of copper. The estimates are based on the assumption that the cost-price ratio will be such as to permit the mining of ore having approximately the same grade as that which is now being produced.

Chile has the largest reserve with 46 million tons, followed in order by the United States (32.5 million), Northern Rhodesia (24.5 million), Belgian Congo (20 million), Soviet Bloc (16 million), Peru (12.5 million), and Canada (7 million). Substantial orebodies make up the smaller reserves of Yugoslavia (1.2 million), Union of South Africa and South-West Africa (1.1 million), Australia (1 million), Philippines (1 million); Mexico (750,000), Turkey (500,000), and Cyprus (200,000). Cuba, Bolivia, Finland, Norway, Spain, Sweden, India, Japan, and other countries account for an estimated additional 6 million tons of recoverable copper. There are substantial inferred reserves that will likely develop into measured or indicated ore upon extension of present mine workings and delin-

cation of new deposits by planned expansion and exploration projects.

The United States has a reserve of recoverable copper-in-use estimated to be about 30 million tons.

CONSERVATION

Mining and metallurgical research leading to more economic extraction and beneficiation of copper ores have made immense tonnages of ore available which otherwise would have been of no value as a source of copper. The need for lower costs, in turn, has encouraged research for the development of more efficient methods and techniques at all levels in the production of copper and copper products.

One of the most effective conservation practices is the reclamation of copper from scrap that provides approximately one-fourth of the U.S. supply.

SOURCES OF STATISTICAL INFORMATION

Monthly and annual data on mine production of recoverable copper are reported by producers to the Federal Bureau of Mines; monthly data on production of blister copper, refined copper by shapes, stocks of blister, refined and unrefined copper are reported by the primary smelting and refining companies. Primary copper plants and chemical plants report stocks, production, consumption, and shipments of copper sulfate monthly, and copper smelters report production of byproduct sulfuric acid annually. Sales of copper by copper selling agencies are reported annually.

Consumption of refined copper by major industry classes is reported monthly. Consumption of scrap by types, by primary copper producers, secondary smelters and brass mills is reported monthly. Other consumption data collected annually include consumption of brass and bronze ingot by foundries, and refined copper and scrap at foundries, miscellaneous manufacturers and chemical plants. The domestic data collected are sufficiently adequate and accurate for current programming and planning.

World mine and smelter production data are compiled by the Bureau's Division of Foreign Activities. U.S. imports and exports of copper are obtained by the Bureau of the Census.

There are no data on consumption of copper by end uses or by geographic locations. Also lacking are adequate consumption data outside the United States.

PRODUCTION, CONSUMPTION, AND FOREIGN TRADE

PRODUCTION

World mine production of copper has increased without interruption since 1950, and output of 3.9 million tons in 1957 established a world-production record. The increased rates were due mainly to output from new properties and stepped-up production at many established mines encouraged by the highest prices in 90 years.

The United States is the largest copper-producing country in the world and has been for many years (figure 4 on p. 18). The United States lost this position only once since 1883, when Chile outranked it in the depression year 1934. In the most recent 10-year period (1949–58) the United States produced 29 percent of the world output. Chile usually ranks second among leading copper-producing countries, however, in 1953 and 1954 it was surpassed by Northern Rhodesia. Six countries each averaged in excess of 250,000 tons annually in the last 5 years as follows, in thousands of tons: United States 1,001; Chile 493; Northern Rhodesia 440; U.S.S.R. 421; Canada 338; and Belgian Congo 261. Comparable data in the previous 5-year period, 1949–53, were: United States 888; Chile 416; Northern Rhodesia 347; U.S.S.R. 280; Canada 269; and Belgian Congo 205.

TABLE 4.—*Supply and distribution of copper in the United States*

[Thousand short tons]

Year	Supply					Distribution			
	Production			Imports (refined)	Total	Consumption		Exports (refined)	Total
	Primary		Secondary (old scrap)			Refined	Secondary (in alloys)		
	Domestic materials	Foreign materials							
1949–53 (average)	886	220	634	224	1,964	1,488	330	146	1,964
1954	842	278	587	215	1,924	1,523	314	288	2,125
1955	967	273	615	233	2,088	1,687	314	288	2,289
1956	1,000	277	668	232	2,177	1,613	314	288	2,215
1957	1,020	284	647	199	2,150	1,532	311	288	2,131
1958	822	181	611	139	1,753	1,331	305	288	1,924

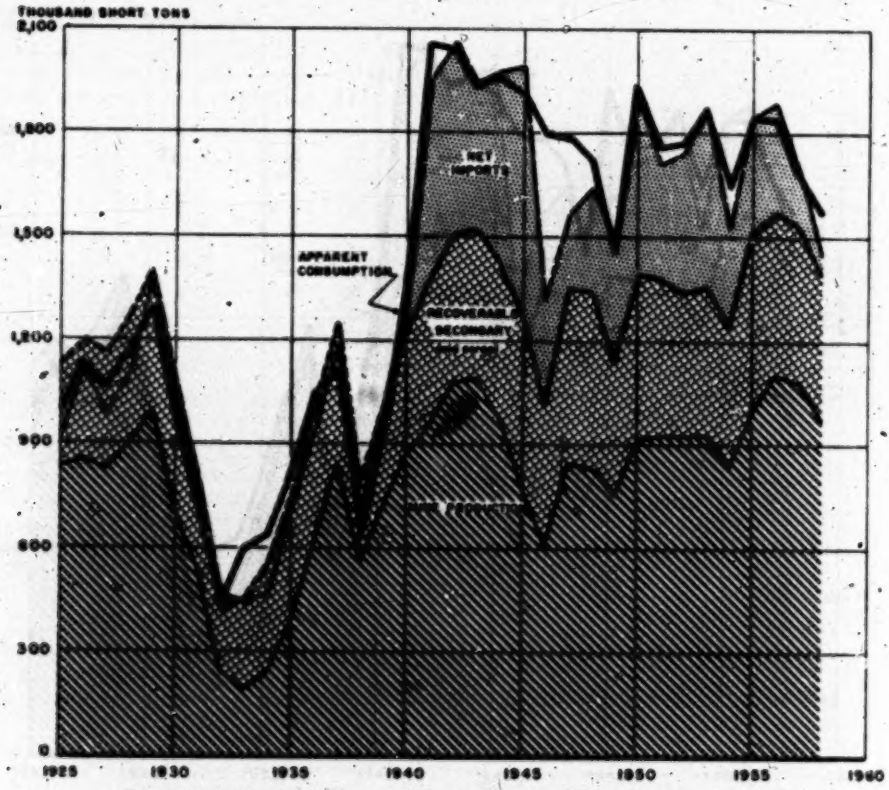

FIGURE 4.—Salient Statistics of the Copper Industry of the United States, 1925–58.

The shortage of copper supply that existed for most of the period from the beginning of World War II was reversed in 1956. More than enough copper became available and to reduce the oversupply many producers curtailed production beginning in October 1956. Reductions continued throughout 1957 and into 1958. Demand for copper turned upward about mid-1958, and in the late months of the year production schedules in the United States and abroad were stepped up to meet the increasing demand.

CONSUMPTION

Over the period 1948 to 1958 the annual consumption of copper in the world increased (according to data compiled by the American Bureau of Metal Statistics) from 2,764,000 tons in 1948 to 4,091,000 tons in 1958. This increase of about 50 percent was due to the demand for copper necessary for rehabilitation and rebuilding of industries in the war stricken countries of Europe, growth of industry in underdeveloped countries, and expansion of industrial activity in others. Except for 1949 and 1953 world consumption made significant advances each year. Although the United States maintained its status as the largest copper consuming country as it had since the turn of the century, its percentage of world demand dropped approximately 40 percent. Consumption in the United States during the last decade advanced 9 percent to the alltime peace time high in 1956, then declined 20 percent due to the recession in 1957 and 1958.

The consumption of refined copper, by broad industry classifications, is shown in table 8. There are no recent continuing statistical data

TABLE 5.—*Mine production of recoverable copper in the United States, by States*

[Short tons]

State	1940–43 (average)	1944	1945	1946	1947	1948
Alaska	2	4	1	(1)	(1)	3
Arizona	393,482	377,027	454,108	398,998	413,284	483,000
California	699	363	313	330	345	749
Colorado	3,981	4,623	4,228	4,237	5,113	4,198
Idaho	3,411	4,628	5,616	6,648	7,913	9,846
Michigan	33,179	32,203	35,085	37,326	36,900	38,616
Missouri	2,050	1,935	1,722	1,660	1,604	1,629
Montana	81,613	88,540	81,542	96,426	91,512	92,022
Nevada	33,207	76,217	75,333	69,824	72,730	69,157
New Mexico	63,797	69,148	64,617	74,345	67,572	64,440
Oregon	12	5	4	7	29	10
Pennsylvania [2]	5,983	5,270	4,710	4,102	7,516	5,673
Tennessee	7,171	6,097	5,911	10,448	8,790	6,159
Texas	9		1			
Utah	309,270	311,588	323,940	329,654	327,157	338,184
Virginia	5,597	4,998	4,956	5,468	5,455	679
Washington	4,894	5,636	3,988	3,998	1,799	92
Wyoming		1		3	4	(1)
Total	933,446	933,672	998,270	1,104,180	1,086,949	979,329

[1] Less than ½ ton.
[2] Includes North Carolina.

TABLE 6.—*World mine production of copper, by countries*

[Short tons]

Country	1940–43 (average)	1944	1945	1946	1947	1948
Australia	23,748	46,760	60,986	59,406	63,206	63,200
Belgian Congo [1]	264,848	243,424	238,181	273,628	267,129	263,044
Canada	361,788	392,722	383,994	344,980	295,100	346,816
Chile	413,950	466,661	477,973	459,944	435,306	459,541
Cyprus (exports)	38,148	36,060	36,179	36,497	43,676	38,614
Finland	29,695	32,180	32,702	33,180	33,700	31,500
Germany: East	13,000	22,500	15,000	25,000	24,000	24,000
Japan	33,156	73,066	24,988	36,497	45,566	60,053
Mexico	67,220	69,413	65,259	63,479	66,970	71,000
Peru	54,421	42,336	47,944	53,966	63,722	64,552
Philippines	12,389	14,817	13,347	29,722	44,513	51,042
Rhodesia and Nyasaland, Federation of: Northern Rhodesia	347,913	426,709	395,302	445,466	480,313	441,973
South West Africa	13,024	14,668	13,668	23,695	30,610	30,979
Sweden	14,957	14,886	17,278	18,436	19,994	21,289
Turkey [1]	18,277	37,042	26,294	27,207	30,866	34,225
Union of South Africa	57,382	66,626	69,289	81,282	80,969	84,615
U.S.S.R. [1]	333,000	333,000	388,000	420,000	470,000	470,000
United States	933,446	933,672	998,270	1,104,180	1,086,949	979,329
Yugoslavia [1]	97,333	93,264	91,161	93,000	97,186	97,117
Other countries	79,000	97,000	98,000	98,000	110,000	114,000
World total (estimate)	2,923,000	3,110,000	3,113,000	3,295,000	3,305,000	3,240,000

[1] Smaller production.

showing the consumption of copper by end uses. However, quantities of copper used in 1950 for certain products and industries estimated by an industry representative for the President's Materials Policy Commission are shown in table 2.

FOREIGN TRADE

Before World War II U.S. imports and exports of copper constituted a well-balanced trade through which the smelting, refining, and fabricating facilities of this country were used to treat foreign crude materials and to return refined copper and manufactures of copper abroad. After the beginning of the war the United States needed all the copper that entered the country to supply new peak consumption needs. In the postwar period demand continued above prewar levels to fill postponed civilian requirements; as a result the United States had remained partially dependent on imported material.

The alltime record receipts of foreign materials was made in 1945 when 853,000 tons of copper in all forms was received; a record quantity of refined copper (530,000) tons also was received in 1945. From 1954 through 1958, 41 percent of the refined and unrefined copper imported came from Chile, 18 percent from Canada, 9 percent from Mexico, 8 percent from the Federation of Rhodesia and Nyasaland, and 6 percent from Peru; 47 percent was in the form of blister and other unrefined materials, 31 percent in refined form, and 20 percent was ores and concentrates.

Most of the copper exported from the United States is refined copper and in advanced forms

TABLE 7.—*World smelter production of copper, by countries*

[Short tons]

Country	1949–53 (average)	1954	1955	1956	1957	1958
Australia	21,388	42,613	41,092	84,914	88,988	72,309
Belgian Congo	294,848	343,434	389,141	378,538	387,028	363,054
Canada	238,408	343,365	388,997	338,488	332,540	339,788
Chile	391,742	372,818	447,392	508,330	498,730	492,143
Finland	10,347	33,181	34,883	34,767	39,489	53,873
Germany:						
East	21,200	28,000	30,000	33,000	33,000	33,000
West [1]	209,883	258,271	286,916	279,458	279,231	286,699
Japan	51,246	73,914	90,333	101,946	120,013	113,167
Mexico	57,027	68,527	69,730	62,080	63,061	67,109
Norway	10,527	14,210	15,142	17,013	17,357	19,261
Peru	34,826	39,178	34,862	34,056	44,137	42,782
Poland	13,200	9,000	17,000	22,000	22,000	19,180
Rhodesia and Nyasaland, Federation of: Northern Rhodesia	345,240	424,745	394,257	420,803	468,187	419,943
Sweden	16,969	18,423	19,130	18,672	21,472	22,268
Turkey	15,227	27,062	26,234	27,287	29,806	24,535
Union of South Africa	46,416	45,152	47,480	46,031	46,220	53,606
U.S.S.R.	280,000	362,000	366,000	430,000	470,000	470,000
United States [2]	966,497	945,809	1,109,536	1,301,352	1,178,145	1,099,052
Yugoslavia	37,185	33,304	31,151	32,200	37,186	37,117
Other countries	39,000	40,000	45,000	50,000	61,000	65,000
World total (estimate)	3,010,000	3,280,000	3,490,000	4,000,000	4,070,000	3,980,000

[1] Includes scrap.

[2] Smelter output from domestic and foreign ores, exclusive of scrap. Production from domestic ores only, exclusive of scrap, was as follows: 1949–53 (average), 894,162; 1954, 854,351; 1955, 1,037,311; 1956, 1,217,580; 1957, 1,093,582; and 1958, 902,918.

TABLE 8.—*Refined copper consumed by classes of consumers in the United States*

[Short tons]

Year	Wire mills	Brass mills	Chemical plants	Secondary smelters	Foundries and miscellaneous	Total
1949–53 (average)	707,958	539,749	3,596	12,526	31,626	1,295,457
1954	668,601	543,945	2,339	7,434	30,720	1,254,729
1955	812,953	947,044	1,744	6,927	33,726	1,802,004
1956	954,330	611,009	1,758	7,554	36,264	1,521,359
1957	775,032	533,954	1,490	7,575	33,182	1,352,134
1958	740,279	479,510	867	7,182	32,018	1,260,077

TABLE 9.—*Copper (unmanufactured) imported into the United States, in terms of copper content* [1] *(Bureau of the Census)*

[Short tons]

Class and country	1949–53 (average)	1954	1955	1956	1957	1958
Class:						
Ore, concentrates, etc.	111,345	115,576	125,527	122,174	124,789	92,003
Blister and other unrefined	190,951	205,484	253,590	276,085	301,136	268,182
Refined	700,943	315,060	202,312	101,745	163,309	128,404
Other	12,680	4,663	12,568	5,743	5,788	7,060
Total	905,442	394,829	594,100	502,747	594,022	495,309
Country:						
Chile	297,967	205,953	238,772	206,623	258,015	200,143
Canada	81,820	89,911	107,094	120,499	130,224	74,813
Mexico	98,429	51,229	69,942	52,830	47,746	87,033
Peru	19,742	22,450	31,119	42,641	41,638	30,429
Rhodesia and Nyasaland, Federation of	55,001	61,905	73,464	27,562	45,430	35,169
Belgian Congo	1,180	15,539	14,100	12,764	10,221	15,515
Other	91,403	66,962	91,909	102,633	92,759	99,218
Total	905,442	394,829	594,100	505,747	594,022	495,309

[1] Data are "general" imports; that is, they include copper imported for immediate consumption plus material entering the country under bond.

of manufacture, in which the copper content is not calculable. Because supplies of copper in the United States have been inadequate to fill requirements in most of the period since the end of World War II, copper has been subject to export controls. During 1949–53 exports of refined copper averaged 140,000 tons annually, and ranged from 110,000 to 174,000 tons. In the 5-year period, 1954–58, inclusive, exports of refined copper rose to an average of 274,000 tons annually and ranged from 200,000 tons to 385,000. All restrictions on exports of refined copper were removed in September 1956 and shipments of such metal from the United States during 1958 rose to 385,000 tons, the highest since 1929.

TABLE 10.—*Exports of refined copper from the United States, by countries (Bureau of the Census)*

[Short tons]

Country	1949–53 (average)	1954	1955	1956	1957	1958
United Kingdom	49,226	25,247	38,062	15,869	89,649	115,653
France	23,876	20,239	68,063	68,969	54,657	91,145
Germany, West	11,334	20,226	55,251	225,993	93,773	64,831
Italy	14,518	18,031	9,559	28,150	33,624	89,847
Switzerland	7,174	10,227	5,685	15,689	14,630	11,368
Japan	549	6,241	194	30,644	46,810	5,720
Other	26,207	84,229	62,686	42,407	55,911	64,726
Total	129,923	214,961	199,819	229,103	348,025	384,089

SELF SUFFICIENCY AND STRATEGIC CONSIDERATIONS

For many years before World War II U.S. production of primary and secondary copper exceeded demand and there was a substantial surplus for export. Since then, however, roughly one-fourth of domestic needs have come from foreign sources. For the period 1954–58, domestic mine production provided 50 percent of the supply, and imports and old scrap furnished 28 and 22 percent, respectively. Projecting future demand in relation to population increase and per capita consumption and mine production capacities, the United States will continue to be dependent on foreign sources for a sizeable portion of its domestic requirements.

In the 1954–58 period, Western Hemisphere countries furnished 79 percent of U.S. imports; 41 percent came from Chile, 18 percent from Canada, 9 percent from Mexico, 6 percent from Peru, and 5 percent from other countries. Western Hemisphere production of copper is more than adequate to take care of Western Hemisphere consumption and there was an excess of more than 500,000 tons in 1958.

Mining, smelting, and refining capacities to produce copper in the United States plus the imports expected to be available in wartime from strategically accessible foreign sources and the Nation's stockpile, will provide an adequate supply of copper under anticipated emergency conditions. The development of new ore deposits and planned expansions at operating mines in Canada and South America will ensure reliable foreign sources of copper.

The largest strategic use of copper has been in cartridge brass for ammunition; other ordnance items are rotating bands, bullet jackets, bearings, springs, detonators, fuse parts, and primer cups. The uses of copper and its alloys in mobile mounts, jeeps, trucks, tanks, etc., are in general the same as those for automotive applications. Likewise, the uses in field telephones, walkie-talkies, radios, radar, missiles, power generators, and distribution systems are similar to those of electrical applications in related nonstrategic items.

TABLE 11.—*United States mine production of copper, apparent consumption of new copper and excess consumption over production*

[Thousand short tons]

Period	Mine production	Apparent consumption (new)	Excess consumption over production
1939–53	7,399	6,489	[1]960
1949–53	5,023	4,919	[1]104
1949–57	8,706	13,843	4,846
1950	919	1,447	528
1951	935	1,304	370
1952	935	1,370	435
1953	935	1,435	500
1954	935	1,335	400
1955	999	1,326	327
1956	1,104	1,367	263
1957	1,367	1,499	132
1958	979	1,157	178

[1] Production excess.

DEFENSE PROGRAM

Under the Defense Production Act of 1950, as amended, various types of production expansion assistance were developed for copper—production loans, government floor-price purchase contracts with escalation provisions, certificates of necessity permitting accelerated amortization of capital investment for income tax purposes, and exploration loans amounting to 50 percent of total costs repayable from eventual production. The San Manuel Copper Corp. and the White Pine Copper Co. started delivering their production to the Government under the Defense Materials Procurement Agency (DMPA) floor price contracts in the last quarter of 1957 after the price of copper had fallen to 27 cents in September. Through June 30, 1958, the Defense Minerals Exploration Administration (DMEA) had entered into 53 exploration contracts, in which copper was the major target commodity. The total estimated cost was $3,485,182 of which the Government's share was $1,742,590. Copper reserves have been developed in several areas as a result of the DMEA program.

Other defense measures were establishment of ceiling prices of copper and copper alloys

and strict export controls. Early in 1953 the situation had eased to the point where price controls and national and international allocations of copper were abandoned although military and Atomic Energy Commission needs were still to receive preferential treatment. Due to the continuing shortage of copper until the middle of 1956, quantity export controls were maintained on copper through the third quarter of 1956 and on copper scrap through the third quarter of 1957.

PRICES AND COSTS

Average annual copper prices in the United States have ranged from 5.67 cents a pound in 1932, the lowest in history, to the recent peak of 41.88 cents in 1956. Under price control during World War II and for a short period thereafter when the Government granted premiums on a quota system for copper production, February 1942–June 1947, the average price including all premiums was 14.3 cents a pound. Government regulation of prices following the outbreak of war in Korea established a ceiling of 24.5 cents a pound on January 26, 1951 which lasted until copper prices were decontrolled February 25, 1953. Labor strikes in the latter half of 1954 and increasing consumption of copper both in the United States and Europe resulted in a shortage of copper, and the price rose continually reaching 46 cents a pound on February 21, 1956, the highest in 90 years. Supply surpassed demand in the United States early in 1956 and the first reduction in price in more than 2 years was made in July of that year. A continuing high rate of production and declining consumption resulted in increasing stocks and the price of copper declined gradually until it reached a low of 25 cents a pound in January 1958. The price was raised to 26½ cents in July and to 29 cents in October reflecting effective overall reduction of mine production, a diminishing surplus, and an increasing market.

TABLE 12.—*Average prices of electrolytic copper*

(Cents per pound)

Year	Domestic f.o.b. refinery [1]	Domestic f.o.b. refinery [2]	Domestic copper delivered
1949	19.36	19.202	[3] 19.7
1950	21.46	21.235	[3] 20.8
1951	24.37	24.200	[4] 24.3
1952	24.37	24.200	[4] 24.2
1953	28.92	28.708	[4] 28.7
1954	29.62	29.604	29.5
1955	37.30	37.491	37.3
1956	41.88	41.818	42.1
1957	30.99	30.576	30.1
1958	26.13	25.764	26.3

[1] Quoted prices for domestic shipments, American Metal Market.
[2] Quoted prices for domestic shipments, E&MJ Metal and Mineral Markets.
[3] Prices for 1949–50 were f.o.b. refinery and included foreign copper delivered in United States.
[4] Prices for 1951–53 f.o.b. refinery and delivered.

Information on operational or overall costs per unit of production or of final product for mining, milling, smelting, refining, marketing, etc. is not readily available. A study by the Rhodesian Selection Trust Co., Ltd., indicated the cost of producing electrolytic copper in 1955 in the Northern Rhodesian Copperbelt was over 19 cents a pound compared with an average of about 15.25 cents a pound within the United States. An analysis of 1956 production in the United States by The Anaconda Company showed that 13.9 percent cost 30 cents a pound or more, 22.6 percent 29 cents or more and 33.1 percent 25 cents or more, leaving a balance of 66.9 percent produced under 25 cents a pound, but implying the overall average cost a pound of copper in the United States exceeded that of foreign production. Another recent statistical study arrived at a 5 year (1954–58) cost of approximately 25 cents a pound for seven domestic and foreign producing companies that accounted for 30 percent of the world's mine production.

TAXES

There are no special taxes imposed on the copper industry. Producers are granted a depletion allowance of 15 percent on domestic and foreign production.

TARIFF

An excise tax of 4 cents a pound was imposed on copper June 21, 1932. The Government was virtually the only importer in World War II, and during the period it held this position the tax was not applicable. The tax was reinstated for a very brief period, following which it was suspended by acts of Congress from April 30, 1947 to June 30, 1950. The suspended tax, meanwhile, was reduced as a result of the Trade Agreement negotiations at Geneva in 1947, to 2 cents a pound effective March 16, 1949. The 2-cent tax came into effect on July 1, 1950, but was suspended again on April 1, 1951. The law provided that the Tariff Commission must notify the President within 15 days after the end of any calendar month in which the average price dropped below 24 cents a pound, delivered Connecticut Valley, and within 20 days thereafter the President would revoke the suspension. The suspension was extended each year until 1955 when it was extended to June 30, 1958. Meanwhile, at the June 1956 meetings in Geneva on General Agreements Tariffs and Trade

(GATT), copper was subjected to certain concessions. The excise tax on copper metal, ores, nd concentrates would drop 15 percent (5 percent for each of 3 years) if the tariff were reimposed and the price of copper was not below 24 cents a pound. For fiscal 1957, 1958, and 1959, the excise tax would be 1.9, 1.8, and 1.7 cents, respectively. The latter tax became effective July 1, 1958.

RESEARCH

Prospecting and exploration by industry in recent years has resulted in the development of tremendous reserves in the major copper-producing countries. In all principal copper-producing areas in the world, ore reserves today substantially exceed those in the past. Exploratory drilling programs, in some cases supplementing geophysical and geochemical surveys, have confirmed inferred extensions of known deposits and anomalous indications of newly found occurrences. In the United States, prospecting by American Metal Climax, Inc. and Kennecott Copper Corp. found commercial deposits in Michigan; Pima Mining Co., Duval Sulfur and Potash Co., and American Smelting and Refining Co. discovered additional properties in Arizona; and The Anaconda Company outlined enough additional ore at Butte, Montana, for four extensive projects. In Chile, at Chile Exploration Co.'s Chuquicamata mine, additional oxide ore was found by drilling beyond the rim of the pit; the ore reserve at Andes Copper Co.'s El Salvador mine was increased from 80 million tons to 375 million by additional drilling and an important new discovery was made near Cabildo in Aconcagua Province. Through development research Mufulira Copper Mines, Ltd., Northern Rhodesia, have sufficient information to increase the company's copper production by 55 percent. This type of research by the mining companies is responsible for today's developed copper resources which through continuing efforts are expected to increase year by year for some time to come.

Mining equipment companies in developing more efficient earth-moving and transportation units have done much in improving efficiencies and controlling mining costs. Belt conveyors for moving ore to a central point in underground mines, as well as open pits and skip hoists instead of train or truck haulage to remove ore from open-pit mines, are recent improvements made at some properties based on equipment research.

Most segments of the industry have research facilities and men charged with experimentally investigating methods, technologies and equipment respecting their particular fields of mining, mineral dressing, leaching, smelting, refining, fabricating, foundry practice, plating and finishing and related operations. Research in procedure, and equipment for crushing, grinding, classification and flotation of copper ores has resulted in refinements that have improved recovery. In smelting, a study on the thermodynamics of the copper-iron-sulfur system at matte smelting temperatures established more accurately the region of immiscibility between matte and metal in the liquid state. Losses of metal in slag were minimized by deviating from the common practice of returning converter slag to the reverberatory furnace. A process possibility is the direct production of electrolytically refined copper and elemental sulfur from pyritic ores. The fabricating industry is widening its market research activities and improving facilities. An emphasized market research program is being carried into traditional fields such as the automotive industry as well as into such comparatively new areas as electronic computers.

[fol. 5884] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 422

Telephone Jersey Shore 477
Central Cable Corporation

Bare and Weatherproof Wire and Cable
Copper and Aluminum

Jersey Shore, Pa.

January 26, 1955.

Mr. Alfred R. Gneiser
Aluminum Co. of America
York, Pennsylvania

Dear Mr. Gneiser:

On January 14 your office advised us of an increase in the aluminum primary metal prices, which reflected an increase on the hot rolled rods we regularly purchase from you, in an amount of one cent per pound. This price, we were advised, was effective on all orders placed after that date, and subject to change without notice.

Coincidental with the increase of the price of the rods we purchase from you, you published price sheets governing the sale of aluminum electrical conductors, which price, we were told, reflected the increased metal cost.

You will recall our several conversations in which you confirmed the reports we had received that aluminum conductor was being sold by producers at prices drastically under the published prices and, further confirmed that these prices were being offered for a stated period, specifically on a firm basis for the first half of 1955.

I am sure your principals will readily recognize the position we find ourselves placed in as a result of the activities outlined above, and our desire for a remedy allowing us to continue the production and sale of aluminum conductor. For this reason we have requested your best price on a firm basis for our requirements of aluminum rod for redrawing for the period to July 1, 1955.

We wish to assure you of our appreciation for your very good service and consideration during the long period we have been purchasing this commodity from you.

May we have your prompt reply.

Very truly yours, Central Cable Corporation, Melvin C. Harris, Vice President.

MCH:jd

Received January 27, 1955. York Office.

[fol. 5885] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 423

Copy for Mr. A. R. Gneiser, York
Noted March 4, 1955 A R G

February 14, 1955.

Received February 1, 1955 York Office

Mr. Melvin C. Harris, Vice President,
Central Cable Corporation,
Jersey Shore, Pennsylvania.

Dear Mr. Harris:

In Mr. Gneiser's absence, I am taking the liberty of replying to your letter of January 26, 1955 to him in which you request our best price on a firm basis for your requirements of aluminum redraw rod for the period of July 1, 1955. This reply has been delayed because I referred the matter to our home office in Pittsburgh to determine whether we could quote a firm price for this period and, if so, what that price should be.

I regret to inform you that we cannot quote on a firm basis. All of our sales of aluminum redraw rod are on the basis of price in effect at the time of shipment and we cannot, consistently with the law, quote you a firm price without quoting the same firm price to our other customers who

are competitors of yours. We will be very happy to receive your orders for redraw rod on the basis of our price in effect at time of shipment, and we hope that we will be able to accept all of the business which you care to place with us. We certainly would not condition any acceptance of orders [fol. 5886] upon receiving orders for your full requirements. Any such orders for ⅜ in. dia. EC-H12 or EC-H14 redraw rod, in quantities of 30,000 lbs. or more, will be priced at $.280 per lb., and as stated above, will be invoiced at our price in effect on date of shipment.

In your letter of January 26 you mentioned prices at which aluminum conductor had been sold. While I am informed by our legal counsel that a discussion of prices in past transactions is of itself permissible, the consequences of a misinterpretation of any discussion of this nature are so potentially dangerous both to us and to those with whom such discussions might be had that our company does not permit such discussions with our competitors. Therefore, I have been instructed, in accordance with company policy, not to enter into discussions of conductor prices with you.

I trust that with this explanation you will not think that this letter is at all discourteous or abrupt. Most assuredly we have been happy to serve you in the past and we hope that you will continue to favor us with your business in the future.

Very truly yours, Aluminum Company of America,
——, ——, Assistant District Sales Manager.

LCF/ac
cc—Mr. A. R. Gneiser, Aluminum Company of America, York, Pa.
cc (nico) Mr. D. B. Miller, Pittsburgh, (nico) Mr. P. T. Coffin, Pittsburgh.

[fol. 5887] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 424

Nehring Electrical Works

Manufacturers of
Bare and Weatherproof Copper Wire and Cable
Aluminum Cable, Steel Reinforced (A.C.S.R.)
DeKalb, Illinois

July 1, 1957.

Mr. C. B. Owen
c/o Aluminum Company of America
520 N. Michigan Avenue
Chicago 11, Illinois

Dear Mr. Owen:

We have received the opening of the eleven bids of Tennessee Valley Authority, and have very carefully checked the prices quoted.

We received none of the orders. There were eight bidders on each inquiry and for us to be competitive with the prices quoted, we would have to purchase aluminum rods as low as 28¢ per pound. We very carefully figured our costs and material, except the aluminum, and then included a little profit. We then added the value of the aluminum to bring the total figure up to the prices quoted. In that way we arrived at what we should pay for aluminum rods—as low as 28¢ per pound and not over 30½¢ per pound.

If this condition continues we see no alternative except to produce our own aluminum rods, and we are in very good position to do so.

We are not complaining about anything; we are not even much concerned about the situation, but in all our time, the price of finished copper wire and cable never was reduced unless the price of copper went down. Now the price of aluminum cable is down as much as 5½¢ per pound below the published price sheet, on which the selling price was formerly determined, and yet the price of aluminum is no lower and we are even told the price of aluminum will advance. Another thing, aluminum cable is sold on "firm

price" and aluminum rods sold "subject to price change before shipment".

Thought we would make mention of this condition and would appreciate receiving your comments.

Yours very truly, Nehring Electrical Works, Paul A. Nehring, President.

PAN:MMO

[fol. 5888] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 425

This Copy For: Mr. P. T. Coffin, Pittsburgh

July 2, 1957.

C. B. Owen
Chicago Office
Mr. D. B. Miller
Pittsburgh Office

Received May 5, 1959. Genl. Files

Re: Nehring Electrical Works, DeKalb, Illinois

July 3, 1957.

Please see the attached photostatic copy of a letter received from Mr. P. A. Nehring of Nehring Electrical Works. We thought you would be interested in seeing it. We will appreciate any comments you may have.

C. B. Owen.

CBO:jas
Att.
cc: Mr. P. T. Coffin, Pittsburgh.

[fol. 5889] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 426

July 11, 1957.

David B. Miller
Pittsburgh Office
Mr. C. B. Owen
Chicago Office

Re: Nehring Electrical Works

Attached to your letter of July 2 was Mr. Nehring's letter to you of July 1.

I would suggest that you might wish to reply to Mr. Nehring's letter somewhat along the following lines:

"Since receiving your letter of July 1, 1957 I have given a good deal of consideration to the situation which you presented. I cannot say that there is any easy solution to the problem, but I am glad to have the opportunity to comment on it.

"You recognize, I am sure, that in view of the fact our companies compete in the sale of ACSR I cannot discuss with you the pricing policies which might or ought to prevail in that industry. I can mention the historical fact, however, that Alcoa did not take the lead in what has resulted currently in substantial sales of ACSR at prices below published schedules. We have not reduced our schedule prices, but we have found it necessary to quote lower prices from time to time to meet the lower prices being quoted by our competitors.

"You raise the question of what should be done with respect to the price of redraw rod. About all I can say is that competition determines the price, whether of ACSR, redraw rod or pig. So far as our prices are concerned, we would hope to make a fair and reasonable profit on each of our products consistent with a constant endeavor to foster the [fol. 5890] further use of aluminum in all proper applications. Whether we should look solely to the selling price of ACSR in considering prices for our E.C. pig and redraw rod, or whether we should also consider the operations of our company as a whole, is perhaps a matter upon which in-

formed people might theoretically differ. We think we are following a proper procedure, taking into consideration all relevant circumstances. We may be wrong, but at least we are sincere in our belief that we are right."

David B. Miller.

DBM:dh
CC: Mr. P. T. Coffin, Pgh. Office.

[fol. 5891] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 427

This Copy For: Mr. D. B. Miller, Pittsburgh

July 15, 1957.

Mr. Paul A. Nehring
Nehring Electrical Works
De Kalb, Illinois

Dear Mr. Nehring:

Since receiving your letter of July 1, 1957 I have given a good deal of consideration to the situation which you presented. I cannot say that there is any easy solution to the problem, but I am glad to have the opportunity to comment on it.

You recognize, I am sure, that in view of the fact our companies compete in the sale of ACSR I cannot discuss with you the pricing policies which might or ought to prevail in that industry. I can mention the historical fact, however, that Alcoa did not take the lead in what has resulted currently in substantial sales of ACSR at prices below published schedules. We have not reduced our schedule prices, but we have found it necessary to quote lower prices from time to time to meet the lower prices being quoted by our competitors.

You raise the question of what should be done with respect to the pricing of redraw rod. About all I can say is that competition determines the price, whether of ACSR, redraw rod or pig. So far as our prices are concerned, we would

hope to make a fair and reasonable profit on each of our products consistent with a constant endeavor to foster the further use of aluminum in all proper applications. Whether we should look solely to the selling price of ACSR in considering prices for our E.C. pig and redraw rod, or whether we should also consider the operations of our company as a whole, is perhaps a matter upon which informed people [fol. 5892] might theoretically differ. We think we are following a proper procedure, taking into consideration all relevant circumstances. We may be wrong, but at least we are sincere in our belief that we are right.

Sincerely yours, Aluminum Company of America,
C. B. Owen.

CBO:jas
cc: Mr. D. B. Miller, Pittsburgh (nico); Mr. P. T. Coffin, Pittsburgh (nico).

[fol. 5893] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 428

Nehring Electrical Works

Manufacturers of
Bare and Weatherproof Copper Wire and Cable
Aluminum Cable, Steel Reinforced (A. C. S. R.)
DeKalb, Illinois

July 16, 1957.

Mr. C. B. Owen
Aluminum Company of America
520 N. Michigan Avenue
Chicago 11, Illinois

Dear Mr. Owen:

Thank you for your letter of July 15th in reply to ours of July 1st wherein mention was made about the sale of ACSR up to 5½¢ below the published sheet on which we used to base our selling prices.

As mentioned previously, the price of rods has not been reduced, yet the price of aluminum rods went up when the

price of copper advanced, but has not come down with the price of copper which has lowered from 16¢ to 26¢ per pound in different parts of the world.

. . . . . .

We have had customers tell us that they are told there is so much profit from the pig to the rod that they can cut the price of cable, but who is going to keep the price of cable down if and when there should be greater demand for cable? It looks as though that's going to be up to the independent manufacturers with aluminum from Canada.

As I stated before, I never saw such a condition in all my time in the manufacture of electrical conductor. We are not trying to bring about any change or asking for any help for we are organized to shut down if need be rather than keep operating; however, I predict if this condition does not change, there will be a complaint to the Department of Justice and I have heard there is such a move underway at present.

We mailed you an order for rods yesterday but rightfully and truthfully under these present conditions, I believe we should get all our rods from Canada or from an independent manufacturer.

With kindest regards and best wishes, we remain,

Yours very truly, Nehring Electrical Works, Paul A. Nehring, President.

PAN:MMD

What's the connection? P.T.C.

[fol. 5894] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 429

This Copy for: Mr. P. T. Coffin, Pittsburgh

July 17, 1957.

C. B. Owen
Chicago Office
Mr. D. B. Miller
Pittsburgh Office

Received May 5, 1959. Genl. Files

July 18, 1957.

Re: Nehring Electrical Works, DeKalb, Illinois

Please see the attached photostatic copy of Mr. Paul A. Nehring's letter in answer to my letter of July 15, 1957, copy of which I sent to you. I will appreciate any comments you wish to forward.

C. B. Owen.

CBO:jas
cc: Mr. T. C. Jones, Chicago Sales, Mr. P. T. Coffin, Pittsburgh.

[fol. 5895] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 430

Nehring Electrical Works

Manufacturers of
Bare and Weatherproof Copper Wire and Cable
Aluminum Cable, Steel Reinforced (A.C.S.R.)
DeKalb, Illinois

January 28, 1958.

Mr. J. B. Holloman
Aluminum Company of America
520 N. Michigan Avenue
Chicago, Illinois

Dear Mr. Holloman:

According to the going price of aluminum cable and for us to meet the highest price (and our cost of production should be as low as any), we should have a rod price from 4¢ to 6¢ a pound lower than the present price of aluminum rods. Therefore, you can readily see why you are not receiving rod business from us at this time.

We are operating at full capacity but entirely on copper at the present time. Just thought we would make mention of this as that is the situation with the independent manufacturer. I presume you know about the one independent manufacturer that is lining up production of aluminum with rolling mill and cabling especially for R.E.A.'s with a $50,000,000 loan from the government. We have been asked to consider an investment in this production.

There was a time many years ago when the independent manufacturers were able to put up a community rolling mill and buy their metal from other than the domestic producers, which we have been doing for two years or more. Prices are certainly all over the map. The quotations we receive on copper vary 2½¢ a pound from the highest to the lowest. There used to be about ⅛¢ to ¼¢ difference in price, that is in the 40 years the writer has experienced.

Yours very truly, Nehring Electrical Works, Paul A. Nehring, President.

PAN:MMD

[fol. 5896] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 431

Nehring Electrical Works

Manufacturers of
Bare and Weatherproof Copper Wire and Cable
Aluminum Cable, Steel Reinforced (A.C.S.R.)
DeKalb, Illinois

February 13, 1958.

Mr. J. B. Holloman
Aluminum Company of America
520 N. Michigan Avenue
Chicago, Illinois

Dear Mr. Holloman:

The New York Brokers are approaching us regarding the possibility of importing aluminum rods. Perhaps we could import pig aluminum at a lower duty and have it converted into rods. Would you be interested on such toll work?

For a long time, we have been buying imported copper as much as 2½¢ per pound below the producer's fixed price, and we have to do something about aluminum. It appears that the market is rigged against us, and we are talking plain about it.

We can have pig aluminum converted by the Properzi Process, but rather than put in such a mill ourselves, we would rather install a mill that would roll copper also.

Yours very truly, Nehring Electrical Works, Paul A. Nehring, President.

PAN:MMD

P.S. We know of an order placed this week for aluminum cable for just about what the aluminum rods and steel core costs us.

[fol. 5897] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 432

Nehring Electrical Works

Manufacturers of
Bare and Weatherproof Copper Wire and Cable
Aluminum Cable, Steel Reinforced (A.C.S.R.)
DeKalb, Illinois

February 27, 1958.

Aluminum Company of America
520 N. Michigan Ave.
Chicago 11, Illinois

Att'n. Mr. J. B. Holloman

Gentlemen:

Reference is made to your letter of the 20th which was received the day after you were here in DeKalb.

You mentioned rod business and I believe I explained to you why we have not been purchasing any rods for sometime. This is due to the spread between rods and finished aluminum cable, and the spread of about 8½¢ a pound between the ingot and rods. It is not possible for us to meet the present selling prices. What little we are running now in one machine is for stock and to use up some of the steel core wire we have here. We will see what happens later.

It is lucky for us that we are quite busy on copper at both plants. One of our good customers that is buying a half million pounds of copper from us, says he was told by one of the cable producers that they thought they would cut their price and offer contracts again before long. I wonder if he didn't refer to another "white sale".

We note what you say about your pricing policies. It looks as though about the same thing is going on in copper. The domestic producers' copper is 2½¢ a pound higher than the price from several other sources and from abroad. That is why we think we may have to use aluminum from abroad as well as copper. Doesn't it seem strange that you hear so much noise about the tremendous and wonderful production of aluminum and copper in this country, yet foreign copper

competition outstrips all of you. By the way, we must be quite a big company to be importing material with the 100 million pounds of surplus in the States. What do you think?

Yours very truly, Nehring Electrical Works, Paul A. Nehring, President.

PAN:MMD

[fol. 5898] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 433

Nehring Electrical Works

Manufacturers of
Bare and Weatherproof Copper Wire and Cable
Aluminum Cable, Steel Reinforced (A.C.S.R.)
DeKalb, Illinois

April 17, 1959.

Mr. J. B. Holloman
Aluminum Company of America
520 N. Michigan Avenue
Chicago 11, Illinois

Dear Mr. Holloman:

We received yours of the 9th and also the 15th revising your quotation as an error had been made in the time limit.

As yet, we can buy to better advantage and have to do so because of the small spread between the price of rods and finished cable. Of course, the spread between the ingot and rods is not very large either. There is nothing we would rather do than buy locally, and we just cannot imagine a small company like ours (which we have always tried to keep small), importing material.

Yours very truly, Nehring Electrical Works, Paul A. Nehring, President.

PAN:MMD

Plaintiff's Exhibit 434

SHIPMENTS OF ALUMINUM CONDUCTOR WIRE AND CABLE 1/, 1955 - 1959

(Thousands of Pounds of Aluminum Content)

	1955		1956		1957		1958	
	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total
TOTAL INDUSTRY SHIPMENTS REPORTED TO BDSA 2/	197,328	100.00	245,870	100.00	232,454	100.00	226,503	100.00
ALUMINUM COMPANY OF AMERICA	72,199	36.6	61,080	24.8	63,742	27.4	62,960	27.8
ROME CABLE CORPORATION	3,006	1.5	4,199	1.7	3,242	1.4	2,948	1.3
TOTAL FOR ALCOA AND ROME	75,205	38.1	65,279	26.5	66,984	28.8	65,908	29.1
OTHER FIRMS:								
Anaconda Wire and Cable Company	21,202	10.7	33,308	13.9	36,479	15.7	35,853	15.8
Kaiser Aluminum and Chemical Corp. 3/	43,252	21.9	47,935	19.5	43,665	18.8	52,243	23.1
Bristol Plant of U. S. Rubber Co. 4/	1,603	0.8	1,926	0.8				
Olin Mathieson Chemical Corp.					13,005	5.6	10,084	4.5
Southern Electrical Corp. 5/	11,592	5.9	19,905	8.1				
Reynolds Metals Company	15,836	8.0	20,004	8.1	20,952	9.0	23,636	10.4
John A. Roebling's Sons 6/							107	0.0
General Cable Corp.	5,860	3.0	11,079	4.5	19,253	8.3	13,656	6.0
Essex Wire Corp. 7/	6,737	3.4	7,623	3.1	7,705	3.3	10,259	4.5
Hendrix Wire and Cable Corp.	221	0.1	252	0.1	309	0.1	356	0.2
Okonite Company 8/	588	0.3	1,313	0.5	369	0.2	110	0.0
					[illegible]	[illegible]	[illegible]	[illegible]

Plaintiff's Exhibit 434

SHIPMENTS OF ALUMINUM CONDUCTOR WIRE AND CABLE 1/, 1955 - 1959

(Thousands of Pounds of Aluminum Content)

	1955		1956		1957		1958		1959	
	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total
TS REPORTED TO BDSA 2/	197,328	100.00	245,870	100.00	232,454	100.00	226,503	100.00	258,218	100.00
ERICA	72,199	36.6	61,080	24.8	63,742	27.4	62,960	27.8	69,395	26.9
	3,006	1.5	4,199	1.7	3,242	1.4	2,948	1.3	4,022	1.6
ME	75,205	38.1	65,279	26.5	66,98	28.8	65,908	29.1	73,417	28.5
Cable Company	21,202	10.7	33,308	13.5	36,479	15.7	35,853	15.8	43,387	16.8
d Chemical Corp. 3/	43,252	21.9	47,935	19.5	43,665	18.8	52,243	23.1	49,006	19.0
U. S. Rubber Co. 4/	1,603	0.8	1,926	0.8						
emical Corp.					13,005	5.6	10,084	4.5	12,844	5.0
al Corp. 5/	11,592	5.9	19,905	8.1						
ompany	15,836	8.0	20,004	8.1	20,952	9.0	23,636	10.4	27,994	10.8
s Sons 6/							107	0.0	360	0.1
p.	5,860	3.0	11,079	4.5	19,253	8.3	13,656	6.0	16,952	6.6
7/	6,737	3.4	7,623	3.1	7,705	3.3	10,259	4.5	7,163	2.8
Cable Corp.	221	0.1	252	0.1	309	0.1	356	0.2	538	0.2
8/	588	0.3	1,313	0.5	369	0.2	110	0.0	361	0.1

	1955		1956		1957		1958	
	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total
TOTAL INDUSTRY SHIPMENTS REPORTED TO BDSA 2/	197,328	100.00	245,870	100.00	232,454	100.00	226,503	100.00
ALUMINUM COMPANY OF AMERICA	72,199	36.6	61,080	24.8	63,742	27.4	62,960	27.8
ROME CABLE CORPORATION	3,006	1.5	4,199	1.7	3,242	1.4	2,948	1.3
TOTAL FOR ALCOA AND ROME	75,205	38.1	65,279	26.5	66,984	28.8	65,908	29.1
OTHER FIRMS:								
Anaconda Wire and Cable Company	21,202	10.7	33,308	13.5	36,479	15.7	35,853	15.8
Kaiser Aluminum and Chemical Corp. 3/	43,252	21.9	47,935	19.5	43,665	18.8	52,243	23.1
Bristol Plant of U. S. Rubber Co. 4/	1,603	0.8	1,926	0.8				
Olin Mathieson Chemical Corp.					13,005	5.6	10,084	4.5
Southern Electrical Corp. 5/	11,592	5.9	19,905	8.1				
Reynolds Metals Company	15,836	8.0	20,004	8.1	20,952	9.0	23,636	10.4
John A. Roebling's Sons 6/							107	0.0
General Cable Corp.	5,860	3.0	11,079	4.5	19,253	8.3	13,656	6.0
Essex Wire Corp. 7/	6,737	3.4	7,623	3.1	7,705	3.3	10,259	4.5
Hendrix Wire and Cable Corp.	221	0.1	252	0.1	309	0.1	356	0.2
Okonite Company 8/	588	0.3	1,313	0.5	369	0.2	110	0.0
Southwire Company	5,986	3.0	16,024	6.5	8,371	3.6	5,273	2.3
Nehring Electrical Works	4,526	2.3	5,913	2.4	4,792	2.1	1,083	0.5
Walker Brothers	506	0.3	360	0.1	411	0.2	316	0.1
Western Electric			1,800	0.7	2,500	1.1	200	0.1
Westinghouse Electric Corp. 9/			144	0.1	103	0.0		
Other Shipments Reported to BDSA 10/	4,214	2.1	13,005	5.3	7,556	3.3	7,419	3.3

	1955		1956		1957		1958		1959	
	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total
REPORTED TO BDSA 2/	197,328	100.00	245,870	100.00	232,454	100.00	226,503	100.00	258,218	100.00
ICA	72,199	36.6	61,080	24.8	63,742	27.4	62,960	27.8	69,395	26.9
	3,006	1.5	4,199	1.7	3,242	1.4	2,948	1.3	4,022	1.6
	75,205	38.1	65,279	26.5	66,984	28.8	65,908	29.1	73,417	28.5
ble Company	21,202	10.7	33,308	13.5	36,479	15.7	35,853	15.8	43,387	16.8
Chemical Corp. 3/	43,252	21.9	47,935	19.5	43,665	18.8	52,243	23.1	49,006	19.0
S. Rubber Co. 4/	1,603	0.8	1,926	0.8						
cal Corp.					13,005	5.6	10,084	4.5	12,844	5.0
Corp. 5/	11,592	5.9	19,905	8.1						
any	15,836	8.0	20,004	8.1	20,952	9.0	23,636	10.4	27,994	10.8
ons 6/							107	0.0	360	0.1
	5,860	3.0	11,079	4.5	19,253	8.3	13,656	6.0	16,952	6.6
	6,737	3.4	7,623	3.1	7,705	3.3	10,259	4.5	7,163	2.8
le Corp.	221	0.1	252	0.1	309	0.1	356	0.2	538	0.2
	588	0.3	1,313	0.5	369	0.2	110	0.0	361	0.1
	5,986	3.0	16,024	6.5	8,371	3.6	5,273	2.3	12,135	4.7
orks	4,526	2.3	5,913	2.4	4,792	2.1	1,083	0.5	4,428	1.7
	506	0.3	360	0.1	411	0.2	316	0.1	175	0.1
			1,800	0.7	2,500	1.1	200	0.1	0	0.0
Corp. 9/			144	0.1	103	0.0				
cted to BDSA 10/	4,214	2.1	13,005	5.3	7,556	3.3	7,419	3.3	9,458	3.7

[fol. 5900]

1/ Shipments of aluminum conductor wire and cable are the sum of the shipments of aluminum wire, insulated or covered, and ACSR and aluminum cable, bare.

2/ The Business and Defense Services Administration requires reports only for months in which total shipments of aluminum products by a firm amounted to 10 thousand or more pounds. Thus the maximum amount that a firm could ship in a year and not be required to report would be under 120 thousand pounds per year of all aluminum products. Only if a firm produced only aluminum wire and cable, insulated or covered, and ACSR and aluminum cable, bare, and its shipments were spread evenly over the twelve months could it produce 120 thousand non-reportable pounds in any calendar year. In 1955, the year with the lowest industry total, 120 thousand pounds would be less than seven-hundredths of one per cent of the industry total. Individual company reports to the Department of Justice, however, show that six firms shipped more than 120 thousand pounds in one or more of these years, but did not report their shipments to BDSA. Circle Wire and Cable Corporation unreported shipments in excess of 120 thousand pounds ranged from less than one-tenth of one per cent in 1957 to less than three-tenths of one per cent of the BDSA industry total in 1959. Collyer Insulated Wire Company reported to the Department of Justice its use of aluminum wire and cable in its production of insulated products, rather than its actual shipments. Assuming that its shipments corresponded with its production, its total for 1955 and 1956 was more than 120 thousand pounds, but less than one-tenth of one per cent in 1955 and less than two-tenths of one per cent of the industry total in 1956. Continental Copper and Steel Industries, Inc. shipped less than one-tenth of one per cent in 1959. General Electric Company shipments ranged from less than two-tenths of one per cent in 1955 to less than four-tenths of one per cent of the BDSA total in 1959. Narragansett Wire Company shipped less than one-tenth of the BDSA total in 1958 and 1959. Triangle Conduit and Cable Company shipments ranged from less than two-tenths of one per cent in 1957 to less than one-tenth of one per cent of the BDSA total in 1955. The addition of these shipments to the BDSA total would change no market share by more than two-tenths of one percentage point. Percentages may not sum to 100 because of rounding of numbers.

3/ Shipments by Kaiser were estimated by subtracting the shipments reported to the Department of Justice by the other integrated companies from the total shipments of all integrated companies. The sources of the total shipments of all integrated companies are U. S. Department of Commerce, BDSA, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Mill Shapes by Integrated and Non-integrated Producer, 1950-1957", May 7, 1958, p. 1, and "Gross Shipments of Aluminum Wire by Integrated and Nonintegrated Producers, 1954-1957", November 8, 1961, for the years 1955 through 1957 and "Gross Shipments of Aluminum Mill Shapes by Integrated and Non-integrated Producers, 1958-1960", November 17, 1961, for the years 1958 and 1959.

4/ Acquired by Kaiser on February 11, 1957. Bristol plant shipments are included in Kaiser shipments for all of 1957 as well as 1958 and 1959.

5/ Acquired by Olin Mathieson on May 6, 1957. Southern Electrical shipments are listed as shipments by Olin for all of 1957 as well as 1958 and 1959.

6/ Roebling has been owned by Colorado Fuel and Iron Corp. since 1952. Most of the conductor wire and cable machinery of Roebling was purchased by Reynolds Metals Company in March 1961.

7/ Shipments for all years based on information supplied by Essex Wire Corporation to the Department of Justice. Essex based the figures for 1955, 1956, and 1959 on reports to BDSA, but Essex estimated shipments for some months in 1957 and 1958.

8/ The Okonite Company was acquired by Kennecott Copper Corporation on November 24, 1958.

9/ Westinghouse shipped between 10 and 50 thousand pounds in 1958, and between 50 and 100 thousand poinds in 1955 and 1959.

10/ Four other firms are known to have reported some shipments of aluminum conductor wire and cable to BDSA. Central Cable Corporation supplied the Department of Justice no information on its shipments. The American Steel and Wire Division of the United States Steel Corporation reported to BDSA in 1955, 1956, and 1957, shipments amounting to less than one-tenth of one per cent of the industry total reported to BDSA. In 1958 and 1959 this company's shipments were less than 10 thousand pounds per month and therefore not reported. The

[illegible], and its shipments were spread evenly over the twelve months could it produce 120 thousand non-reportable pounds in any calendar year. In 1955, the year with the lowest industry total, 120 thousand pounds would be less than seven-hundredths of one per cent of the industry total. Individual company reports to the Department of Justice, however, show that six firms shipped more than 120 thousand pounds in one or more of these years, but did not report their shipments to BDSA. Circle Wire and Cable Corporation unreported shipments in excess of 120 thousand pounds ranged from less than one-tenth of one per cent in 1957 to less than three-tenths of one per cent of the BDSA industry total in 1959. Collyer Insulated Wire Company reported to the Department of Justice its use of aluminum wire and cable in its production of insulated products, rather than its actual shipments. Assuming that its shipments corresponded with its production, its total for 1955 and 1956 was more than 120 thousand pounds, but less than one-tenth of one per cent in 1955 and less than two-tenths of one per cent of the industry total in 1956. Continental Copper and Steel Industries, Inc. shipped less than one-tenth of one per cent in 1959. General Electric Company shipments ranged from less than two-tenths of one per cent in 1955 to less than four-tenths of one per cent of the BDSA total in 1959. Narragansett Wire Company shipped less than one-tenth of the BDSA total in 1958 and 1959. Triangle Conduit and Cable Company shipments ranged from less than two-tenths of one per cent in 1957 to less than one-tenth of one per cent of the BDSA total in 1955. The addition of these shipments to the BDSA total would change no market share by more than two-tenths of one percentage point. Percentages may not sum to 100 because of rounding of numbers.

3/ Shipments by Kaiser were estimated by subtracting the shipments reported to the Department of Justice by the other integrated companies from the total shipments of all integrated companies. The sources of the total shipments of all integrated companies are U. S. Department of Commerce, BDSA, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Mill Shapes by Integrated and Non-integrated Producer, 1950-1957", May 7, 1958, p. 1, and "Gross Shipments of Aluminum Wire by Integrated and Nonintegrated Producers, 1954-1957", November 8, 1961, for the years 1955 through 1957 and "Gross Shipments of Aluminum Mill Shapes by Integrated and Non-integrated Producers, 1958-1960", November 17, 1961, for the years 1958 and 1959.

4/ Acquired by Kaiser on February 11, 1957. Bristol plant shipments are included in Kaiser shipments for all of 1957 as well as 1958 and 1959.

5/ Acquired by Olin Mathieson on May 6, 1957. Southern Electrical shipments are listed as shipments by Olin for all of 1957 as well as 1958 and 1959.

6/ Roebling has been owned by Colorado Fuel and Iron Corp. since 1952. Most of the conductor wire and cable machinery of Roebling was purchased by Reynolds Metals Company in March 1961.

7/ Shipments for all years based on information supplied by Essex Wire Corporation to the Department of Justice. Essex based the figures for 1955, 1956, and 1959 on reports to BDSA, but Essex estimated shipments for some months in 1957 and 1958.

8/ The Okonite Company was acquired by Kennecott Copper Corporation on November 24, 1958.

9/ Westinghouse shipped between 10 and 50 thousand pounds in 1958, and between 50 and 100 thousand poinds in 1955 and 1959.

10/ Four other firms are known to have reported some shipments of aluminum conductor wire and cable to BDSA. Central Cable Corporation supplied the Department of Justice no information on its shipments. The American Steel and Wire Division of the United States Steel Corporation reported to BDSA in 1955, 1956, and 1957, shipments amounting to less than one-tenth of one per cent of the industry total reported to BDSA. In 1958 and 1959 this company's shipments were less than 10 thousand pounds per month and therefore not reported. The Collyer Insulated Wire Company filed reports with BDSA in 1958 and 1959, but indicated shipments less than 10 thousand pounds per month. The Crescent Insulated Wire and Cable Company filed reports with BDSA, but its shipments averaged less than 10 thousand pounds per month for all years except 1956 for which the company reported to the Department of Justice 112 thousand pounds for the first eight months only.

Sources: Alcoa and Rome shipments from Defendants' Answers to Plaintiff's Interrogatories, Answer to Interrogatory 1; other company shipments, except as indicated in footnotes, from letters from individual companies to the Department of Justice; total industry shipments from U. S. Department of Commerce, Business and Defense Services Administration, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producer, 1950-1957," May 7, 1958, "Gross Shipments of Aluminum Wire by Integrated and Nonintegrated Producers 1954-1957," November 8, 1961, and "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers, 1958-1960," November 17, 1961.

Plaintiff's Exhibit 435

SHIPMENTS OF ACSR AND ALUMINUM CABLE, BARE, 1955 - 1959

(Thousands of Pounds of Aluminum Content)

	1955		1956		1957		1958	
	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total
TOTAL INDUSTRY SHIPMENTS REPORTED TO BDSA 1/	157,237	100.0	188,282	100.0	181,701	100.0	175,157	100.0
ALUMINUM COMPANY OF AMERICA	67,850	43.2	56,161	29.8	58,964	32.5	56,990	32.5
ROME CABLE CORPORATION	224	0.1	603	0.3	535	0.3	537	0.3
TOTAL for ALCOA and ROME	68,074	43.3	56,764	30.1	59,499	32.8	57,527	32.8
OTHER FIRMS:								
Anaconda Wire and Cable Company	13,899	8.8	23,660	12.6	27,515	15.1	27,156	15.5
Kaiser Aluminum and Chemical Corp. 2/	32,647	20.8	37,498	19.9	32,370	17.8	38,462	22.0
Bristol Plant of U. S. Rubber Co. 3/	83	0.1	91	0.0				
Olin Mathieson Chemical Corp.					10,469	5.8	7,355	4.2
Southern Electrical Corp. 4/	9,355	5.9	16,401	8.7				
Reynolds Metals Company	15,184	9.7	18,582	9.9	19,035	10.5	21,168	12.1
General Cable Corp.	2,551	1.6	7,734	4.1	13,215	7.3	8,777	5.0
Essex Wire Corp. 5/	4,082	2.6	5,162	2.7	5,204	2.9	7,143	4.1
Southwire Co.	5,075	3.2	11,735	6.2	7,211	4.0	3,984	2.3
Nehring Electrical Works	4,526	2.9	5,913	3.1	4,792	2.6	1,083	0.6
Other Shipments Reported to BDSA 6/	1,761	1.1	4,742	2.5	2,391	1.3	2,502	1.4

Plaintiff's Exhibit 435

SHIPMENTS OF ACSR AND ALUMINUM CABLE, BARE, 1955 - 1959

(Thousands of Pounds of Aluminum Content)

	1955		1956		1957		1958		1959	
	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total
...TS REPORTED TO BDSA 1/	157,237	100.0	188,282	100.0	181,701	100.0	175,157	100.0	197,065	100.0
ERICA	67,850	43.2	56,161	29.8	58,964	32.5	56,990	32.5	61,934	31.4
	224	0.1	603	0.3	535	0.3	537	0.3	1,342	0.7
E	68,074	43.3	56,764	30.1	59,499	32.8	57,527	32.8	63,276	32.1
Cable Company	13,899	8.8	23,660	12.6	27,515	15.1	27,156	15.5	31,911	16.2
nd Chemical Corp. 2/	32,647	20.8	37,498	19.9	32,370	17.8	38,462	22.0	34,442	17.5
J. S. Rubber Co. 3/	83	0.1	91	0.0						
mital Corp.					10,469	5.8	7,355	4.2	10,093	5.1
l Corp. 4/	9,355	5.9	16,401	8.7						
mpany	15,184	9.7	18,582	9.9	19,035	10.5	21,168	12.1	25,285	12.8
	2,551	1.6	7,734	4.1	13,215	7.3	8,777	5.0	10,582	5.4
5/	4,082	2.6	5,162	2.7	5,204	2.9	7,143	4.1	4,644	2.4
	5,075	3.2	11,735	6.2	7,211	4.0	3,984	2.3	9,767	5.0
Works	4,526	2.9	5,913	3.1	4,792	2.6	1,083	0.6	4,428	2.2
ported to BDSA 6/	1,761	1.1	4,742	2.5	2,391	1.3	2,502	1.4	2,637	1.3

[fol. 5902]

1/ Percentages may not sum to 100 because of rounding of numbers.

2/ Shipments by Kaiser Aluminum were estimated by substracting the shipments reported to the Department of Justice by the other integrated companies from the total shipments of all integrated companies. The sources of the total shipments of all integrated companies are U. S. Department of Commerce, BDSA, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers, 1950-1957," May 7, 1958, p. 1, for the years 1955-1957, and "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers, 1958-1960," November 17, 1961, for the years 1958 and 1959.

3/ Acquired by Kaiser on February 11, 1957. Bristol plant shipments are included in Kaiser shipments for all of 1957 as well as 1958 and 1959.

4/ Acquired by Olin Mathieson on May 6, 1957. Southern Electrical shipments are listed as shipments by Olin for all of 1957 as well as 1958 and 1959.

5/ Shipments for all years based on information supplied by Essex Wire Corporation to the Department of Justice. Essex based the figures for 1955, 1956, and 1959 on reports to BDSA, but Essex estimated shipments for some months in 1957 and 1958.

6/ Central Cable Corporation is the only other company known to have produced and reported shipments of ACSR and Aluminum Cable, Bare, but it supplied the Department of Justice no information on its shipments.

Sources: Alcoa and Rome shipments from Defendants' Answers to Plaintiff's Interrogatories, Answer to Interrogatory 1; other company shipments, except as indicated in footnotes, from letters from individual companies to the Department of Justice; total industry shipments from U. S. Department of Commerce, Business and Defense Services Administration, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers, 1950-1957," May 7,1958 and "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers, 1958-1960," November 17, 1961.

[fol. 5903] In United States District Court

Plaintiff's Exhibit 436

SHIPMENTS OF ALUMINUM WIRE AND CABLE, INSULATED OR COVERED, 1955 - 1959

(Thousands of Pounds of Aluminum Content)

	1955		1956		1957		1958	
	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total
TOTAL INDUSTRY SHIPMENTS REPORTED TO BDSA 1/	40,091	100.0	57,588	100.0	50,753	100.0	51,346	100.0
ALUMINUM COMPANY OF AMERICA	4,349	10.8	4,919	8.5	4,778	9.4	5,970	11.6
ROME CABLE CORPORATION	2,782	6.9	3,596	6.2	2,707	5.3	2,411	4.7
TOTAL FOR ALCOA AND ROME	7,131	17.7	8,515	14.7	7,485	14.7	8,381	16.3
OTHER FIRMS:								
Anaconda Wire and Cable Company	7,303	18.2	9,648	16.8	8,964	17.7	8,697	16.9
Kaiser Aluminum Chemical Corp. 2/	10,605	26.5	10,437	18.1	11,295	22.3	13,781	26.8
Bristol Plant of U.S. Rubber Co. 3/	1,520	3.8	1,835	3.2				
Olin Mathieson Chemical Corp.					2,536	5.0	2,729	5.3
Southern Electrical Corp. 4/	2,237	5.6	3,504	6.1				
Reynolds Metals Company	652	1.6	1,422	2.5	1,917	3.8	2,468	4.8
John A. Roebling's Sons 5/							107	0.2
General Cable Corp.	3,309	8.3	3,345	5.8	6,038	11.9	4,879	9.5
Essex Wire Corporation 6/	2,655	6.6	2,461	4.3	2,501	4.9	3,116	6.1
Hendrix Wire and Cable Corp.	221	0.6	252	0.4	300	0.6	256	0.5

PLAINTIFF'S EXHIBIT 436

SHIPMENTS OF ALUMINUM WIRE AND CABLE, INSULATED OR COVERED, 1955 - 1959

(Thousands of Pounds of Aluminum Content)

	1955		1956		1957		1958		1959	
	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total
MENTS REPORTED TO BDSA 1/	40,091	100.0	57,588	100.0	50,753	100.0	51,346	100.0	61,153	100.0
AMERICA	4,349	10.8	4,919	8.5	4,778	9.4	5,970	11.6	7,461	12.2
ION	2,782	6.9	3,596	6.2	2,707	5.3	2,411	4.7	2,680	4.4
ROME	7,131	17.7	8,515	14.7	7,485	14.7	8,381	16.3	10,141	16.6
and Cable Company	7,303	18.2	9,648	16.8	8,964	17.7	8,697	16.9	11,476	18.8
n Chemical Corp. 2/	10,605	26.5	10,437	18.1	11,295	22.3	13,781	26.8	14,564	23.8
of U.S. Rubber Co. 3/	1,520	3.8	1,835	3.2						
Chemical Corp.					2,536	5.0	2,729	5.3	2,751	4.5
rical Corp. 4/	2,237	5.6	3,504	6.1						
s Company	652	1.6	1,422	2.5	1,917	3.8	2,468	4.8	2,709	4.4
g's Sons 5/							107	0.2	360	0.6
Corp.	3,309	8.3	3,345	5.8	6,038	11.9	4,879	9.5	6,370	10.4
poration 6/	2,655	6.6	2,461	4.3	2,501	4.9	3,116	6.1	2,519	4.1
nd Cable Corp.	221	0.6	252	0.4	309	0.6	356	0.7	538	0.9

	1955		1956		1957		1958	
	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total
TOTAL INDUSTRY SHIPMENTS REPORTED TO BDSA 1/	40,091	100.0	57,588	100.0	50,753	100.0	51,346	100.0
ALUMINUM COMPANY OF AMERICA	4,349	10.8	4,919	8.5	4,778	9.4	5,970	11.6
ROME CABLE CORPORATION	2,782	6.9	3,596	6.2	2,707	5.3	2,411	4.7
TOTAL FOR ALCOA AND ROME	7,131	17.7	8,515	14.7	7,485	14.7	8,381	16.3
OTHER FIRMS:								
Anaconda Wire and Cable Company	7,303	18.2	9,648	16.8	8,964	17.7	8,697	16.9
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Bristol Plant of U.S. Rubber Co. 3/	1,520	3.8	1,835	3.2				
Olin Mathieson Chemical Corp.					2,536	5.0	2,729	5.3
Southern Electrical Corp. 4/	2,237	5.6	3,504	6.1				
Reynolds Metals Company	652	1.6	1,422	2.5	1,917	3.8	2,468	4.8
John A. Roebling's Sons 5/							107	0.2
General Cable Corp.	3,309	8.3	3,345	5.8	6,038	11.9	4,879	9.5
Essex Wire Corporation 6/	2,655	6.6	2,461	4.3	2,501	4.9	3,116	6.1
Hendrix Wire and Cable Corp.	221	0.6	252	0.4	309	0.6	356	0.7
Okonite Company 7/	588	1.5	1,313	2.3	369	0.7	110	0.2
Southwire Company	911	2.3	4,289	7.4	1,160	2.3	1,289	2.5
Walker Brothers	506	1.3	360	0.6	411	0.8	316	0.6
Western Electric			1,800	3.1	2,500	4.9	200	0.4
Westinghouse Electric Corp. 8/			144	0.3	103	0.2		
Other Shipments Reported to BDSA 9/	2,453	6.1	8,263	14.3	5,165	10.2	4,917	9.6

	1955		1956		1957		1958		1959	
	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total	Shipments	Percent of Total
IPMENTS REPORTED TO BDSA 1/	40,091	100.0	57,588	100.0	50,753	100.0	51,346	100.0	61,153	100.0
OF AMERICA	4,349	10.8	4,919	8.5	4,778	9.4	5,970	11.6	7,461	12.2
ATION	2,782	6.9	3,596	6.2	2,707	5.3	2,411	4.7	2,680	4.4
ND ROME	7,131	17.7	8,515	14.7	7,485	14.7	8,381	16.3	10,141	16.6
e and Cable Company	7,303	18.2	9,648	16.8	8,964	17.7	8,697	16.9	11,476	18.8
num Chemical Corp. 2/	10,605	26.5	10,437	18.1	11,295	22.3	13,781	26.8	14,564	23.8
t of U.S. Rubber Co. 3/	1,520	3.8	1,835	3.2						
on Chemical Corp.					2,536	5.0	2,729	5.3	2,751	4.5
ctrical Corp. 4/	2,237	5.6	3,504	6.1						
als Company	652	1.6	1,422	2.5	1,917	3.8	2,468	4.8	2,709	4.4
ing's Sons 5/							107	0.2	360	0.6
e Corp.	3,309	8.3	3,345	5.8	6,038	11.9	4,879	9.5	6,370	10.4
orporation 6/	2,655	6.6	2,461	4.3	2,501	4.9	3,116	6.1	2,519	4.1
and Cable Corp.	221	0.6	252	0.4	309	0.6	356	0.7	538	0.9
any 7/	583	1.5	1,313	2.3	369	0.7	110	0.2	361	0.6
mpany	911	2.3	4,289	7.4	1,160	2.3	1,289	2.5	2,368	3.9
ers	506	1.3	360	0.6	411	0.8	316	0.6	175	0.3
tric			1,800	3.1	2,500	4.9	200	0.4	0	0.0
Electric Corp. 8/			144	0.3	103	0.2				
nts Reported to BDSA 9/	2,453	6.1	8,263	14.3	5,165	10.2	4,917	9.6	6,821	11.2

The Business and Defense Services Administration requires reports only for months in which total shipments of aluminum products a firm amounted to 10 thousand or more pounds. Thus the maximum amount that a firm could ship in a year and not be required to port would be under 120 thousand pounds per year of all aluminum products. Only if a firm produced only aluminum wire and cable, nsulated or covered, and its shipments were spread evenly over the twelve months could it produce 120 thousand non-reportable pounds any calendar year. In 1955, the year with the lowest industry total, 120 thousand pounds would be less than three-tenths of e per cent of the industry total. Individual company reports to the Department of Justice, however, show that six firms shipped ore than 120 thousand pounds in one or more of these years, but did not report their shipments to BDSA. Circle Wire and Gable orporation shipments ranged from less than one-tenth of one per cent in 1955 and 1956 to one per cent of the BDSA total in 1959. ollyer Insulated Wire Company reported to the Department of Justice its use of aluminum wire and cable in its production of insulated roducts rather than its actual shipments. Assuming that its shipments corresponded with its production, its total for 1955 and 1956 as more than 120 thousand pounds, but less than one-half of one per cent of the BDSA industry total. Continental Copper and Steel ndustries, Inc., shipped less than four-tenths of one per cent in 1959. General Electric Company shipments ranged from six-tenths f one per cent in 1955 to one and a half per cent in 1959. Narragansett Wire Company shipped three-tenths of one per cent of the BDSA otal in 1958 and four-tenths of one per cent of the BDSA total in 1959. Triangle Conduit and Cable Company shipments ranged from even-tenths of one per cent in 1957 to less than one-tenth of one per cent in 1959. The combined shipments of these companies ranged rom one per cent in 1955 to two and a half per cent in 1959. The addition of these shipments to BDSA total would change no market share y more than six-tenths of one percentage point. Percentages may not sum to 100 because of rounding of numbers.

2/ Shipments by Kaiser Aluminum were estimated by subtracting the shipments reported to the Department of Justice by the other integrated companies from the total shipments of all integrated companies. The sources of the total shipments of all integrated companies are U.S. Department of Commerce, Business and Defense Services Administration, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Wire by Integrated and Nonintegrated Producers 1954-1957", November 8, 1961, for the years 1955 through 1957; from "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers for the years 1958-1960", November 17, 1961, for the years 1958 and 1959.

3/ Acquired by Kaiser on February 11, 1957. Bristol plant shipments are included in Kaiser shipments for all of 1957 as well as 1958 and 1959.

4/ Acquired by Olin Mathieson on May 6, 1957. Southern Electrical shipments are listed as shipments by Olin for all of 1957 as well as 1958 and 1959.

5/ Division of Colorado Fuel and Iron Corp. Most of the aluminum wire and cable machinery of Roebling was purchased by Reynolds in March 1961.

6/ Shipments of all years based on information supplied by Essex to the Department of Justice. Essex based the figures for 1955, 1956, and 1959 on reports to BDSA, but Essex estimated shipments for some months in 1957 and 1958.

7/ The Okonite Company was acquired by Kennecott Copper Corporation on November 24, 1958.

8/ Westinghouse shipped between 10 and 50 thousand pounds in 1958, and between 50 and 100 pounds in 1955 and 1959.

9/ Five other firms are known to have reported some shipments of aluminum wire and cable, insulated or covered, to BDSA. Central Cable Corporation supplied the Department of Justice no information on its shipments. The American Steel and Wire Division of the United States Steel Corporation reported to BDSA in 1955, 1956, and 1957, shipments amounting to less than one-half of one per cent of the industry total reported to BDSA. In 1958 and 1959 this company's shipments were less than 10 thousand pounds per month and therefore not reported. The Collyer Insulated Wire Company filed reports with BDSA in 1958 and 1959, but indicated shipments less than 10 thousand pounds per month. The Crescent Insulated Wire and Cable Company filed reports with BDSA, but its shipments averaged less than 10 thousand pounds per month for all years except 1956 for which the company reported to the Department of Justice for the first eight months only. Nehring Electrical Works reported less than one-tenth of one per cent of the industry total in 1958 and 1959.

Sources: Alcoa and Rome shipments from Defendants' Answers to Plaintiff's Interrogatories, Answer to Interrogatory 1; other company shipments.

eport would be under 120 thousand pounds per year of all aluminum products. Only if a firm produced only aluminum wire and cable, nsulated or covered, and its shipments were spread evenly over the twelve months could it produce 120 thousand non-reportable pounds n any calendar year. In 1955, the year with the lowest industry total, 120 thousand pounds would be less than three-tenths of ne per cent of the industry total. Individual company reports to the Department of Justice, however, show that six firms shipped ore than 120 thousand pounds in one or more of these years, but did not report their shipments to BDSA. Circle Wire and Cable orporation shipments ranged from less than one-tenth of one per cent in 1955 and 1956 to one per cent of the BDSA total in 1959. ollyer Insulated Wire Company reported to the Department of Justice its use of aluminum wire and cable in its production of insulated roducts rather than its actual shipments. Assuming that its shipments corresponded with its production, its total for 1955 and 1956 as more than 120 thousand pounds, but less than one-half of one per cent of the BDSA industry total. Continental Copper and Steel ndustries, Inc., shipped less than four-tenths of one per cent in 1959. General Electric Company shipments ranged from six-tenths f one per cent in 1955 to one and a half per cent in 1959. Narragansett Wire Company shipped three-tenths of one per cent of the BDSA total in 1958 and four-tenths of one per cent of the BDSA total in 1959. Triangle Conduit and Cable Company shipments ranged from seven-tenths of one per cent in 1957 to less than one-tenth of one per cent in 1959. The combined shipments of these companies ranged from one per cent in 1955 to two and a half per cent in 1959. The addition of these shipments to BDSA total would change no market share by more than six-tenths of one percentage point. Percentages may not sum to 100 because of rounding of numbers.

2/ Shipments by Kaiser Aluminum were estimated by subtracting the shipments reported to the Department of Justice by the other integrated companies from the total shipments of all integrated companies. The sources of the total shipments of all integrated companies are U.S. Department of Commerce, Business and Defense Services Administration, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Wire by Integrated and Nonintegrated Producers 1954-1957", November 8, 1961, for the years 1955 through 1957; from "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers for the years 1958-1960", November 17, 1961, for the years 1958 and 1959.

3/ Acquired by Kaiser on February 11, 1957. Bristol plant shipments are included in Kaiser shipments for all of 1957 as well as 1958 and 1959.

4/ Acquired by Olin Mathieson on May 6, 1957. Southern Electrical shipments are listed as shipments by Olin for all of 1957 as well as 1958 and 1959.

5/ Division of Colorado Fuel and Iron Corp. Most of the aluminum wire and cable machinery of Roebling was purchased by Reynolds in March 1961.

6/ Shipments of all years based on information supplied by Essex to the Department of Justice. Essex based the figures for 1955, 1956, and 1959 on reports to BDSA, but Essex estimated shipments for some months in 1957 and 1958.

7/ The Okonite Company was acquired by Kennecott Copper Corporation on November 24, 1958.

8/ Westinghouse shipped between 10 and 50 thousand pounds in 1958, and between 50 and 100 pounds in 1955 and 1959.

9/ Five other firms are known to have reported some shipments of aluminum wire and cable, insulated or covered, to BDSA. Central Cable Corporation supplied the Department of Justice no information on its shipments. The American Steel and Wire Division of the United States Steel Corporation reported to BDSA in 1955, 1956, and 1957, shipments amounting to less than one-half of one per cent of the industry total reported to BDSA. In 1958 and 1959 this company's shipments were less than 10 thousand pounds per month and therefore not reported. The Collyer Insulated Wire Company filed reports with BDSA in 1958 and 1959, but indicated shipments less than 10 thousand pounds per month. The Crescent Insulated Wire and Cable Company filed reports with BDSA, but its shipments averaged less than 10 thousand pounds per month for all years except 1956 for which the company reported to the Department of Justice for the first eight months only. Nehring Electrical Works reported less than one-tenth of one per cent of the industry total in 1958 and 1959.

Sources: Alcoa and Rome shipments from Defendants' Answers to Plaintiff's Interrogatories, Answer to Interrogatory 1; other company shipments, except as indicated in footnotes, from letters from individual companies to the Department of Justice; total industry shipments from U. S. Department of Commerce, Business and Defense Services Administration, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Wire by Integrated and Nonintegrated Producers 1954-1957", November 8, 1961, and "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers 1958-1960", November 17, 1961.

[fol. 5905] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 438

CONCENTRATION OF SHIPMENTS OF ALUMINUM CONDUCTOR WIRE AND CABLE 1/
ACCOUNTED FOR BY INTEGRATED PRODUCERS, 1955-1959

(Thousands of Pounds of Aluminum Content)

	Shipments	Shipments	Percent of Industry Total
1955			
Industry Total as Reported to BDSA		197,328	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		66,041	33.5
TOTAL SHIPMENTS OF INTEGRATED COMPANIES		131,287	66.5
Aluminum Company of America	72,199		
Kaiser Aluminum and Chemical Corporation 2/	43,252		
Reynolds Metals Company	15,836		
1956			
Industry Total as Reported to BDSA		245,870	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		83,543	34.1
TOTAL SHIPMENTS OF INTEGRATED COMPANIES		162,327	65.9
Aluminum Company of America	61,080		
Kaiser Aluminum and Chemical Corporation 2/	47,935		
Reynolds Metals Company	20,004		
Anaconda Wire & Cable Company 3/	33,308		
1957			
Industry Total as Reported to BDSA		232,454	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		67,616	29.1
TOTAL SHIPMENTS OF INTEGRATED COMPANIES		164,838	70.9
Aluminum Company of America	63,742		
Kaiser Aluminum and Chemical Corporation 2/ 4/	42,665		

Kaiser Aluminum and Chemical Corporation 2/	12,199		
Reynolds Metals Company	43,252		
	15,836		
1956			
Industry Total as Reported to BDSA		245,870	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		83,543	34.1
TOTAL SHIPMENTS OF INTEGRATED COMPANIES		162,327	65.9
Aluminum Company of America	61,080		
Kaiser Aluminum and Chemical Corporation 2/	47,935		
Reynolds Metals Company	20,004		
Anaconda Wire & Cable Company 3/	33,308		
1957			
Industry Total as Reported to BDSA		232,454	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		67,616	29.1
TOTAL SHIPMENTS OF INTEGRATED COMPANIES		164,838	70.9
Aluminum Company of America	63,742		
Kaiser Aluminum and Chemical Corporation 2,4/	43,665		
Reynolds Metals Company	20,952		
Anaconda Wire & Cable Company	36,479		
1958			
Industry Total as Reported to BDSA		226,503	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		41,727	18.4
TOTAL SHIPMENTS OF INTEGRATED COMPANIES 6/		184,776	81.6
Aluminum Company of America	62,960		
Kaiser Aluminum and Chemical Corporation 2/	52,243		
Reynolds Metals Company	23,636		
Anaconda Wire & Cable Company	35,853		
Olin Mathieson Chemical Corporation 5/	10,084		
1959			
Industry Total as Reported to BDSA		258,218	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		51,570	19.9
TOTAL SHIPMENTS OF INTEGRATED COMPANIES 6/		206,648	80.1
Aluminum Company of America 7/	73,417		
Kaiser Aluminum and Chemical Corporation 2/	49,006		
Reynolds Metals Company	27,994		
Anaconda Wire & Cable Company	43,387		
Olin Mathieson Chemical Corporation	12,844		

[fol. 5906]

1/ Shipments of aluminum conductor wire and cable are the sum of the shipments of aluminum wire, insulated or covered, and ACSR and aluminum cable, bare.

2/ Shipments by Kaiser were estimated by subtracting the shipments reported to the Department of Justice by the other integrated companies from the total shipments of all integrated companies included in U. S. Department of Commerce, BDSA, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Mill Shapes by Integrated and Non-integrated Producers, 1950 - 1957," May 7, 1958, p. 1 and "Gross Shipments of Aluminum Wire by Integrated and Nonintegrated Producers 1954 - 1957," November 8, 1961, for the years 1955 through 1957, and "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers, 1958 - 1960," November 17, 1961, for the years 1958 and 1959.

3/ The Anaconda Company became a producer of primary aluminum in late 1955.

4/ Bristol plant shipments are included in the Kaiser figure for all of 1957 and thereafter. This plant was acquired by Kaiser on February 11, 1957.

5/ Olin Mathieson became a producer of primary aluminum in 1958, through a jointly owned subsidiary, Ormet Corporation. Southern Electricel Corporation was acquired by Olin Mathieson on May 6, 1957, and its shipments were reported to BDSA as shipments of Olin after that date, and are included as integrated for all of 1958.

6/ If General Cable Corporation were treated as an integrated company after the entry of Ormet Corporation, because of the intercorporate stock relationship among General Cable, American Smelting and Refining Company, Revere Copper, and Ormet Corporation, then the integrated companies' share would be 87.6 percent in 1958 and 86.7 percent in 1959.

7/ Rome's shipments are treated as integrated for the whole year 1959.

Sources: Alcoa and Rome shipments from Defendants' Answers to Plaintiff's Interrogatories, Answer to Interrogatory 1; other company shipments, except as indicated in footnotes, from letters from individual companies to the Department of Justice; total industry shipments from U. S. Department of Commerce, Business and Defense Service Administration, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers, 1950 - 1957," May 7, 1958, "Gross Shipments of Aluminum Wire by Integrated and Nonintegrated Producers 1954 - 1957," November 8, 1961, and "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers, 1958 - 1960," November 17, 1961.

[fol. 5907] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 439

CONCENTRATION OF SHIPMENTS OF ACSR AND ALUMINUM CABLE, BARE, ACCOUNTED FOR BY INTEGRATED PRODUCERS, 1955-1959

(Thousands of Pounds of Aluminum Content)

	Shipments	Shipments	Percent of Industry Total
1955			
Industry Total as Reported to BDSA		157,237	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		41,556	26.3
TOTAL SHIPMENTS OF INTEGRATED COMPANIES		115,681	73.7
Aluminum Company of America	67,850		
Kaiser Aluminum and Chemical Corporation 1/	32,647		
Reynolds Metals Company	15,184		
1956			
Industry Total as Reported to BDSA		188,282	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		52,381	27.8
TOTAL SHIPMENTS OF INTEGRATED COMPANIES		135,901	72.2
Aluminum Company of America	56,161		
Kaiser Aluminum and Chemical Corporation 1/	37,498		
Reynolds Metals Company	18,582		
Anaconda Wire & Cable Company 2/	23,660		
1957			
Industry Total as Reported to BDSA		181,701	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		43,817	24.1
TOTAL SHIPMENTS OF INTEGRATED COMPANIES		137,884	75.9
Aluminum Company of America	58,964		
Kaiser Aluminum and Chemical Corporation 1/	32,370		

1956				
	Industry Total as Reported to BDSA		188,282	100.0
	TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		52,381	27.8
	TOTAL SHIPMENTS OF INTEGRATED COMPANIES		135,901	72.2
	Aluminum Company of America	56,161		
	Kaiser Aluminum and Chemical Corporation 1/	37,498		
	Reynolds Metals Company	18,582		
	Anaconda Wire & Cable Company 2/	23,660		
1957				
	Industry Total as Reported to BDSA		181,701	100.0
	TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		43,817	24.1
	TOTAL SHIPMENTS OF INTEGRATED COMPANIES		137,884	75.9
	Aluminum Company of America	58,964		
	Kaiser Aluminum and Chemical Corporation 1,3/	32,370		
	Reynolds Metals Company	19,035		
	Anaconda Wire & Cable Company	27,515		
1958				
	Industry Total as Reported to BDSA		175,157	100.0
	TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		24,026	13.7
	TOTAL SHIPMENTS OF INTEGRATED COMPANIES 5/		151,131	86.3
	Aluminum Company of America	56,990		
	Kaiser Aluminum and Chemical Corporation 1/	38,462		
	Reynolds Metals Company	21,168		
	Anaconda Wire & Cable Company	27,156		
	Olin Mathieson Chemical Corporation 4/	7,355		
1959				
	Industry Total as Reported to BDSA		197,065	100.0
	TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		32,058	16.3
	TOTAL SHIPMENTS OF INTEGRATED COMPANIES 5/		165,007	83.7
	Aluminum Company of America 6/	63,276		
	Kaiser Aluminum and Chemical Corporation 1/	34,442		
	Reynolds Metals Company	25,285		
	Anaconda Wire & Cable Company	31,911		
	Olin Mathieson Chemical Corporation	10,093		

1/ Shipments by Kaiser Aluminum were estimated by subtracting the shipments reported to the Department of Justice by the other integrated companies from the total shipments of all integrated companies included in U. S. Department of Commerce, BDSA, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Mill Shapes by Integrated and Non-integrated Producers, 1950-1957," May 7, 1958, p. 1, for the years 1955-1957, and "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers, 1958-1960," November 17, 1961, for the years 1958 and 1959.

2/ The Anaconda Company became a producer of primary aluminum in late 1955.

3/ Bristol plant shipments are included in the Kaiser figure for all of 1957 and thereafter. This plant was acquired by Kaiser on February 11, 1957.

4/ Olin Mathieson became a producer of primary aluminum in 1958, through a jointly owned subsidiary, Ormet Corporation. Southern Electrical Corporation was acquired by Olin Mathieson on May 6, 1957, and its shipments were reported to BDSA as shipments of Olin after that date and are included as integrated for all of 1958.

5/ If General Cable Corporation were treated as an integrated company after the entry of Ormet Corporation, because of the intercorporate stock relationship among General Cable, American Smelting and Refining Company, Revere Copper, and Ormet Corporation, then the integrated companies' share would be 91.3 percent in 1958 and 89.1 percent in 1959.

6/ Rome's shipments are treated as integrated for the whole year 1959.

Sources: Alcoa and Rome shipments from Defendants' Answers to Plaintiff's Interrogatories, Answer to Interrogatory 1; other company shipments, except as indicated in footnotes, from letters from individual companies to the Department of Justice, total industry shipments from U. S. Department of Commerce, Business and Defense Services Administration, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers, 1950-1957;" May 7, 1958, and "Gross Shipments of Aluminum Mill Shapes by Integrated and Non-integrated Producers, 1958-1960," November 17, 1961, adjusted as indicated in footnotes.

[fol. 5909] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 440

(Thousands of Pounds of Aluminum Content)

	Shipments	Shipments	Percent of Industry Total
1955			
Industry Total as Reported to BDSA		40,091	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		24,485	61.0
TOTAL SHIPMENTS OF INTEGRATED COMPANIES		15,606	39.0
Aluminum Company of America	4,349		
Kaiser Aluminum and Chemical Corporation 1/	10,605		
Reynolds Metals Company	652		
1956			
Industry Total as Reported to BDSA		57,588	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		31,162	54.1
TOTAL SHIPMENTS OF INTEGRATED COMPANIES		26,426	45.9
Aluminum Company of America	4,919		
Kaiser Aluminum and Chemical Corporation 1/	10,437		
Reynolds Metals Company	1,422		
Anaconda Wire & Cable Company 2/	9,648		
1957			
Industry Total as Reported to BDSA		50,753	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		23,799	46.8
TOTAL SHIPMENTS OF INTEGRATED COMPANIES		26,954	53.2

Reynolds Metals Company	652		
1956			
Industry Total as Reported to BDSA		57,588	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		31,162	54.1
TOTAL SHIPMENTS OF INTEGRATED COMPANIES		26,426	45.9
Aluminum Company of America	4,919		
Kaiser Aluminum and Chemical Corporation 1/	10,437		
Reynolds Metals Company	1,422		
Anaconda Wire & Cable Company 2/	9,648		
1957			
Industry Total as Reported to BDSA		50,753	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		23,799	46.8
TOTAL SHIPMENTS OF INTEGRATED COMPANIES		26,954	53.2
Aluminum Company of America	4,778		
Kaiser Aluminum and Chemical Corporation 1,3/	11,295		
Reynolds Metals Company	1,917		
Anaconda Wire & Cable Company	8,964		
1958			
Industry Total as Reported to BDSA		51,346	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		17,701	34.6
TOTAL SHIPMENTS OF INTEGRATED COMPANIES		33,645	65.4
Aluminum Company of America	5,970		
Kaiser Aluminum and Chemical Corporation 1/	13,781		
Reynolds Metals Company	2,468		
Anaconda Wire & Cable Company	8,697		
Olin Mathieson Chemical Corporation 4/	2,729		
1959			
Industry Total as Reported to BDSA		61,153	100.0
TOTAL SHIPMENTS OF NONINTEGRATED COMPANIES		19,512	31.9
TOTAL SHIPMENTS OF INTEGRATED COMPANIES		41,641	68.1
Aluminum Company of America 6/	10,141		
Kaiser Aluminum and Chemical Corporation 1/	14,564		
Reynolds Metals Company	2,709		
Anaconda Wire & Cable Company	11,476		
Olin Mathieson Chemical Corporation	2,751		

1/ Shipments by Kaiser Aluminum were estimated by subtracting the shipments reported to the Department of Justice by the other integrated companies from the total shipments of all integrated companies included in U. S. Department of Commerce, Business and Defense Services Administration, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Wire by Integrated and Nonintegrated Producers 1954-1957," November 8, 1961, for the years 1955 through 1957; from "Gross Shipments of Aluminum Mill Shapes by Integrated and Non-integrated Producers, 1958-1960," November 17, 1961, for the years 1958 and 1959.

2/ The Anaconda Company became a producer of primary aluminum in late 1955.

3/ Bristol plant shipments are included in the Kaiser figure for all of 1957 and thereafter. This plant was acquired by Kaiser on February 11, 1957.

4/ Olin Mathieson became a producer of primary aluminum in 1958, through a jointly owned subsidiary, Ormet Corporation. Southern Electrical Corporation was acquired by Olin Mathieson on May 6, 1957, and its shipments were reported to HDSA as shipments of Olin after that date, and are included as integrated for all of 1958.

5/ If General Cable Corporation were treated as an integrated company after the entry of Ormet Corporation, because of the intercorporate stock relationship among General Cable, American Smelting and Refining Company, Revere Copper, and Ormet Corporation, then the integrated companies' share would be 65.4 percent in 1958 and 68.1 percent in 1959.

6/ Rome's shipments are treated as integrated for the whole year 1959.

Sources: Alcoa and Rome shipments from Defendants' Answers to Plaintiff's Interrogatories, Answer to Interrogatory 1; other company shipments, except as indicated in footnotes, from letters from individual companies to the Department of Justice, total industry shipments from U. S. Department of Commerce, Business and Defense Services Administration, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Wire by Integrated and Nonintegrated Producers 1954-1957," November 8, 1961, and "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers, 1958-1960," November 17, 1961, adjusted as indicated in footnotes.

Plaintiff's Exhibit 441

POSITION OF ROME AMONG NONINTEGRATED PRODUCERS OF ALUMINUM CONDUCTOR WIRE AND CABLE 1955-1958

(Thousands of pounds of Aluminum Content)

	1955		1956		1957		1958	
	Shipments	Percent of Shipments of Nonintegrated Firms	Shipments	Percent of Shipments of Nonintegrated Firms	Shipments	Percent of Shipments of Nonintegrated Firms	Shipments	Percent of Shipments o Nonintegrate Firms
I. ALUMINUM CONDUCTOR WIRE AND CABLE								
Nonintegrated Firms 1/	66,041	100.0	83,543	100.0	67,616	100.0	41,727	100.0
ROME CABLE CORPORATION	3,006	4.6	4,199	5.0	3,242	4.8	2,948	7.1
II. ACSR AND ALUMINUM CABLE, BARE								
Nonintegrated Firms 1/	41,556	100.0	52,381	100.0	43,817	100.0	24,026	100.0
ROME CABLE CORPORATION	224	0.5	603	1.2	535	1.2	537	2.2
III. ALUMINUM WIRE AND CABLE, INSULATED OR COVERED								
Nonintegrated Firms 1/	24,485	100.0	31,162	100.0	23,799	100.0	17,701	100.0
ROME CABLE CORPORATION	2,782	11.4	3,596	11.5	2,707	11.4	2,411	13.6

1/ Totals of Nonintegrated Firms as reported by Business and Defense Services Administration revised to exclude Anaconda Wire and Cable Company in 1956 and 1957, and Bristol for all of 1957.

SOURCES: Rome shipments from Defendants' Answers to Plaintiff's Interrogatories, Answer to Interrogatory 1;

[fol. 5911] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 441

POSITION OF ROME AMONG NONINTEGRATED PRODUCERS OF ALUMINUM CONDUCTOR WIRE AND CABLE 1955-1958

(Thousands of pounds of Aluminum Content)

	1955		1956		1957		1958	
	Shipments	Percent of Shipments of Nonintegrated Firms	Shipments	Percent of Shipments of Nonintegrated Firms	Shipments	Percent of Shipments of Nonintegrated Firms	Shipments	Percent of Shipments of Nonintegrated Firms
I. ALUMINUM CONDUCTOR WIRE AND CABLE								
Nonintegrated Firms 1/	66,041	100.0	83,543	100.0	67,616	100.0	41,727	100.0
ROME CABLE CORPORATION	3,006	4.6	4,199	5.0	3,242	4.8	2,948	7.1
II. ACSR AND ALUMINUM CABLE, BARE								
Nonintegrated Firms 1/	41,556	100.0	52,381	100.0	43,817	100.0	24,026	100.0
ROME CABLE CORPORATION	224	0.5	603	1.2	535	1.2	537	2.2
III. ALUMINUM WIRE AND CABLE, INSULATED OR COVERED								
Nonintegrated Firms 1/	24,485	100.0	31,162	100.0	23,799	100.0	17,701	100.0
ROME CABLE CORPORATION	2,782	11.4	3,596	11.5	2,707	11.4	2,411	13.6

1/ Totals of Nonintegrated Firms as reported by Business and Defense Services Administration revised to exclude Anaconda Wire and Cable Co. [illegible] 1957 [illegible] Printed for

POSITION OF ROME AMONG NONINTEGRATED PRODUCERS OF ALUMINUM CONDUCTOR WIRE AND CABLE 1955-1958

(Thousands of pounds of Aluminum Content)

	1955		1956		1957		1958	
	Shipments	Percent of Shipments of Nonintegrated Firms	Shipments	Percent of Shipments of Nonintegrated Firms	Shipments	Percent of Shipments of Nonintegrated Firms	Shipments	Percent of Shipments of Nonintegrated Firms
I. ALUMINUM CONDUCTOR WIRE AND CABLE								
Nonintegrated Firms 1/	66,041	100.0	83,543	100.0	67,616	100.0	41,727	100.0
ROME CABLE CORPORATION	3,006	4.6	4,199	5.0	3,242	4.8	2,948	7.1
II. ACSR AND ALUMINUM CABLE, BARE								
Nonintegrated Firms 1/	41,556	100.0	52,381	100.0	43,817	100.0	24,026	100.0
ROME CABLE CORPORATION	224	0.5	603	1.2	535	1.2	537	2.2
III. ALUMINUM WIRE AND CABLE, INSULATED OR COVERED								
Nonintegrated Firms 1/	24,485	100.0	31,162	100.0	23,799	100.0	17,701	100.0
ROME CABLE CORPORATION	2,782	11.4	3,596	11.5	2,707	11.4	2,411	13.6

1/ Totals of Nonintegrated Firms as reported by Business and Defense Services Administration revised to exclude Anaconda Wire and Cable Company in 1956 and 1957, and Bristol for all of 1957.

SOURCES: Rome shipments from Defendants' Answers to Plaintiff's Interrogatories, Answer to Interrogatory 1; total shipments of nonintegrated firms from U.S. Department of Commerce, Business and Defense Services Administration, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers, 1950-1957," May 7, 1958, and "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers, 1958-1960," November 17, 1961, and individual company letters to Department of Justice.

POSITION OF ROME AMONG NONINTEGRATED PRODUCERS OF ALUMINUM CONDUCTOR WIRE AND CABLE 1955-1958

(Thousands of pounds of Aluminum Content)

	1955		1956		1957		1958	
	Shipments	Percent of Shipments of Nonintegrated Firms	Shipments	Percent of Shipments of Nonintegrated Firms	Shipments	Percent of Shipments of Nonintegrated Firms	Shipments	Percent of Shipments of Nonintegrated Firms
I. ALUMINUM CONDUCTOR WIRE AND CABLE								
ated 1/	66,041	100.0	83,543	100.0	67,616	100.0	41,727	100.0
E TION	3,006	4.6	4,199	5.0	3,242	4.8	2,948	7.1
II. ACSR AND ALUMINUM CABLE, BARE								
ated 1/	41,556	100.0	52,381	100.0	43,817	100.0	24,026	100.0
E TION	224	0.5	603	1.2	535	1.2	537	2.2
III. ALUMINUM WIRE AND CABLE, INSULATED OR COVERED								
ated 1/	24,485	100.0	31,162	100.0	23,799	100.0	17,701	100.0
E TION	2,782	11.4	3,596	11.5	2,707	11.4	2,411	13.6

---

s of Nonintegrated Firms as reported by Business and Defense Services Administration revised to exclude nda Wire and Cable Company in 1956 and 1957, and Bristol for all of 1957.

Rome shipments from Defendants' Answers to Plaintiff's Interrogatories, Answer to Interrogatory 1; total shipments of nonintegrated firms from U.S. Department of Commerce, Business and Defense Services Administration, Aluminum and Magnesium Division, "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers, 1950-1957," May 7, 1958, and "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers, 1958-1960," November 17, 1961, and individual company letters to Department of Justice.

[fol. 5912] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 442

Companies Listed as Producing Aluminum Conductor Wire and Cable [1] in the U. S. Department of Commerce BDSA Directory of Aluminum Suppliers, Dated April 1, 1961, but not listed in the Directory for June 30, 1955

Olin Mathieson Chemical Corporation [2]
Hatfield Wire and Cable Corporation Division of Continental Copper and Steel Industries
Circle Wire and Cable Corporation, Subsidiary of Cerro Corporation [3]

---

[1] The Directory of Aluminum Suppliers is broken down into a number of categories. This tabulation lists all companies that were listed in either the "ACSR and Aluminum Cable, bare" category or the "Wire and Cable, insulated or covered" category in the 1961 directory but not listed in either category in the 1955 directory.

[2] The Olin Mathieson Chemical Corporation displaced Southern Electrical Corporation which company was acquired by Olin Mathieson on May 6, 1957.

[3] While Circle Wire and Cable Corporation is not listed as a producer of these products in the directory for June 30, 1955, but Circle indicated in a letter to the Department of Justice dated August 22, 1961, that it did manufacture aluminum conductor wire in 1955.

[fol. 5913] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 443

Shipments of Aluminum Weatherproof and Service Drop Wire and Cable Compared with Total Shipments of Aluminum Wire and Cable, Insulated or Covered, by Six Companies,[1] 1959.

Company	Total Insulated or Covered[2]	Weatherproof and Service Drop[2]	Weatherproof and Service Drop as Percent of Total Insulated or Covered
Aluminum Company of America	7,550	7,550	100.0
Rome Cable Corporation	2,677	2,438	91.1
Anaconda Wire and Cable Company	11,476	11,017	96.0
General Cable Corporation	46,704[3,4]	45,902[3]	98.3
Kaiser Aluminum & Chemical Corp.	15,356	11,092	72.2
Southwire Company	2,388	2,384	99.8

[1] These six companies in 1959 shipped 73.5 percent of all shipments of aluminum wire and cable, insulated or covered, reported to BDSA. These six are the only companies for which the Department of Justice has data on weatherproof and service drop shipments that are comparable with data on total insulated or covered shipments.

[2] Thousands of pounds of aluminum content except where indicated otherwise.

[3] Measured in feet.

[4] The letter from General Cable says sales of some other unspecified aluminum insulated wire and cable amounted to "a small fraction of one percent." This figure is based on the assumption that the unspecified sales were exactly one percent.

Sources: Alcoa and Rome figures from Defendants' Answers to Plaintiff Interrogatories numbers 5 and 4, respectively; other figures from individual company letters to the Department of Justice.

Plaintiff's Exhibit 444

SALES BY DOMESTIC PRIMARY ALUMINUM PRODUCERS OF E. C. ALUMINUM PIG AND INGOT AND E. C. ALUMINUM ROD AND BAR TO NONINTEGRATED PRODUCERS OF ALUMINUM CONDUCTOR WIRE & CABLE, AND TO OTHER FIRMS
1956 - 1959
(Thousands of Pounds)

	1956		1957		1958		1959
	To Nonintegrated Producers of conductor wire & cable	To Other Firms	To Nonintegrated Producers of conductor wire & cable	To Other Firms	To Nonintegrated Producers of conductor wire & cable	To Other Firms	To Nonintegrate Producers of conductor wire & cable
E. C. ALUMINUM PIG & INGOT SOLD BY:							
ALUMINUM COMPANY OF AMERICA	18,660	-	13,926	71	11,565	5,012	3,833
Anaconda Wire & Cable Co.	3,137	-	3,241	-	2,131	-	1,878
Harvey Aluminum							1,935
Kaiser Aluminum and Chemical Corp.	3,150	-	2,938	5	1,926	23	728
Reynolds Metals Company	3,962	-	2,381	-	454	-	1,636
Olin Mathieson Chemical Co.						1,383	7
Total	28,909	-	22,486	76	16,076	6,418	10,017
E. C. ALUMINUM BAR & ROD SOLD BY:							
ALUMINUM COMPANY OF AMERICA	16,262	25	12,028	-	6,950	-	13,654
Anaconda Wire & Cable Co.	300	-	30	-	-	-	-
Harvey Aluminum							-
Kaiser Aluminum and Chemical Corp.	22,279	3,328	8,081	3,036	8,896	522	8,220
Reynolds Metals Company	1,849	-	1,169	-	1,133	-	950
Olin Mathieson Chemical Corp.						273	
Total	40,690	3,353	21,308	3,036	16,979	795	22,824
TOTAL OF E. C. ALUMINUM PIG AND INGOT AND BAR AND ROD SOLD BY:							
ALUMINUM COMPANY OF AMERICA	34,922	25	25,954	71	18,515	5,012	17,487
Anaconda Wire & Cable Co.	3,437	-	3,271	-	2,131	-	1,878
Harvey Aluminum							1,935
Kaiser Aluminum and Chemical Corp.	25,429	3,328	11,019	3,041	10,822	545	8,948
Reynolds Metals Co.	5,811		3,550		1,587		2,586
Olin Mathieson Chemical Corp.						1,656	7
Total	69,599	3,353	43,794	3,112	33,055	7,213	32,841

Sources: Alcoa Sales from Defendants' Answers to Plaintiff's Interrogatories, Numbers 20 and 64; other companies from letters from individual companies to the Department of Justice.

PLAINTIFF'S EXHIBIT 444

SALES BY DOMESTIC PRIMARY ALUMINUM PRODUCERS OF E. C. ALUMINUM PIG AND INGOT AND E. C. ALUMINUM ROD AND BAR TO NONINTEGRATED PRODUCERS OF ALUMINUM CONDUCTOR WIRE & CABLE, AND TO OTHER FIRMS
1956 - 1959
(Thousands of Pounds)

	1956		1957		1958		1959	
	To Nonintegrated Producers of conductor wire & cable	To Other Firms	To Nonintegrated Producers of conductor wire & cable	To Other Firms	To Nonintegrated Producers of conductor wire & cable	To Other Firms	To Nonintegrated Producers of conductor wire & cable	To Other Firms
SOLD BY:								
ERICA	18,660	-	13,926	71	11,565	5,012	3,833	1,898
Co.	3,137	-	3,241	-	2,131	-	1,878	-
							1,935	434
mical Corp.	3,150	-	2,938	5	1,926	23	728	103
	3,962	-	2,381	-	454	-	1,636	-
Co.						1,383	7	1,579
	28,909	-	22,486	76	16,076	6,418	10,017	4,014
D BY:								
RICA	16,262	25	12,028	-	6,950	-	13,654	-
o.	300	-	30	-	-	-	-	-
							-	-
mical Corp.	22,279	3,326	8,081	3,036	8,896	522	8,220	923
	1,849	-	1,169	-	1,133	-	950	-
Corp.						273		68
	40,690	3,353	21,308	3,036	16,979	795	22,824	991
AND INGOT								
RICA	34,922	25	25,954	71	18,515	5,012	17,487	1,898
o.	3,437	-	3,271	-	2,131	-	1,878	-
							1,935	434
mical Corp.	25,429	3,328	11,019	3,041	10,822	545	8,948	1,026
	5,811		3,550		1,587		2,586	-
Corp.						1,656	7	1,647
	69,599	3,353	43,794	3,112	33,055	7,213	32,841	5,005

rom Defendants' Answers to Plaintiff's Interrogatories, Numbers 20 and 64;
es from letters from individual companies to the Department of Justice.

[fol. 5915] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 450

Value of Shipments of Conductor Wire and Cable, 1958
(Thousands of Dollars)

	1958	
	Shipments & Interplant Transfers	Percent of Industry Total
Industry Total	1,553,955	100.0
Aluminum Company of America	28,521	1.8
Rome Cable Corporation	22,001	1.4
Rea Magnet Wire Co., Inc.	17,651	1.1
Total of Alcoa, Rome & Rea	68,173	4.3

Sources: Industry total from Bureau of the Census, "1958 Census of Manufactures," MC58(2)-33D; Alcoa figures from Defendant's Answers to Questions 4 and 5 in Plaintiff's Letter of August 19, 1959; Rome figures from Defendant's Answers to Questions 8 and 9 in Plaintiff's Letter of August 18, 1959; Rea figures from Defendants' Answer to Interrogatory 34.

[fol. 5916] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 451

Value of Shipments of Wire and Cable, Insulated and Covered, 1958
(Thousands of Dollars)

	1958	
	Shipments & Interplant Transfers	Percent of Industry Total
Industry Total	1,321,675	100.0
Aluminum Company of America	4,501	0.3
Rome Cable Corporation	17,422	1.3
Rea Magnet Wire Co., Inc.	17,651	1.3
Total of Alcoa, Rome & Rea	39,574	2.9

Sources: Industry total from Bureau of the Census, "1958 Census of Manufactures," MC58(2)-33D; Alcoa figures from Defendant's Answers to Questions 4 and 5 in Plaintiff's Letter of August 19, 1959; Rome figures from Defendant's Answers to Questions 8 and 9 in Plaintiff's Letter of August 18, 1959; Rea figures from Defendants' Answer to Interrogatory 34.

[fol. 5917] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 452

Value of Shipments of Conductor Wire and Cable, Bare, 1958
(Thousands of Dollars)

	1958	
	Shipments & Interplant Transfers	Percent of Industry Total
Industry Total	232,280	100.0
Aluminum Company of America	24,020	10.3
Rome Cable Corporation	4,579	2.0
Alcoa and Rome Consolidated	28,599	12.3

Sources: Industry total from Bureau of the Census, "1958 Census of Manufactures," MC58(2)-33D; Alcoa figures from Defendant's Answers to Questions 4 and 5 in Plaintiff's Letter of August 19, 1959; Rome figures from Defendant's Answers to Questions 8 and 9 in Plaintiff's Letter of August 18, 1959.

[fol. 5918] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 454

Value of Shipments of Service Drop Cable, 1958
(Thousands of Dollars)

	1958	
	Shipments & Interplant Transfers	Percent of Total
Industry Total	$ 28,053	100.0
Aluminum Company of America	3,033	10.8
Rome Cable Corporation	1,424	5.1
Alcoa and Rome Consolidated	4,457	15.9

Sources: Industry total from Bureau of the Census, "1958 Census of Manufactures," MC58(2)-33D, Product Codes 3357944 and 3357945; Alcoa figures from Defendant's Answers to Questions 4 and 5 in Plaintiff's Letter of August 19, 1959; Rome figures from Defendant's Answer to Questions 8 and 9 in Plaintiff's Letter August 18, 1959.

[fol. 5919] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 455

Value of Shipments of Conduit in the United States, 1960
(Thousands of Dollars)

	Shipments & Interplant Transfers	Percent of Industry Total
Industry total[1]	$ 125,707	100.0
Aluminum Company of America[2]	4,285	3.4
Rome Cable Division	4,354	3.5
Alcoa plus Rome	8,639	6.9

[1] The industry total is the sum of Census categories: rigid conduit (standard weight), including couplings, nipples, bends, and elbows: steel (Product Code 3644221) and other (Product Code 3644222), and electrical metallic tubing (thin wall conduit) including couplings, nipples, bends, and elbows: steel (Product Code 3644223) and other (Product Code 3644224), reported on Census Form MA-36K.

[2] Exclusive of sales of fittings.

Sources: Industry total from: U.S. Department of Commerce, Bureau of the Census, "Current Industrial Reports," M36K(60)-1, "Wiring Devices and Supplies, 1960"; Alcoa's figures from Defendants' Answers to Interrogatory 53; Rome's figures from Defendants' Objections to Plaintiff's Proposed Statistical Summaries and Schedules, Compilations and Tabulations, dated January 26, 1962.

Revision from Bureau of the Census letter dated February 1, 1962.

[fol. 5920] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 458

Value of Shipments of Aluminum Conduit, 1960
(Thousands of Dollars)

	Shipments & Interplant Transfers	Percent of Industry Total
Industry Total[1]	16,155	100.0
Alcoa (exclusive of Rome agency sales)[2]	1,938	12.0
Rome (sales as agent of Alcoa)[2]	2,347	14.5
Alcoa (inclusive of Rome agency sales)[2]	4,285	26.5

[1] The industry total is the sum of Census categories: rigid conduit (standard weight), including couplings, nipples, bends, and elbows: other than steel (Product Code 3644222) and electrical metallic tubing (thin wall conduit), including couplings, nipples, bends, and elbows: other than steel (Product Code 3644224), reported on Census Form MA-36K.

[2] Exclusive of fittings.

Sources: Industry total from: U. S. Department of Commerce, Bureau of the Census, "Current Industrial Reports," M36K(60)-1, "Wiring Devices and Supplies, 1960"; Alcoa's figures from Defendants' Answers to Interrogatory 53; Rome's figures from Defendants' Answers to Interrogatory 54.

[fol. 5921] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 465.

Aluminum Ingot Capacity Existing or Under Construction at the End of 1960
(Short tons)

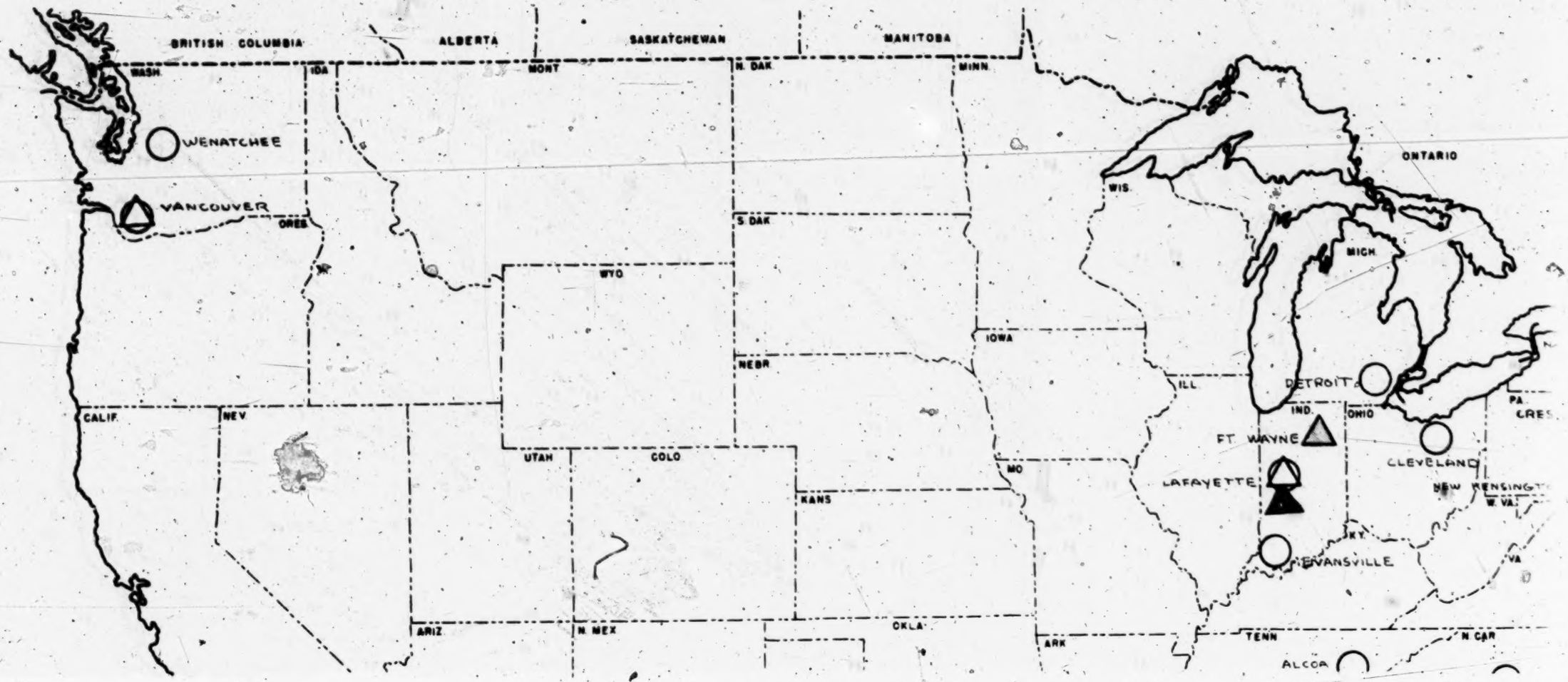
Company	Capacity	Percent of U. S. Total
United States Total	2,655,750	100.0
Aluminum Company of America	1,025,250	38.6
Reynolds Metals Company	701,000	26.4
Kaiser Aluminum & Chemical Corp.	609,500	23.0
Ormet, Inc.	180,000	6.8
Harvey Aluminum	75,000	2.8
Anaconda Aluminum Company	65,000	2.4

Source: 1960 Minerals Yearbook, Volume 1, Metals and Minerals (Except Fuels), Bureau of Mines, Department of the Interior, Page 168.

PLAINTIFF'S EXHIBIT 466

LOCATION OF ALCOA, ROME, AND REA PLANTS PRODUCING ALUMINUM INGOT, AND WIRE, CABLE, C

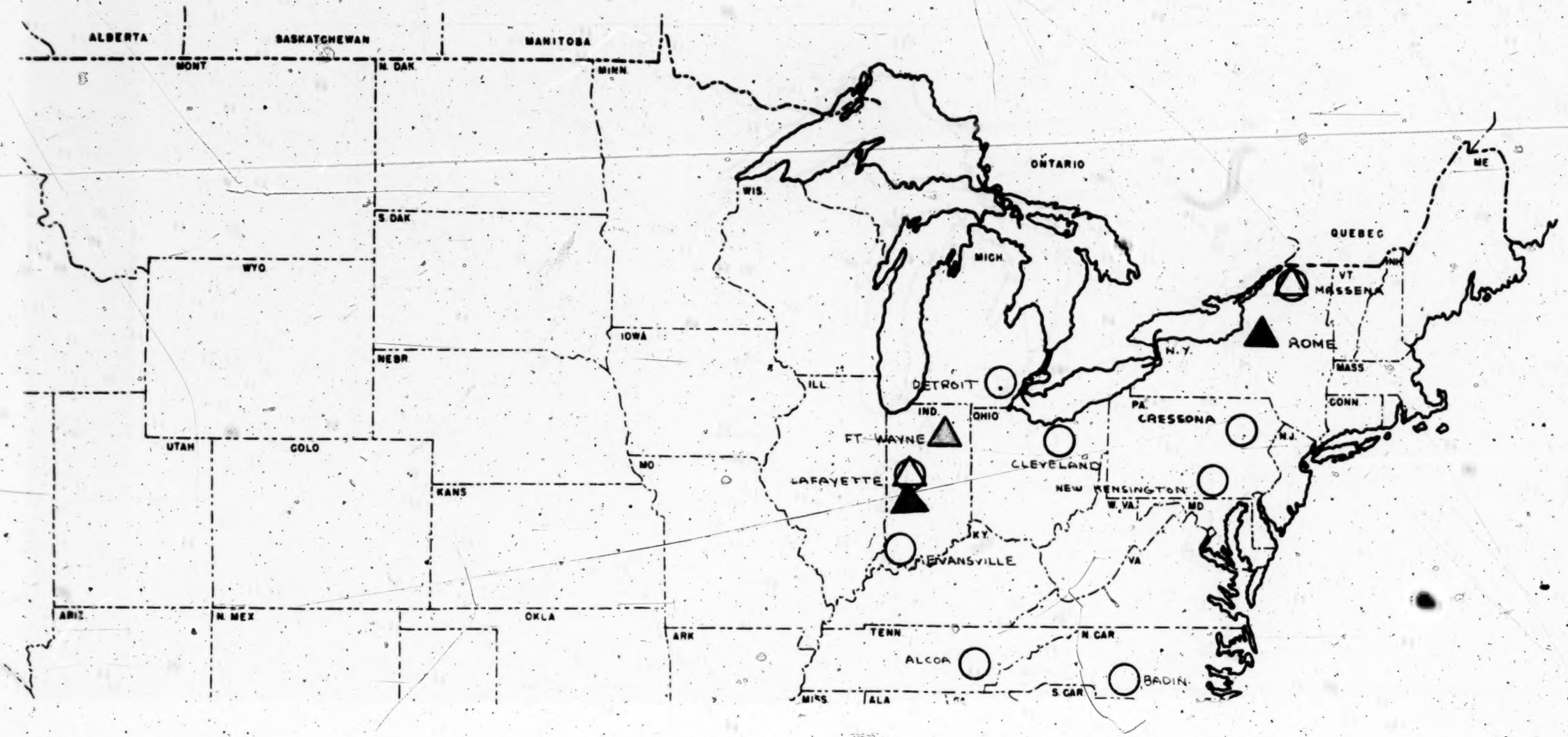
1960

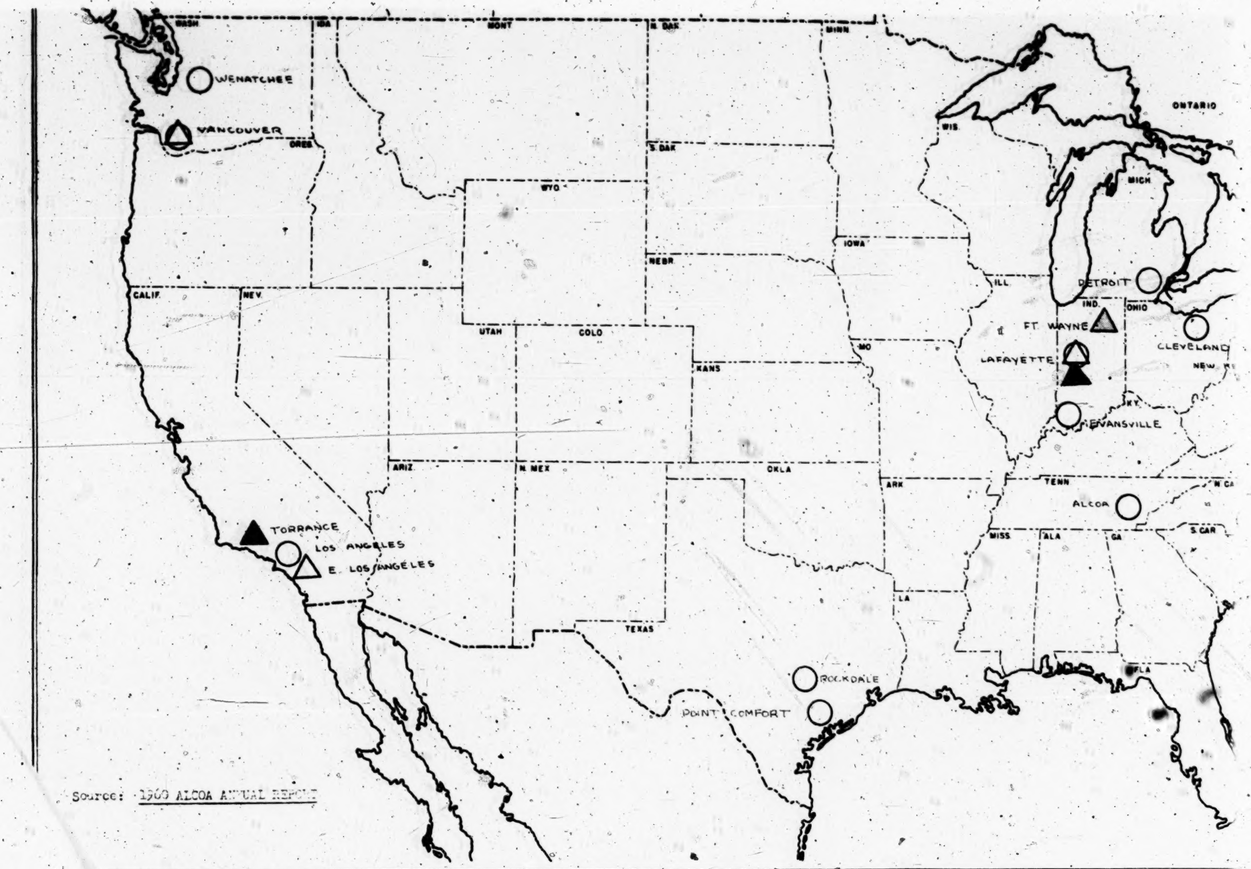


PLAINTIFF'S EXHIBIT 466

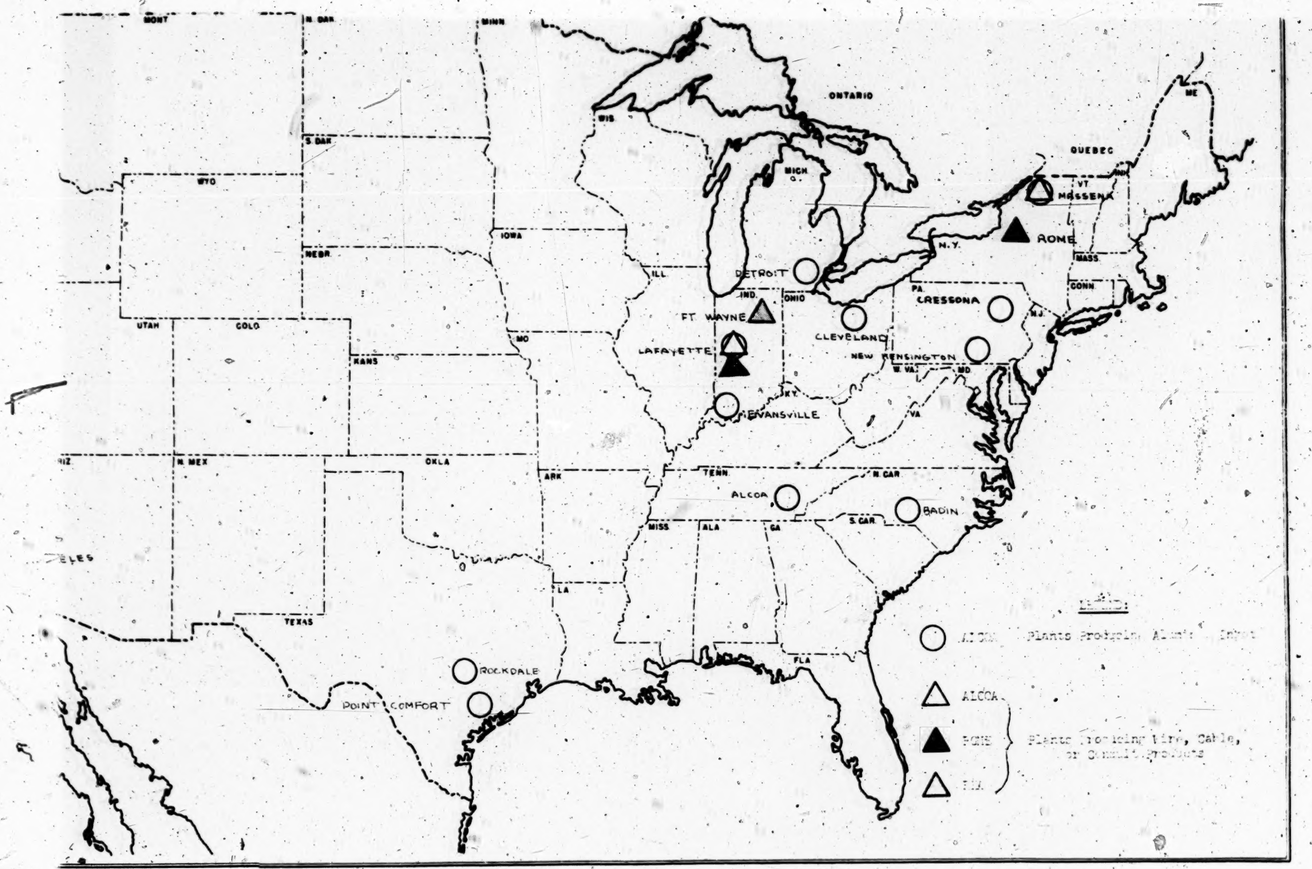
)ME, AND REA PLANTS PRODUCING ALUMINUM INGOT, AND WIRE, CABLE, OR CONDUIT PRODUCTS

1960





Source: 1960 ALCOA ANNUAL REPORT



[fol. 5923] In United States District Court

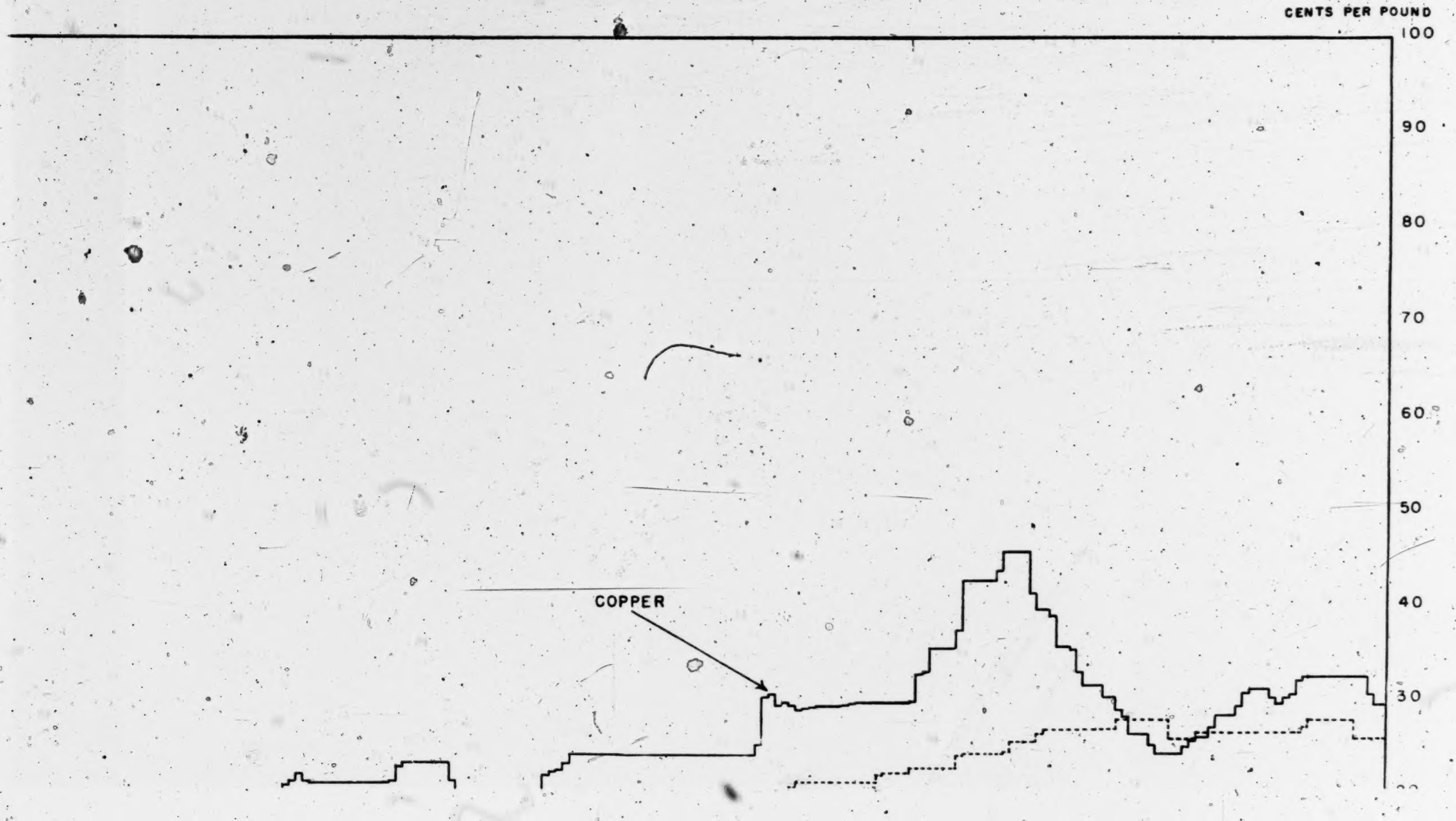
Plaintiff's Exhibit 467

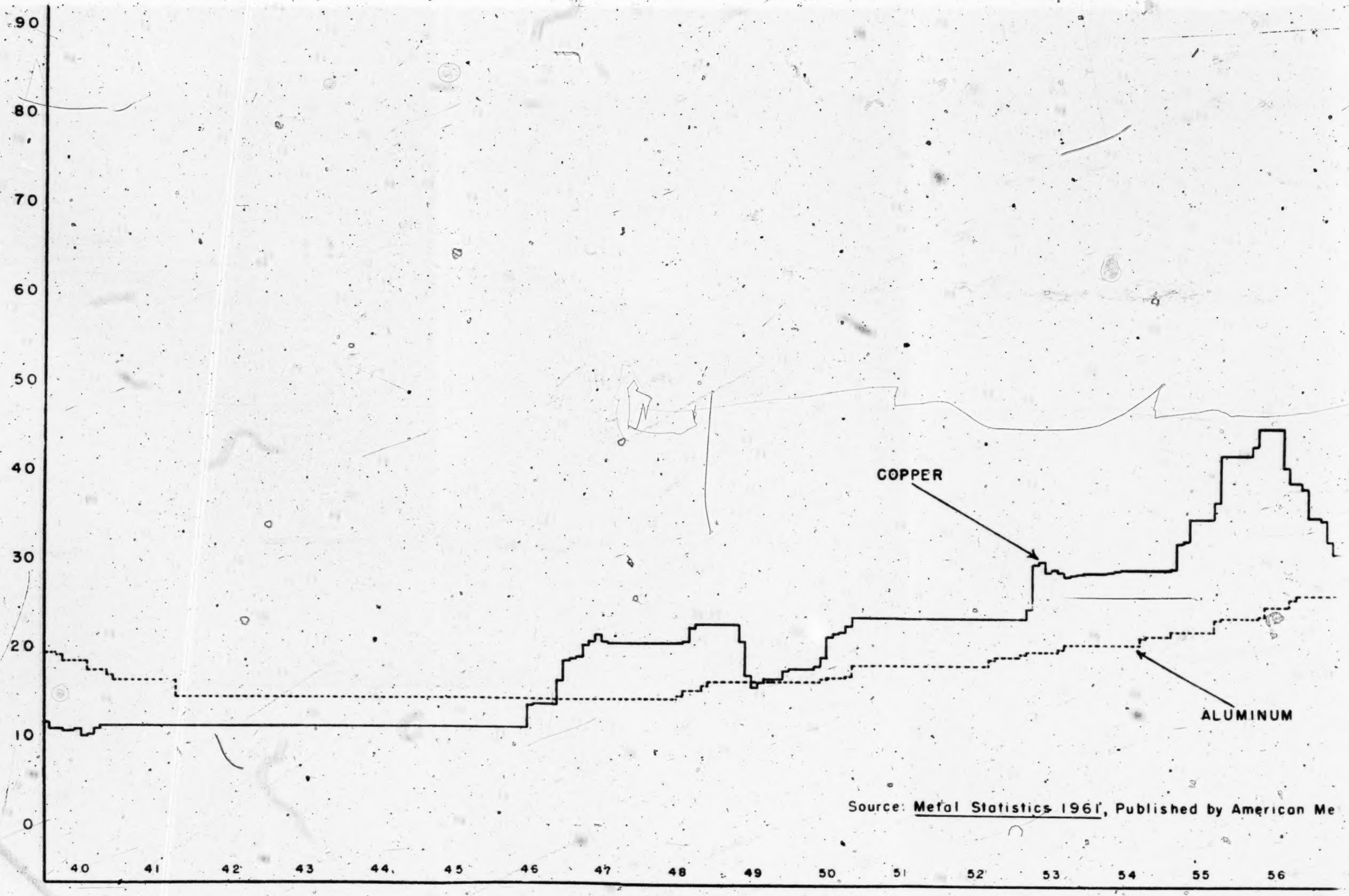
Monthly Average Prices of Electrolytic Copper, New York Refinery and Ingot Aluminum at New York
1940 - 1960

[fol. 5923] In United States District Court

Plaintiff's Exhibit 467

Monthly Average Prices of Electrolytic Copper, New York Refinery and Ingot Aluminum at New York
1940 - 1960

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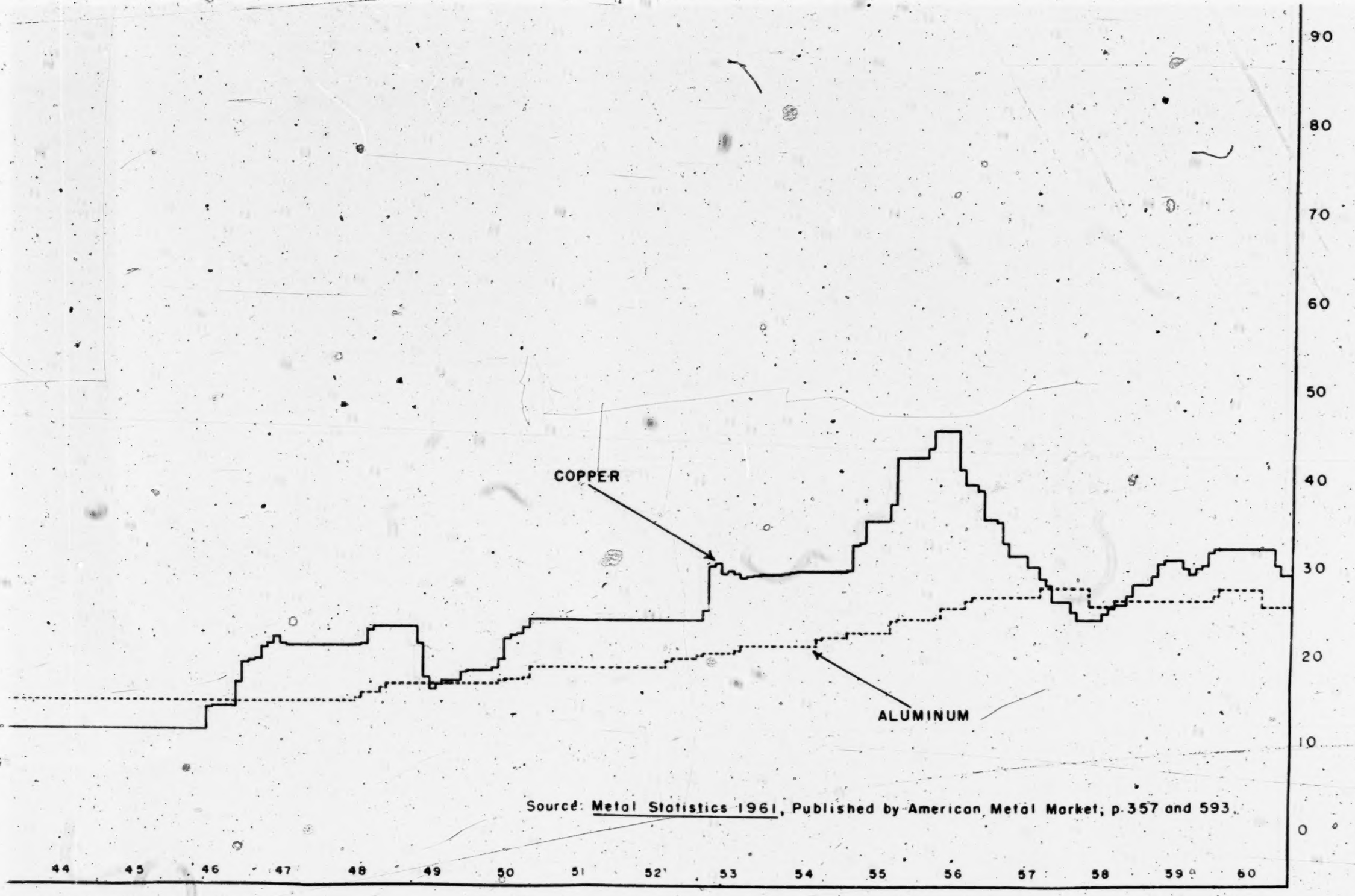
COPPER
ALUMINUM
Source: Metal Statistics 1961, Published by American Me



Source: Metal Statistics 1961, Published by American Metal Market, p. 357 and 593.

[fol. 5924] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 468

Report on the use of Copper and Aluminum Conductor for Overhead Electric Lines and Underground Electric Cable

By

Electric Utilities in the United States For the Years 1950, 1955 & 1959

By Ellery R. Fosdick, Consulting Engineer,
Washington, D. C.
January 1962

[fol. 5925]

Contents

		Page
I.	Purpose and Scope of This Study	1
II.	Conclusions	1
III.	Findings	3
Figure 1.	Trend in Use of Aluminum Conductor on Overhead Electric Lines, 1950-1959	4
2.	Use of Aluminum Conductor on Overhead Electric Lines in Each Region, 1950-1959	5
3.	Trend in Use of Aluminum Conductor on Overhead Electric Transmission Lines, 1950-1959	6
4.	Trend in Use of Bare Aluminum Conductor on Overhead Electric Distribution Lines, 1950-1959	8
5.	Trend in Use of Covered and Insulated Aluminum Conductor on Overhead Electric Distribution Lines, 1950-1959	9
6.	Trend in Use of Aluminum Conductor in Underground Electric Cables, 1950-1959	11
7.	Trend in Use of Copper Conductor in Underground Electric Cables, 1950-1959	13
Table 1.	Use of Aluminum Conductor on Overhead Electric Lines—Percent of Gross Additions, 1950, 1955 & 1959	10
2.	Use of Copper Conductor on Underground Electric Cable—Percent of Gross Additions, 1950, 1955 & 1959	14

Page

Appendix A. Procedures Followed in Making This Study:
1. Definition of Terms and Expressions .....
2. Sources of Information .....
3. Bases Used in Selecting Electric Utilities .....
General .....
Selection Criteria .....
4. Electric Utilities Selected .....
5. Procedures Used in Obtaining Information From Electric Utilities .....
B. Electric Utilities Selected .....
C. Letter from the Bureau of the Budget Approving Letter of Transmittal and Schedules to be Sent to the Electric Utilities .....
D. Letter of Transmittal and Schedules Sent to the Electric Utilities .....

[fol. 5926] I. Purpose and Scope of This Study

The information contained herein has been prepared for the purpose of showing the extent to which aluminum and copper conductor is used for gross additions to overhead electric lines and underground electric cables in the United States. The study covers the period from 1950 to 1959 inclusive. The extent to which aluminum and copper conductor is employed in overhead electric lines and underground cables by electric utilities is an indication of the use of such conductor for these purposes since almost all of these lines and cables in the United States are constructed by electric utilities.

II. Conclusions

The following conclusions in regard to the use of aluminum conductor, aluminum alloy conductor and aluminum conductor steel reinforced (hereinafter collectively referred to as aluminum conductor) and of copper conductor are based upon information furnished by electric utilities which in 1958 supplied electric service to over half of the ultimate consumers in the United States.

1. Aluminum conductor was the dominant conductor used in 1959 for gross additions to overhead electric lines, being employed for 80.1 percent of these additions.
2. A continuing trend toward an increasing use of aluminum conductor for gross additions to each of the three major categories of overhead electric lines occurred over the period from 1950 to 1959 inclusive, as may be seen in the following tabulation.

fol. 5927]

Overhead Lines	% Aluminum Conductor		
	1950	1955	1959
Transmission Lines	74.4	91.0	94.4
Distribution Lines	35.5	64.4	79.0
Bare Conductor	6.5	51.6	77.2
Covered & Insulated Conductor	25.0	60.9	80.1
Total[1]			

3. The trend toward increasing use of aluminum conductor for overhead electric lines over the period from 1950 to 1959 inclusive was:

a. Found throughout the United States in all seven geographical regions.
b. Present for all three types of electric utility in the electric industry.

4. Copper conductor was the dominant conductor used in 1959 for gross additions to underground electric cables, being employed for 97.7 percent of these additions.
5. No appreciable trend away from the use of copper conductor underground cable occurred over the period from 1950 to 1959 inclusive as may be seen in the following tabulation. Although a small amount of aluminum conductor underground cable was used in 1955 and 1959 only two of the utilities using it indicate an intention to use it again in the foreseeable future.

Underground Cables	% Copper Conductor		
	1950	1955	1959
Transmission	100.0	100.0	100.0
Distribution	100.0	98.7	97.5
Total[1]	100.0	98.8	97.7

[1] Based upon total gross additions of transmission and distribution conductor.

[fol. 5928]

III. Findings

Overhead Conductor

General:

The amount of aluminum conductor compared with the total of aluminum and copper conductor used for gross additions to overhead electric lines of the utilities supplying information (hereinafter referred to as relative use of aluminum conductor) increased substantially during the period covered by this study from 1950 to 1959 inclusive. This increase was accompanied by a corresponding decrease in the relative use of copper conductor. The major part of the increase took place during the period from 1950 to 1955. Although the relative use of aluminum conductor continued to increase during the period from 1955 to 1959 it was at a slightly slower rate. This can be seen in Figure 1.

The same general trend has been present in each of the

seven geographical regions in the continental United States as may be seen in Figure 2.

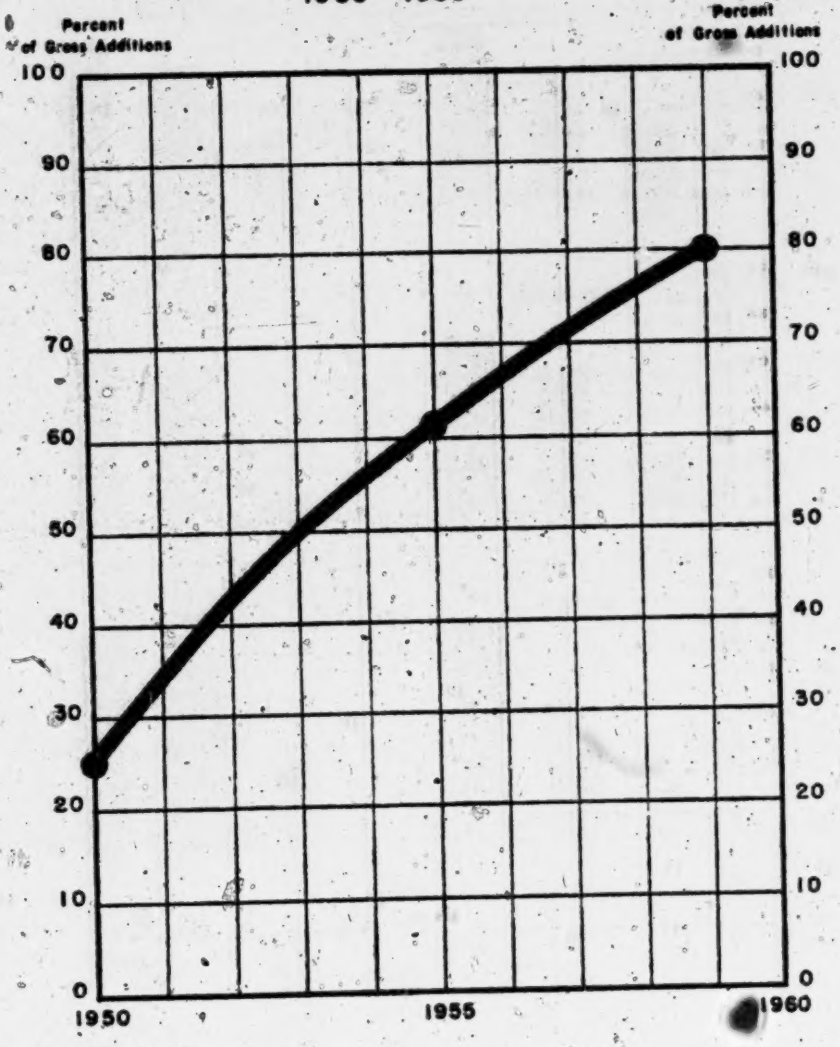
The rapidity of the increase in the relative use of aluminum conductor on overhead electric lines is indicated by the fact that in 1950 this was only 25.0 percent whereas in 1955 it was 60.9 percent and in 1959 it was 80.1 percent. The relative use in 1955 was therefore approximately 2.4 times the relative use in 1950 and the relative use in 1959 was about 3.2 times the relative use in 1950.

Transmission Conductor:

The relative use of aluminum conductor for gross additions to overhead transmission lines of the utilities supplying information increased from 74.4 percent in 1950 to 94.4 percent in 1959 as may be seen from Figure 3. The relative use in 1959 was accordingly approximately 1.3 times the relative use in 1950 which is a com-

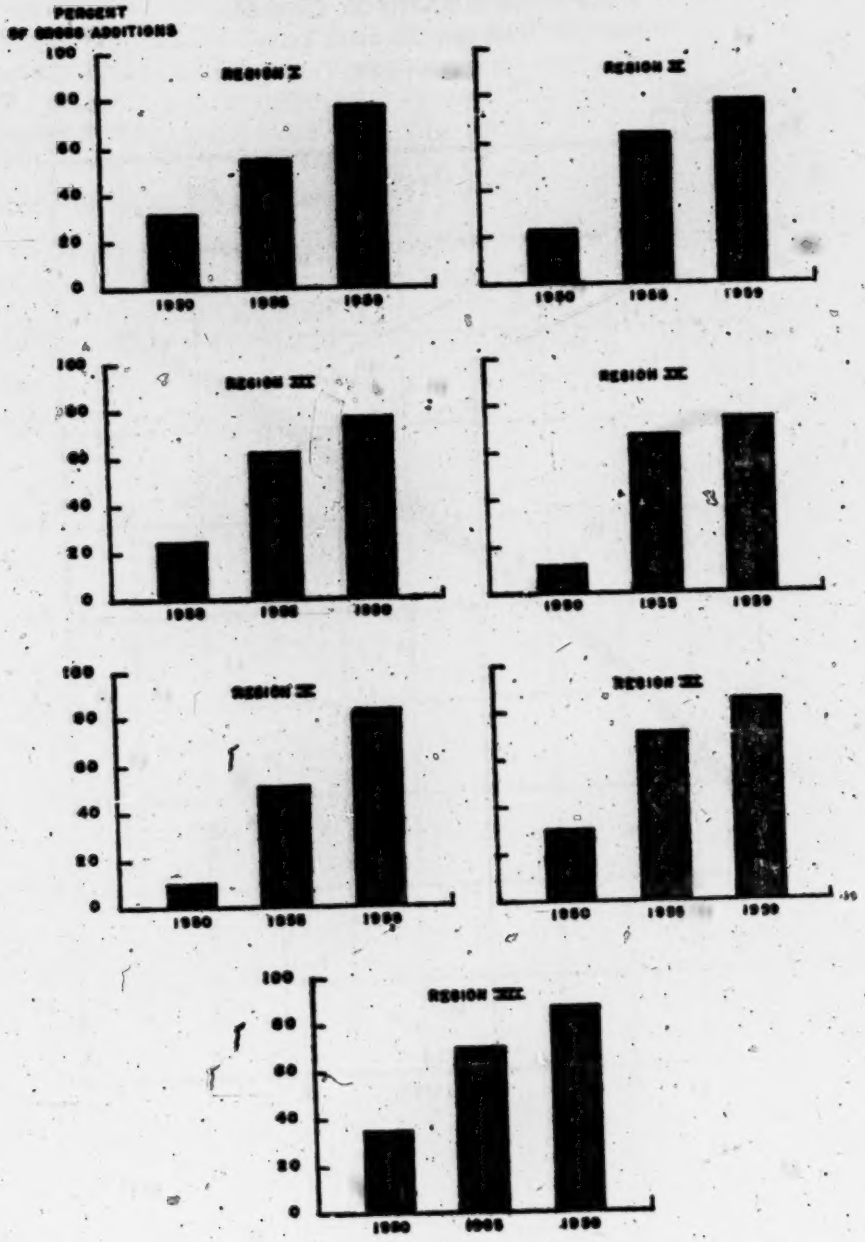
[fol. 5929]

Figure 1
Trend in Use of Aluminum Conductor
on All Overhead Electric Lines
1950 – 1959



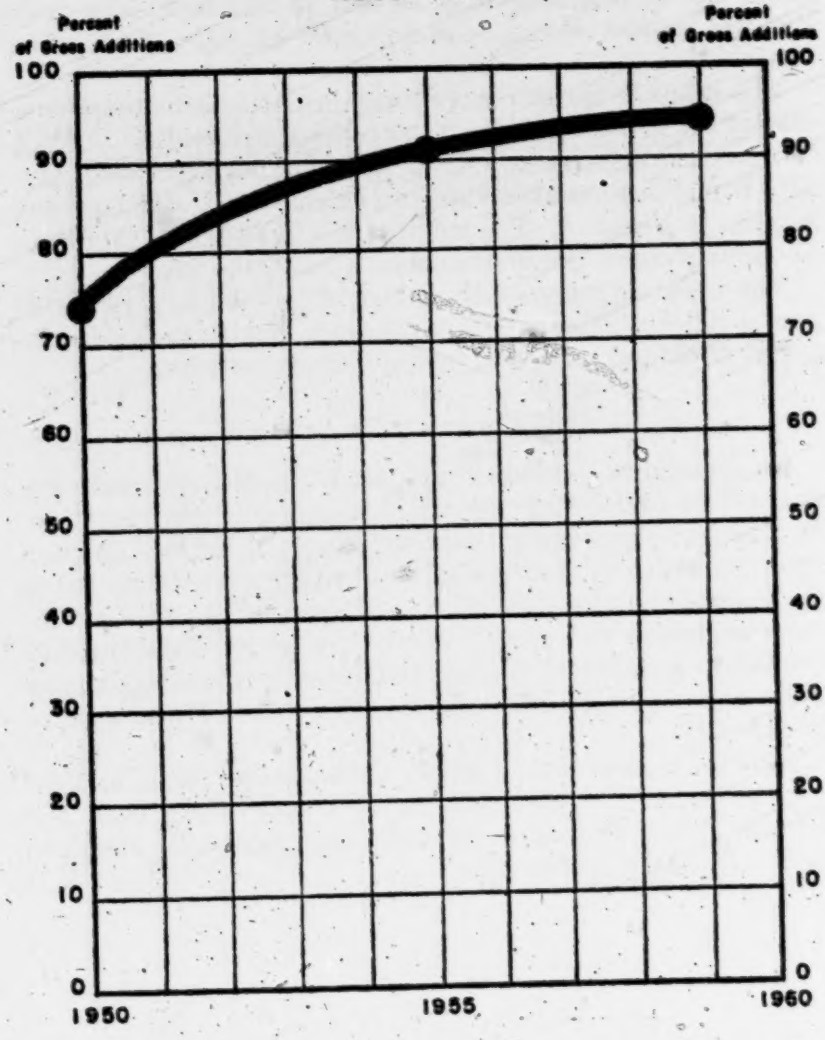
[fol. 5930]

Figure 2
Relative Use of Aluminum Conductor
on Overhead Electric Lines in Each Region
1950-1959



[fol. 5931]

Figure 3
Trend in Use of Aluminum Conductor
on Overhead Electric Transmission Lines
1950 – 1959



[fol. 5932] paratively small increase. This is due to the fact that aluminum conductor has been used to an increasing extent on overhead electric transmission lines until the area left for expanded use is small.

Overhead Distribution Conductor:

The relative use of bare aluminum conductor for gross additions to overhead distribution lines of the utilities supplying information increased from 35.5 percent in 1950 to 79.0 percent in 1959 as may be seen in Figure 4. The relative use in 1959 was accordingly about 2.2 times the relative use in 1950.

The relative use of covered and insulated aluminum conductor for gross additions to overhead distribution lines of the electric utilities supplying information increased rapidly from 6.5 percent in 1950 to 77.2 percent in 1959 as may be seen in Figure 5. The relative use in 1959 was therefore about 11.9 times the relative use in 1950.

The percentages used in making Figures 1 to 5 inclusive are shown in Table 1. These percentages have been computed from data supplied by the electric utilities.

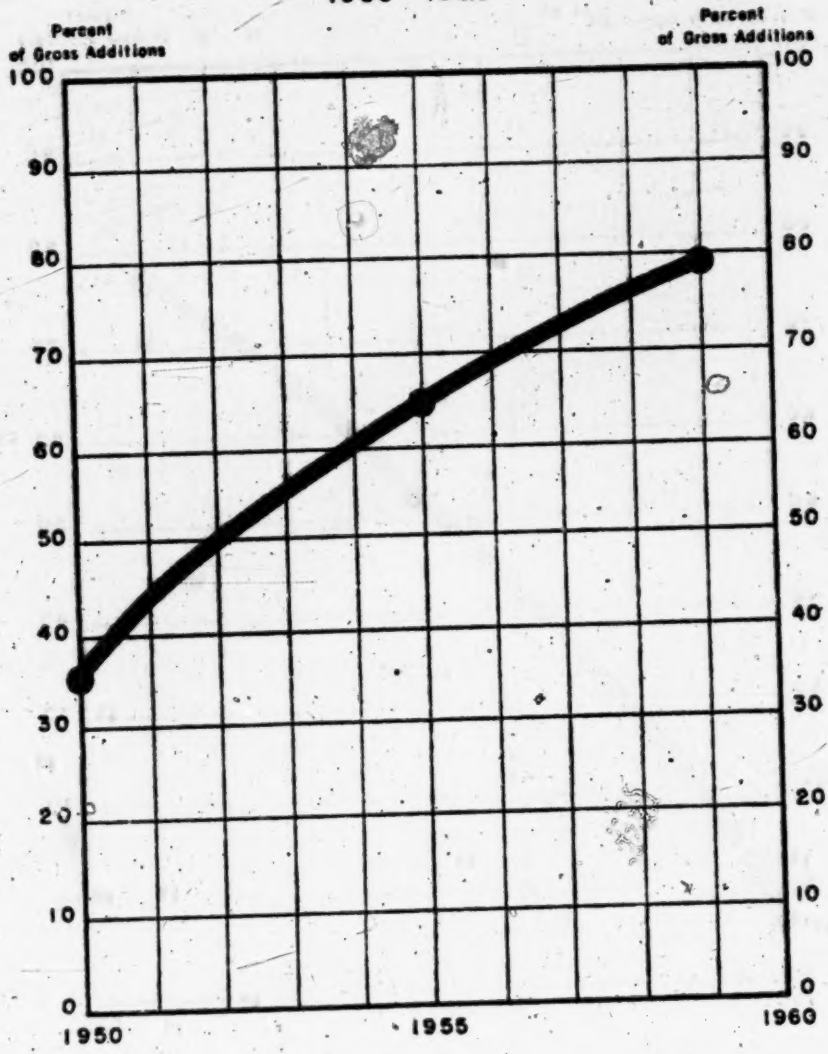
Underground Conductor

No aluminum conductor was used for underground electric cables in 1950 by the utilities supplying information. In 1955 some aluminum conductor was used for this purpose by two utilities located in Region I making the relative usage in the continental United States 1.2 percent. In 1959 aluminum conductor was used for this purpose by seven utilities located in 4 different regions making the relative usage in the continental United States 2.3 percent as may be seen in Figure 6.

Aluminum conductor used in underground cable in 1955 and 1959 was for distribution with none being used for transmission. The usage of aluminum conductor resulted in a very slight decrease in

[fol. 5933]

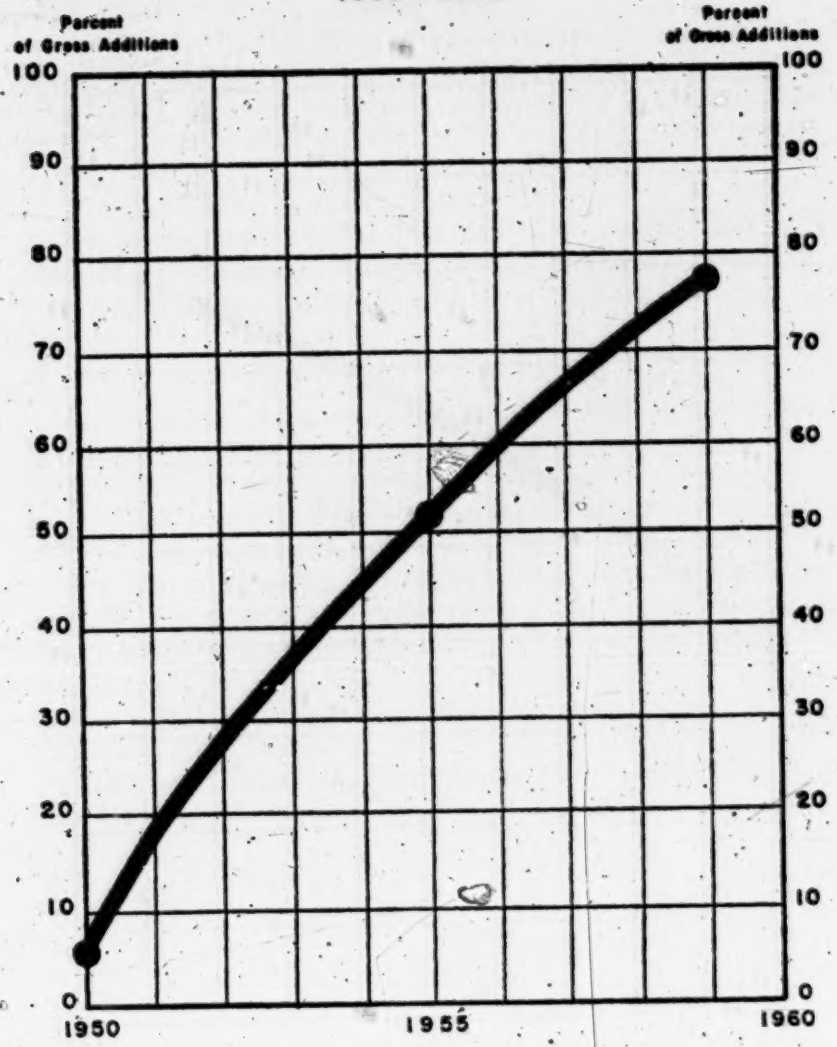
Figure 4
Trend in Use of Bare Aluminum Conductor
on Overhead Electric Distribution Lines
1950 – 1959



[fol. 5934]

Figure 5

Trend in Use of Covered and Insulated Aluminum Conductor on Overhead Electric Distribution Lines 1950—1959



[fol. 5935]

Table I

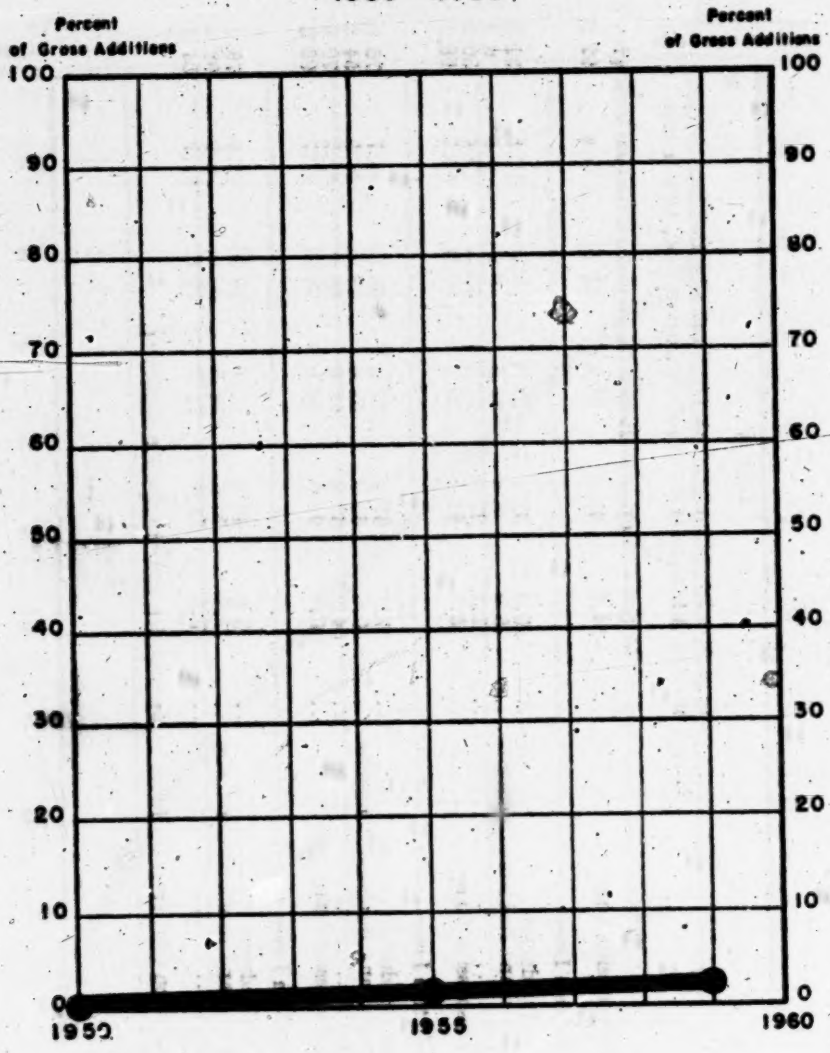
Use of Aluminum Conductor on Overhead Electric Lines
Percent of Gross Additions of Overhead Conductor, 1950, 1955 & 1959

Year	Region I	Region II	Region III	Region IV	Region V	Region VI	Region VII	Total
1950 Transmission Lines	54.5	83.4	74.3	67.0	50.4	92.6	84.2	74.4
Distribution Lines								
Bare Conductor	40.4	32.1	23.9	5.0	17.5	32.0	55.8	35.5
Covered and Insulated Conductor	15.9	8.4	14.5	0.6	0.4	0.4	0.4	6.5
Total (1)	31.1	22.6	24.2	11.5	10.4	30.2	35.3	25.0
1955 Transmission Lines	75.5	93.5	96.5	99.0	86.7	98.1	94.3	91.0
Distribution Lines								
Bare Conductor	57.3	67.9	53.3	58.5	48.7	76.6	80.2	64.4
Covered and Insulated Conductor	50.6	53.9	53.4	72.7	44.5	54.5	53.1	51.6
Total (1)	54.2	63.3	62.0	66.9	51.2	70.8	70.3	60.9
1959 Transmission Lines	90.9	94.5	94.0	75.2	97.7	99.2	99.3	94.4
Distribution Lines								
Bare Conductor	73.6	69.4	74.4	78.9	82.4	78.4	86.3	79.0
Covered and Insulated Conductor	77.9	70.6	72.5	66.4	79.9	92.4	81.4	77.2
Total (1)	77.2	73.0	76.7	73.6	82.9	84.9	87.0	80.1

(1) Based upon total gross additions of transmission and distribution conductor.

[fol. 5936]

Figure 6
Trend in Use of Aluminum Conductor
in Underground Electric Cables
1950 — 1959



[fol. 5937] the use of copper conductor as may seen in Figure 7.

The percentages used in making Figure 7 are shown in Table 2 which also shows the percentages for each of the seven geographical region and for transmission and distribution cable separately. The percentages have been computed from data supplied by the utilities. The percentages in Figure 6 are the difference between the percentage in Figure 7 and 100 percent.

The information supplied by electric utilities indicates there is no basis at the present time to expect widespread usage of aluminum conductor for underground electric cable in the continental United States. Only one of the utilities that used this type of conductor has indicated an intention to use more of it. One other utility expects no change in the amount of aluminum conductor used for underground cable and all the others indicate they do not intend to use it in the future.

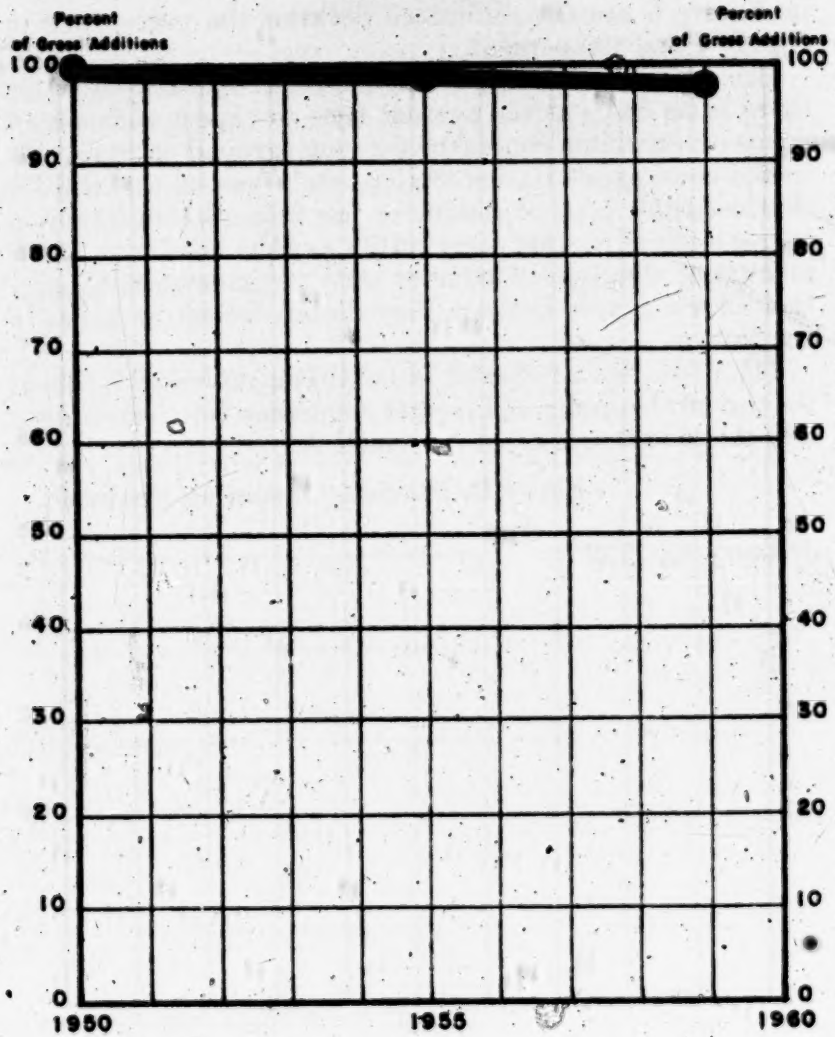
The procedures followed in obtaining information about the use of aluminum and copper conductor for electric lines and cables is discussed in Appendix A.

Ellery R. Fosdick, Consulting Engineer.

January 15, 1962

[fol. 5938]

Figure 7
Trend in Use of Copper Conductor
in Underground Electric Cables
1950 — 1959



[fol. 5939]

Table 2

Use of Copper Cable on Underground Electric Lines
Percent of Gross Additions of Underground Cable, 1950, 1955 & 1959

Year	Region I	Region II	Region III	Region IV	Region V	Region VI	Region VII	Total
1950 Transmission Cable	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Distribution Cable	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total (1)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1955 Transmission Cable	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.7
Distribution Cable	98.0	100.0	100.0	100.0	100.0	100.0	100.0	98.8
Total (1)	98.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1959 Transmission Cable	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.5
Distribution Cable	99.3	100.0	99.9	100.0	85.6	100.0	99.3	97.7
Total (1)	99.3	100.0	99.9	100.0	86.0	100.0	99.4	

(1) Based upon total gross additions of transmission and distribution conductor.

2753

[fol. 5940] Appendix A

[fol. 5941] *Procedure Followed in Making This Study*
Definition of Terms and Expressions

The following definitions of terms and expressions used subsequently herein were approved by the American Standards Association August 12, 1941.

A *wire* is a slender rod or filament of drawn metal.

A *conductor* is a wire or combination of wires not insulated from one another, suitable for carrying electric current.

A *stranded conductor* is a conductor composed of a group of wires, or any combination of groups of wires.

Note: The wires in a stranded conductor are usually twisted or braided together.

A *cable* is either a stranded conductor (single conductor cable), or a combination of conductors insulated from one another (multiple conductor cable).

A *bare conductor* is a conductor not covered with insulating material.

Insulated means separated from other conducting surfaces by a dielectric permanently offering a high resistance to the passage of current and to disruptive discharge.

Note: When any object is said to be insulated, it is understood to be insulated in a suitable manner for the conditions to which it is subjected.

An *open-wire* circuit is a circuit made up of conductors separately supported on insulators.

Note: The conductors are usually bare wire, but they may be insulated by some form of continuous insulation. The insulators are usually supported by crossarms or brackets on poles.

An *aluminum conductor* is a conductor made wholly of aluminum.

[fol. 5942] An *aluminum steel conductor* is a composite conductor made up of a combination of aluminum and steel wires. In the usual construction the aluminum wires surround the steel.

Alternating-current transmission is the transfer of electric energy by alternating current from its source to one or more main receiving stations for subsequent distribution.

Note: Generally a voltage is employed which is higher than that which would be delivered or utilized by electrical machinery. Transformers of a capacity comparable to that of the line are usually employed as links between the high voltage transmission and lower voltage used for distribution or utilization.

Alternating-current distribution is the supply to points of utilization of electric energy by alternating current from its source or one or more main receiving stations.

Note: Generally a voltage is employed which is not higher than that which could be delivered or utilized by rotating electric machinery. Step-down transformers with a capacity much smaller than that of the line are usually employed as links between the moderate voltage of distribution and the lower voltage of the consumers apparatus.

Primary distribution mains are the conductors which feed from the center of distribution to direct primary loads or to transformers which feed secondary circuits.

Secondary distribution mains are the conductors connected to the secondaries of distribution transformers from which consumers' services are supplied.

The Service drop is that portion of the overhead service conductors between the last pole and the premises served extending from the last pole to the junction with the service entrance conductors.

[fol. 5943] *Source of Information*

Electric utilities are the best source of information regarding the use of copper and aluminum conductor for overhead lines and underground cables as almost all of these lines and cables in the United States are constructed by the utilities. In obtaining information from the electric utilities it was necessary to establish selection criteria that would keep the work within reasonable limits. As of January 1, 1959, there were 3,355 operating electric utilities in the continental United States serving communities with a population of 500 and over.* A total of 93 electric utilities were selected.

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* McGraw-Hill Directory of Electric Utilities—1959.

Bases Used in Selecting Electric Utilities

General

Information about the amount and kind of overhead and underground electrical conductor used by electric utilities in the United States was not readily available. The largest electric utilities of each type in the 48 continental states of the United States were selected as a source of information because:

(1) They usually keep good records regarding matters such as the type and amount of copper and aluminum conductor used and were considered likely to have the desired information readily available.
(2) A relatively small number of large electric utilities supply service to a substantial proportion of the nation's customers, making it possible to obtain the desired information by fewer inquiries than would be the case if small utilities were selected.

[fol. 5944] Installed generating capacity was used as a basis for selecting the largest privately-owned and publicly-owned non-Federal electric utilities. This basis indicates in a general way the relative size of the large utilities since they usually generate most of their power requirements in their own plants. Furthermore electric utilities with a large amount of generating capacity generally require a relatively large amount of electrical conductor for the delivery of power to customers.

Publicly-owned Federal electric utilities were not included in the group from which selections were made. These utilities are concerned almost exclusively with the generation and/or transmission of electric energy to other electric utilities and use only a relatively small amount of distribution conductor.

The number of miles of electric line energized was used as a basis for selecting the largest rural electric cooperatives instead of installed generating capacity. Most of these cooperatives have little or no generating capacity but instead purchase part or all of their power requirements from others. The number of customers served was not used as a basis of selection since this is not a good indication of the

size of a rural electric cooperative. The density of customers served by rural electric cooperative lines varies with the nature of the areas served.

Data used in selecting electric utilities were for the year 1958 as this was the latest available at the time the work was started. Data used in selecting the privately owned electric utilities were taken from the 1958 report on "Statistics of Electric Utilities in the United States" for privately owned utilities published by the Federal Power Commission. Data used in selecting the publicly owned electric utilities were taken from the 1958 report on "Statistics of Electric Utilities in the United States" for publicly owned utilities published by the Federal Power Commission. Data used in [fol. 5945] selecting the rural electric cooperatives were taken from the "Annual Statistical Report" for 1958 of rural electrification borrowers, published by the Rural Electrification Administration.

These statistical reports cover a large proportion of the electric utility industry in the United States. The electric utilities listed in the reports had an average of 53,485,000 ultimate consumers in the United States in 1958 or approximately 96 percent of the total average of 55,689,790* ultimate consumers served by electric utilities.

In the Federal Power Commission report on privately owned electric utilities is the following statement. "It is estimated that these larger companies comprise, both on the basis of assets and of revenues in excess of 98 percent of the privately owned electric light and power industry".

The Federal Power Commission report on publicly owned electric utilities contains the following paragraph. "The electric utilities included in the summary statements which follow are limited to the larger publicly owned electric utilities exclusive of federally owned projects, which filed with the Commission annual reports for 1958. The proportion of the non-Federal publicly owned division of the electric utility industry represented by such utilities is estimated to be approximately 70 percent both on the basis of electric

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* Average of number of ultimate consumers computed from number as of December 31, 1957 and December 31, 1958 given in Table 26 of Edison Electric Institute No. 27 Publication No. 60-14.

plant investment and of sales to ultimate consumers, and approximately 60 percent on the basis of revenues from ultimate consumers and number of ultimate consumers served, respectively".

The Rural Electrification Administration report on rural electrification cooperatives lists all such cooperatives in the United States, Alaska, Puerto Rico and the Virgin Islands, and supplies certain data for all the active energized borrowers. Only the active energized distribution type of bor- [fol. 5946] rowers in the United States were considered in selecting rural electric cooperatives for this study. The borrowers used in selecting cooperatives for this study comprise approximately 94 percent of all energized distribution type rural electric cooperatives in the continental United States. Former borrowers were not considered in the selection as no information about them was available. The power type of borrowers were not considered as they are concerned almost exclusively with the generation and transmission of electric energy to distribution type borrowers and use little distribution conductor. Refrigeration type of borrowers were not considered as they operate cold storage plants and use little electrical conductor.

Selection Criteria

Privately owned utilities

The largest electric utility serving domestic customers directly based upon the amount of generating capacity installed as of December 31, 1958, was selected in each state. All other smaller utilities were selected in each state which had an installed generating capacity of:

a. 1,000 MW or more or,
b. 75% or more of the installed generating capacity of the largest utility.

Publicly owned utilities include municipal systems, public utility districts, irrigation districts, county systems, mutual systems, Federal systems and state authorities.

The largest non-Federal publicly owned electric utility serving domestic customers directly based upon the amount of generating capacity installed as of December 31, 1958,

was selected in each of the seven geographical regions into which the United States has been divided by the Federal Power Commission. All other publicly owned non-Federal electric utilities were selected which had an installed generating capacity of 100 MW or more.

[fol. 5947] Rural Electric Cooperatives

The two largest rural electric cooperatives serving domestic customers directly based upon the miles of electric line energized as of December 31, 1958, were selected in each of the seven geographical regions into which the United States has been divided by the Federal Power Commission.

Electric Utilities Selected

A total of 93 electric utilities from which to request information were selected as a result of applying the selection criteria previously described. These include 66 privately owned utilities, 13 publicly owned utilities and 14 rural electric cooperatives. Utilities in each of these groups are well dispersed throughout the continental United States being located in each of the 7 geographical regions into which the United States has been divided by the Federal Power Commission as may be seen in the following summary. The utilities selected are also well distributed according to size based upon the amount of installed generating capacity with the largest number being in the small size group which has the largest number of utilities.

The electric utilities selected have 59 percent of the installed generating capacity in the United States based upon the data contained in the annual statistical reports for 1958 of the Federal Power Commission and Rural Electrification Administration and 63 percent of the ultimate consumers. That is, the utilities selected for this study have a combined installed generating capacity of 83,248,000 KW out of a total of 141,642,000 KW and 33,882,000 ultimate consumers out of a total of 53,485,000. The installed generating capacity of the electric utilities selected and the number of ultimate consumers served by them is shown below for each type of utility:

[fol. 5948]

Summary of 93 Electric Utilities Selected

Generating Capacity

KW in millions	Number of Utilities
0.00 to 0.25	31
0.26 to 0.50	12
0.51 to 1.0	19
1.1 to 2.0	19
2.1 to 3.0	7
3.1 to 4.0	3
4.1 & over	2
Total	93
Percent of total generating capacity in the United States (1)	59%

Number of Customers

Percent of total number of ultimate electric consumers in the United States (1)	63%

Ownership

	Number of Utilities
Private	66
Public	13
Rural Electric Cooperative	14
Total	93

Geographic Location

	Number of Utilities
Region I Northeast	22
II Great Lakes	15
III North Central	12
IV Northwestern	10
V Southwestern	13
VI South Central	9
VII Southeastern	12
Total	93

(1) Exclusive of small utilities not listed in published statistics of the Federal Power Commission and of electric cooperatives for which no data are given in published statistics of the Rural Electrification Administration.

[fol. 5949]	Privately Owned	Publicly Owned	R.E.A. Borrowers	Total
Installed Generating Capacity— December 31, 1958				
Reported by FPC and REA MW	112,687	27,857(1)	1,098(2)	141,642
Selected MW	79,004	4,235	9	83,248
%	70	15	—	59
Ultimate Consumers— Average for 1958				
Reported by FPC and REA Thous.	44,853	4,441(3)	4,191(4)	53,485
Selected Thous.	31,876	1,843	163	33,882
%	71	42	4	63

(1) Includes Federal Projects.
(2) Includes Power Type Borrowers.
(3) Includes ultimate consumers served by Federal Projects.
(4) Includes ultimate consumers served by Power Type borrowers.

The 93 electric utilities from which information was requested are listed in Appendix B showing the geographical region in which they are located, installed generating capacity and number of ultimate consumers for each and in addition the miles of line for rural electric cooperatives.

[fol. 5960] Procedure Used in Obtaining Information from Electric Utilities

A set of four schedules was transmitted to each of the 93 electric utilities selected. These schedules requested that information be supplied regarding the gross additions of overhead conductor and underground conductor to electric utility plant (Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance), expected changes in the amount of aluminum conductor used and limitations or restrictions to its use. The four schedules were designed to elicit objective factual information from officials of each utility. All of the 93 electric utilities to which the schedules were sent responded with varying degrees of completeness.

Approval of the four schedules and the letter of transmittal by the Bureau of the Budget was obtained as required under Circular A-40 dated October 24, 1951 that was promulgated under the authority of the Federal Reports Act of 1942. The Bureau of the Budget reviewed the schedules and letter in the light of their intended use to obtain infor-

mation from electric utilities to be selected by the criteria established.

A copy of the letter from the Bureau of the Budget dated September 28, 1960, approving the schedules and the letter of transmittal is attached as Appendix C. A copy of the letter used in transmitting the schedules and a copy of each of the four schedules sent to the electric utilities are attached as Appendix D.

The preparation of the four schedules for use by the electric utilities in supplying information regarding their gross additions of overhead electrical conductor and underground electrical conductor was simplified by the fact that terminology relating to much of the electric utility business in the United States has been standardized. Generally accepted terminology was used where ever practicable in the [fol. 5951] preparation of the schedules so as to facilitate to the maximum extent a correct understanding of the information desired.

Schedule I was for the purpose of obtaining information regarding the gross additions of overhead electrical conductor and Schedule II for gross additions of underground electrical conductor in each of the years 1950, 1955 and 1959. This information was to be supplied separately on each schedule for transmission conductor and distribution conductor with a further breakdown of overhead distribution conductor between bare conductor and insulated or covered conductor. The gross additions were to be given in thousands of feet of single conductor as it was thought this would be generally available and would provide a basis for indicating the relative usage of aluminum conductor compared with copper conductor.

Schedule III relating to overhead lines and Schedule IV relating to underground cables requested information about expected future changes in the proportion of gross additions of aluminum conductor to gross additions of copper conductor and also the limitations or restrictions that may exist in connection with using aluminum conductor.

The information to be supplied on Schedules III and IV was for the purpose of determining whether trends shown by the data supplied on Schedules I and II might be expected to continue or change. The questions were phrased to facili-

tate brief explicit answers to the maximum extent practicable.

The information to be supplied by the electric utilities on the schedules was consistent with the needs. Data regarding the gross additions of conductor to be submitted on Schedules I and II was requested for the years 1950, 1955 and 1959 as this period was sufficiently long and three different years in the period were adequate to indicate a trend.

[fol. 5952] # Appendix B

[fol. 5953] Privately Owned Electric Utilities Selected

Region I.—Northeastern

State	City of Headquarters	Name of Utility Installed MW	M Ult. Consumers
1. Conn.	Berlin	Connecticut Light & Power Co. 791	325
2. Del.	Wilmington	Delaware Power & Light Co. 313	106
3. D. C.	Washington	Potomac Electric Power Co. 1,029	338
4. Maine	Augusta	Central Maine Power Co. 548	237
5. Md.	Baltimore	Baltimore Gas & Electric Co. 956	520
6. Mass.	Boston	Boston Edison Co. 926	522
7. N. H.	Manchester	Public Service Co. of N. H. 317	139
8. N. J.	Newark	Public Service Electric & Gas Co. 2,554	1,381
9. N. Y.	Mineola	Long Island Lighting Co. 1,038	540
	New York	Consolidated Edison Co., of N.Y. Inc. 4,071	2,788
	Syracuse	Niagara Mohawk Power Corp. 3,073	1,068
10. Pa.	Allentown	Pennsylvania Power & Light Co. 1,381	702
	Greensburg	West Penn Power Co. 1,058	373
	Philadelphia	Philadelphia Electric Co. 2,460	1,133
	Pittsburgh	Duquesne Light Co. 1,361	466
11. R. I.	Providence	The Narragansett Electric Co. 371	200
12. Vt.	Rutland	Central Vermont Public Service Corp. 65	61
13. Va.	Richmond	Virginia Electric & Power Co. 1,849	711
14. W. Va.	Roanoke, Va.	Appalachin Power Co. 2,111	481
Total—19 Utilities		26,272	12,091

[fol. 5954] Privately Owned Electric Utilities Selected

Region II.—Great Lakes,

State	City of Headquarters	Name of Utility Installed MW	M Ult. Consumers
1. Ill.	Chicago	Commonwealth Edison Co. 3,492	1,961
2. Ind.	Ft. Wayne	Indiana & Michigan Electric Co. 977	277
	Plainfield	Public Service Co. of Indiana, Inc. 1,227	367
3. Ky.	Louisville	Louisville Gas & Electric Co. 940	186
4. Mich.	Detroit	Detroit Edison Co. 3,174	1,239
	Jackson	Consumers Power Co. 2,013	836
5. Ohio	Akron	Ohio Edison Co. 1,629	560
	Canton	Ohio Power Co. 2,099	448
	Cincinnati	Cincinnati Gas & Electric Co. 1,091	339
	Cleveland	Cleveland Electric Illuminating Co. 1,833	533
6. Wisc.	Milwaukee	Wisconsin Electric Power Co. 1,318	601
Total—11 Utilities		19,793	7,347

[fol. 5955] Privately Owned Electric Utilities Selected

Region III.—North Central

State	City of Headquarters	Name of Utility Installed MW	M Ult. Consumers
1. Iowa	Des Moines	Iowa Power & Light Co. 376	164
2. Kan.	Topeka	Kansas Power & Light Co. 445	179
	Wichita	Kansas Gas & Electric Co. 457	167
3. Minn.	Minneapolis	Northern States Power Co. 1,223	669
4. Mo.	Kansas City	Kansas City Power & Light Co. 884	254
	St. Louis	Union Electric Co. 1,509	574
5. Neb.	.....	(No privately owned utilities in the State of Nebraska)	.....
6. N. D.	Fergus Falls, Minn.	Otter Tail Power Co. 123	98
	Minneapolis, Minn.	Montana-Dakota Utilities Co. 154	72
7. S. D.	Rapid City	Black Hills Power & Light Co. 62	28
Total—9 Utilities		5,233	2,205

[fol. 5956] Privately Owned Electric Utilities Selected

Region IV.—Northwestern

State	City of Headquarters	Name of Utility / Installed MW	M Ult. Consumers
1. Idaho	Boise	Idaho Power Company 620	130
2. Mont.	Butte	Montana Power Company 536	144
3. Ore.	Portland	Pacific Power & Light Company 579	297
4. Wash.	Spokane	Washington Water Power Company 355	145
5. Wyo.	Cheyenne	Cheyenne Light Fuel & Power Co. 6	16
	Frontier	Lincoln Service Corporation 6	2
Total—6 Utilities		2,102	734

[fol. 5957] Privately Owned Electric Utilities Selected

Region V.—Southwestern

State	City of Headquarters	Name of Utility / Installed MW	M Ult. Consumers
1. Ariz.	Phoenix	Arizona Public Service Co. 432	156
2. Calif.	Los Angeles	Southern California Edison Co. 2,814	1,478
	San Francisco	Pacific Gas & Electric Co. 4,986	1,824
3. Colo.	Denver	Public Service Co. of Colorado 709	298
4. Nev.	Las Vegas	Southern Nevada Power Co. 119	32
5. N. M.	Albuquerque	Public Service Co. of New Mexico 172	88
6. Utah	Salt Lake City	Utah Power & Light Co. 706	200
Total—7 Utilities		9,938	4,076

[fol. 5958] Privately Owned Electric Utilities Selected

Region VI.—South Central

State	City of Headquarters	Name of Utility Installed MW	M Ult. Consumers
1. Ark.	Little Rock	Arkansas Power & Light Co. 760	287
2. La.	New Orleans	Louisiana Power & Light Co. 715	225
	New Orleans	New Orleans Public Service, Inc. 543	177
3. Okla.	Oklahoma City	Oklahoma Gas & Electric Co. 853	328
	Tulsa	Public Service Co. of Oklahoma 793	246
4. Texas	Houston	Houston Lighting & Power Co. 1,862	447
Total—6 Utilities		5,526	1,710

[fol. 5959] Privately Owned Electric Utilities Selected

Region VII.—Southeastern

State	City of Headquarters	Name of Utility Installed MW	M Ult. Consumers
1. Ala.	Birmingham	Alabama Power Company 1,906	605
2. Fla.	Miami	Florida Power & Light Co. 1,354	655
3. Ga.	Atlanta	Georgia Power Co. 1,919	666
4. Miss.	Jackson	Mississippi Power & Light Co. 407	175
5. N. C.	Charlotte	Duke Power Company 2,783	1,012
	Raleigh	Carolina Power & Light Co. 1,180	403
6. S. C.	Columbia	South Carolina Electric & Gas Co. 591	177
7. Tenn.	Kingsport	Kingsport Utilities, Inc.	20
Total—8 Utilities		10,140	3,713

[fol. 5960] Publicly Owned Electric Utilities Selected

Region	State	City of Headquarters	Name of Utility Installed MW	M Ult. Consumer
I.	N. Y.	Jamestown	Jamestown Municipal Electric Dept. 55	19
II.	Mich.	Lansing	Board of Water and Electric Light Commissioners 195	45
	Ohio	Cleveland	Cleveland Dept. of Light & Power 138	58
III.	Kan.	Kansas City	Board of Public Utilities 213	42
IV.	Wash.	Seattle	Seattle Dept. of Lighting 693	228
		Tacoma	Tacoma Dept. of Public Utilities (Light Div.) 297	63
V.	Ariz.	Tempe	Salt River Project Agricultural Improvement & Power District 448	64
	Calif.	Imperial	Imperial Irrigation District 190	31
		Los Angeles	Los Angeles Dept. of Water & Power 1,233	884
		Pasadena	Pasadena Municipal Light & Power Dept. 167	48
VI.	Texas	San Antonio	City Public Service Board 391	171
VII.	S. C.	Moncks Corner	S. C. Public Service Authority 215	16
	Tenn.	Memphis	Memphis Light Gas & Water Div.	174
Total—13 Utilities			4,235	1,843

[fol. 5961] Rural Electric Cooperatives Selected

Region	State	City of Headquarters	Name of Cooperative Miles of line chargized	M Ult. Consumer
I.	Md. 7	Denton	Choptank Electric Cooperative, Inc. 3,141	13
	Va. 27	Crewe	Southside Electric Cooperative 4,322	15
II.	Ill. 36	Newton	Norris Electric Cooperative 3,346	11
	Ky. 35	Bowling Green	Warren Rural Elec. Cooperative Corp. 3,958	17
III.	Minn. 57	Pelican Rapids	Lake Region C-Op Electrical Assn. 4,318	10
	N. D. 19	Grand Forks	Nodak Rural Elec. Cooperative, Inc. 5,560	9
IV.	Mont. 15	Lewistown	Fergus Electric Cooperative, Inc. 2,515	3
	Wash. 18	Spokane	Inland Power & Light Co. 3,726	8
V.	Colo. 17	La Junta	Southeast Colo. Power Assn. 4,370	6
	Colo. 37	Limon	Mountain View Elec. Assn. 2,795	4
VI.	Ark. 9	Jonesboro	Craighead Elec. Cooperative Corp. 4,055	16
	Texas 100	Austin	Lower Colo. River Elec. Coop. Inc. 5,226	15
VII.	Fla. 14	Keystone Heights	(1)Clay Electric Cooperative Inc. 3,789	15
	Miss. 40	Taylorsville	Southern Pine Elec. Power Assn. 5,918	21
Total—14 Utilities			57,039	163

(1) The only cooperative selected which has installed generating capacity. This is 9 MW.

[fol. 5962] Appendix C

[fol. 5963] Executive Office of the President
Bureau of the Budget
Washington 25, D. C.

Notice of Approval of Report Form

Date: September 28, 1960.

To: Mr. S. A. Andretta
Administrative Assistant Attorney General
Department of Justice
Subject: Agency's Form No.
Title: Form Letter and Schedules Attached Thereto (Use of Aluminum and Copper Wire and Cable)

The above-named form is hereby approved in accordance with Circular A-40 issued by the Bureau of the Budget under the Federal Reports Act of 1942.

The following notation of approval must be shown in the upper right-hand corner of the form:

Budget Bureau No. 43-6005
Approval Expires December 31, 1960

Will you please transmit to this Office two copies of this form after printing or other multicopying?

/s/ David E. Cohn, David E. Cohn, Clearance Officer,
Office of Statistical Standards.

[fol. 5964] Appendix D

[fol. 5965] United States Department of Justice
Washington, D. C.

Budget Bureau No. 43-6005
Approval Exp. 12-31-60

RAB:CLW
60-0-37-256

The Department of Justice is seeking information as to the relative use by electric utilities of aluminum and copper conductor for new construction and for replacement. This information is necessary with respect to pending litigation, in which neither your utility nor any other electric utility is a party. We are enclosing schedules setting out the specific information desired, and it will be appreciated if you will cooperate in furnishing on these schedules the information requested.

In order that we may obtain the necessary information within time limitations imposed by the afore-mentioned litigation, your return of the completed schedules with the appropriate signature by October 31, 1960, will be appreciated.

Sincerely yours, Robert A. Bicks, Assistant Attorney General, Antitrust Division.

Enclosures

[fol. 5966] United States Department of Justice

Schedule I

Gross Additions [1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Name of Utility

Address of Utility

Type of Overhead Line	Answer in Thousands of Feet [2] 1950	1955	1959
	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx
A. Transmission Lines	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx
1. Copper wire and cable-bare			
2. Aluminum and aluminum alloy wire and cable-bare & ACSR			
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx
	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx
	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx
	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx
1. Copper wire and cable-bare			
2. Aluminum and aluminum alloy wire and cable-bare & ACSR			
3. Copper wire and cable covered and insulated [3]			
4. Aluminum and aluminum alloy wire and cable covered and insulated [3]			

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Signed: ——, ——

[fol. 5967] United States Department of Justice

Schedule II

Gross Additions [1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Name of Utility

Address of Utility

Type of Underground Cable	Answer in Thousands of Feet [2]		
	1950	1955	1959
	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx
A. Transmission cable	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx
1. Copper			
2. Aluminum & Aluminum Alloy			
B. Distribution cable	xxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx
1. Copper			
2. Aluminum & Aluminum Alloy			

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.'

Signed: ——, ——

[fol. 5968] United States Department of Justice

Schedule III

Name of Utility

Address of Utility

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Signed: ——, ——

[fol. 5969] United States Department of Justice

Schedule IV

Name of Utility

Address of Utility

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Signed: ——, ——

[fol. 5970] IN UNITED STATES DISTRICT COURT

PLAINTIFF'S EXHIBIT 468A

Schedules Prepared by Electric Utilities Showing Use of Copper and Aluminum Conductor

Regions I, II & III

[fol. 5971] Utilities

Region: I Northeastern

State	Name
Connecticut	Connecticut Light & Power Co.
Delaware	Delaware Power & Light Co.
District of Columbia	Potomac Electric Power Co.
Maine	Central Maine Power Co.
Maryland	Baltimore Gas & Electric Co.
Maryland	Choptank Electric Coop., Inc.
Massachusetts	Boston Edison Co.
New Hampshire	Public Service Co. of New Hampshire
New Jersey	Public Service Electric & Gas Co.
New York	Jamestown Municipal Electric Co.
New York	Long Island Lighting Co.
New York	Consolidated Edison Co. of New York
New York	Niagara Mohawk Power Co.
Pennsylvania	Pennsylvania Power & Light Co.
Pennsylvania	West Penn Power Co.
Pennsylvania	Philadelphia Electric Co.
Pennsylvania	Duquesne Light Co.
Rhode Island	The Narragansett Electric Co.
Vermont	Central Vermont Public Service Corp.
Virginia	Southside Electric Coop.
Virginia	Virginia Electric & Power Co.
West Virginia	Appalachin Power Co.

[fol. 5972] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

The Connecticut Light & Power Company
P. O. Box 2010, Hartford 1, Conn.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	—	206	1
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	—	147
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	3,511	3,888	2,875
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	1,692	2,091
3. Copper wire and cable covered and insulated[3]	4,722	2,724	1,200
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	3,384	1,679

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Walter W. Foreman
Vice President
October 28, 1960

[fol. 5973] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

The Connecticut Light & Power Company
P. O. Box 2010, Hartford 1, Conn.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	89	253	471
2. Aluminum & Aluminum Alloy	—	24	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Walter W. Foreman
Vice President
October 28, 1960

[fol. 5974] United States Department of Justice

Schedule III

The Connecticut Light & Power Company
P. O. Box 2010, Hartford 1, Conn.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe th changes indicating when they will occur.

Over an extended period, proportion of aluminum to copper expected to increase since aluminum cable is primary standard for overhead construction. In distribution category, the ratio may be static in 1960 and 1961 as Company uses existing stocks of copper cable.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Use of aluminum restricted in areas adjacent to salt water because of connector corrosion problems.

Walter W. Foreman
Vice President
October 28, 1960

[fol. 5975] United States Department of Justice

Schedule IV

The Connecticut Light & Power Company
P. O. Box 2010, Hartford 1, Conn.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No change.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Aluminum Conductor Underground Cable is not in Company standards.
Restricted because of Space limitations (duct)

Thermal Expansion properties
Insulation economics
Connector problems

Walter W. Foreman
Vice President
October 28, 1960

[fol. 5976] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Delaware Power & Light Company
600 Market St., Wilmington 99, Del.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	0	365.971	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	849.566	4.085
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	604.155	105.850	38.441
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	4.680	795.248	686.241
3. Copper wire and cable covered and insulated[3]	1,376.725	391.769	184.516
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	1,530.416	1,272.111

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

F. P. Hyer
Chairman of The Board & Chief,
Executive Officer
October 31, 1960

[fol. 5977] United States Department of Justice

Schedule II

Gross Additions [1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Delaware Power & Light Company
600 Market St., Wilmington 99, Del.

Type of Underground Cable	Answer in Thousands of Feet [2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	303.588	32.781	87.550
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

F. P. Hyer
Chairman of The Board & Chief,
Executive Officer
October 31, 1960

[fol. 5978] United States Department of Justice

Schedule III

Delaware Power & Light Company
600 Market St., Wilmington 99, Del.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Estimated to continue in same proportion as in 1959.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restriction.

F. P. Hyer
Chairman of The Board & Chief,
Executive Officer
October 31, 1960

[fol. 5979] United States Department of Justice

Schedule IV

Delaware Power & Light Company
600 Market St., Wilmington 99, Del.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Do not plan to use aluminum for underground cables.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Space limitation in existing ducts prevents use of aluminum.

F. P. Hyer
Chairman of The Board & Chief,
Executive Officer
October 31, 1960

[fol. 5980] Potomac Electric Power Company
929 E. Street, Northwest
Washington 4, D. C.

December 22, 1960

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Dear Mr. Bicks:

At the telephonic request of Mr. Samuel Karp, Attorney, we are resubmitting the set of schedules relating to the use of aluminum and copper conductors in order to clarify and amplify the statements as originally submitted.

Schedules I & II have not been changed from the original. Schedule III has been amplified to show the estimated change in the proportion of aluminum to copper in 1960 over 1959 occasioned by the present practice of using aluminum conductors for overhead lines, except for distribution primaries, which was established late in 1959. Schedule IV has been restated to cover underground cables only.

Very truly yours, George Bisset, Senior Vice President.

[fol. 5981] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Potomac Electric Power Company
929 E St., N. W., Wash. 4, D. C.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	—	—	—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	87	—	1,851
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	1,939	2,317	3,570
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	—	902
3. Copper wire and cable covered and insulated[3]	3,677	3,785	2,963
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	120	2

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

George Bisset
Senior Vice President
December 22, 1960

[fol. 5982] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1960, 1955 and 1959

Potomac Electric Power Company
929 E St., N. W., Wash. 4, D. C.

Type of Underground Cable	Answer in Thousands of Feet[2] 1960	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	373	134	177
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	1,373	1,012	1,695
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

George Bisset
Senior Vice President
December 22, 1960

[fol. 5983] United States Department of Justice

Schedule III

Potomac Electric Power Company
929 E St., N. W., Wash. 4, D. C.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Our present practice (established late in 1959) of using aluminum Conductors for overhead lines, except for distribution primaries for which copper is standard, will increase the proportion of aluminum to copper in 1960 over 1959. If we assume the quantities of Conductors installed in 1960 to be the same as in 1959 (no 1960 figures being available at this time), the following percentage usage should result.

	1959 Actual	1960 Estimated
Schedule B1 Bare Copper	79.8%	35.9%
B2 Bare Aluminum	20.2%	64.1%
B3 Ins. Copper	99.9%	4.3%
B4 Ins. Aluminum	0.1%	95.7%

We have no plans or schedule for changing this practice at the present time.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

The use of aluminum conductor is not restricted because of corrosion. Copper is preferred for distribution primaries because it is easier to install, maintain and rearrange, also it has greater salvage value. We have no highly corrosive atmosphere on this system.

George Bisset
Senior Vice President
December 22, 1960

[fol. 5984] United States Department of Justice

Schedule IV

Potomac Electric Power Company
929 E St., N. W., Wash. 4, D. C.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Our present practice is to use copper conductors for all underground lines. We have no plans or schedule for changing this practice, at this time.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We do not use any aluminum conductors for underground cable because we have not found any price advantage on an installed basis. The use of aluminum for either conductor or sheath is not standard with the cable manufacturers. There have been experimental installations, but standard installation methods have not been developed.

George Bisset
Senior Vice President
December 22, 1960

[fol. 5985] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959
Baltimore Gas and Electric Company

Lexington and Liberty Streets,
Baltimore 3, Maryland

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	307	2	6
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	181	—	28
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	1,269	856	285
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	741	2,451	2,347
3. Copper wire and cable covered and insulated[3]	1,504	6,819	3,308
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	2,228	4,806
Copper weld			
Transmission	177	3	—
Distribution	—	—	101

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

O. E. Smith
Secretary
October 31, 1960

[fol. 5986] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959
Baltimore Gas and Electric Company

Lexington and Liberty Streets,
Baltimore 3, Maryland

Type of Underground Cable & Wire	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	XXXXXXXX	XXXXXXXX	XXXXXXXX
1. Copper	—	2	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	XXXXXXXX	XXXXXXXX	XXXXXXXX
1. Copper	2,011	1,311	1,072
2. Aluminum & Alummum Alloy			

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

O. E. Smith
Secretary
October 31, 1960

[fol. 5987] United States Department of Justice

Schedule III

Baltimore Gas and Electric Company
Lexington and Liberty Streets,
Baltimore 3, Maryland

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

We expect the proportion of aluminum to copper used in both transmission and distribution lines to increase in 1960 and in subsequent years.

New extensions are normally made with aluminum conductors. Lines that must be reconductored because of load growth are normally reconductored with aluminum. The old copper wires are scrapped if they are small in size or are damaged.

The substitution of aluminum conductors for copper is a continuing process and will therefore not occur in any particular future year.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

The use of aluminum conductors is somewhat limited in industrial areas due to chemical contamination. Copper conductors are normally used for 4 kv and higher voltage lines. Aluminum conductors are used for service drops and other secondary voltage lines. Aluminum conductors are normally covered.

This limitation was imposed to prevent possible corrosion and weakening of aluminum conductors. Continuing test work and experience indicate that our fears

of corrosion of aluminum conductors in these areas may be unfounded. However, no change in policy has yet been made since salvaged copper wire is generally available.

O. E. Smith
Secretary
October 31, 1960

[fol. 5988] United States Department of Justice

Schedule IV

Baltimore Gas and Electric Company
Lexington and Liberty Streets,
Baltimore 3, Maryland

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No change contemplated.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Economic consideration only.

O. E. Smith
Secretary
October 31, 1960

[fol. 5969] Choptank Electric Cooperative, Inc.
Denton, Maryland

October 20, 1960

U. S. Department of Justice
Washington, D. C.
Attention: Mr. Robert A. Bicks

Asst. Attorney General
Antitrust Division

Gentlemen:

Referring to your questionnaire concerning the relative use of aluminum and copper conductor on our system for new construction and replacements:

We are attaching hereto the questionnaire that has been filled in as much as we are able to inform you concerning the use of aluminum and copper on our system. We hope that you will find the information useful.

Very truly yours, Choptank Electric Cooperative, Inc., F. E. Yeoman, Manager.

FEY/a
Enc.

[fol. 5990] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Choptank Electric Cooperative, Inc.
Denton, Maryland

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	None	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	None	None
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	24,535	581	696
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	632	38
3. Copper wire and cable covered and insulated[3]	331	212	59
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	32	186

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

F. E. Yeoman
Manager
October 19, 1960

[fol. 5991] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1960, 1955 and 1959

Choptank Electric Cooperative, Inc.
Denton, Maryland

Type of Underground Cable	Answer in Thousands of Feet[2] 1960	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

F. E. Yeoman
Manager
October 19, 1960

[fol. 5992] United States Department of Justice

Schedule III

Choptank Electric Cooperative, Inc.,
Denton, Maryland

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

A.

Bare Wire

We expect an increase in the proportion of aluminum to copper wire over that of 1959. Most lines that are rebuilt due to increased load are built from aluminum. This is not reflected in the 1959 figure since no lines were rebuilt in that year. The 1955 figure is a truer picture of the proportions of aluminum to copper expected in the future.

Covered Wire

We expect the proportion of aluminum to copper wire to remain the same as 1959.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

B.

We restrict the use of aluminum for lines within two miles of the ocean because of corrosion of connections. No change is expected in this restriction.

F. E. Yeoman
Manager
October 19, 1960

[fol. 5993] United States Department of Justice

Schedule IV

Choptank Electric Cooperative, Inc., Denton, Maryland

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

None.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

None.

F. E. Yeoman
Manager
October 19, 1960

[fol. 5994] Central Maine Power Company

General Office - 9 Green Street - Augusta, Maine

October 27, 1960

Robert A. Bicks, Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Ref: RAB:CLW
60-0-37-256

Dear Mr. Bicks:

We are enclosing the information which you requested on October 11, 1960 as to our use of electrical conductor in 1950, 1955 and 1959 and planned use in the future.

Very truly yours, W. H. Kimball, Comptroller.

[fol. 5995] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Central Maine Power Company
Augusta, Maine

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	35	273	186
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	873	871	522
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	5,000 Est.	2,109	280
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	19	1,128	1,724
3. Copper wire and cable covered and insulated[3]	2,500 Est.	4,227	360
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	29	455	4,126

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

W. H. Kimball
Comptroller
October 27, 1960

[fol. 5996] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Central Maine Power Company
Augusta, Maine

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	69	162	48
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

W. H. Kimball
Comptroller
October 27, 1960

[fol. 5997] United States Department of Justice

Schedule III

Central Maine Power Company
Augusta, Maine

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

We expect the increasing use of aluminum to continue as long as the costs are lower than copper.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

None.

W. H. Kimball
Comptroller
October 27, 1960

[fol. 5998] United States Department of Justice

Schedule IV

Central Maine Power Company
Augusta, Maine

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No changes contemplated.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Not used because of space limitations and because of limited experience in the industry with terminations, connections, etc.

W. H. Kimball
Comptroller
October 27, 1960

[fol. 5999]

Boston Edison Company
Executive Offices
182 Tremont Street
Boston 12, Massachusetts

December 12, 1960

United States Department of Justice
Washington, D.C.
Atten: Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division

Dear Mr. Bicks:

In accordance with our telephone conversation with Mr. Karp of December 5, 1960 we are enclosing herewith by AIR-MAIL a revised set of schedule forms.

Please note the average 50 foot length of service drops have been broken down according to actual number of strands used in each service rather than using an average of three strands. This changes the estimate slightly from what was quoted by telephone December 5th.

Bare and covered wire as originally reported in schedule 1B, have been revised to include service drops.

We regret the inconvenience this has caused you.

Sincerely yours, Ralph M. Kelmon, Assistant Treasurer.

RMK/NCE/mal
enclosure:

[fol. 6000] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Boston Edison Company
182 Tremont Street, Boston 12, Massachusetts

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	None	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	None	None
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	3,256	3,737	2,019
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	5	240	1,274
3. Copper wire and cable covered and insulated[3]	499	1,285	389
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	None	None	975

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Ralph M. Kelmon
Assistant Treasurer
December 12, 1960

[fol. 6001] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1960, 1955 and 1959

Boston Edison Company
182 Tremont Street, Boston 12, Massachusetts

Type of Underground Cable	Answer in Thousands of Feet[2] 1960	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	12	143	106
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	1,676	2,148	2,158
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Ralph M. Kelmon
Assistant Treasurer
December 12, 1960

[fol. 6002] United States Department of Justice

Schedule III

Boston Edison Company
182 Tremont Street, Boston 12, Massachusetts

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

About the same through 1961. Beyond that, it is dependent upon costs.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

Use of Aluminum versus Copper for Service Drops

1. Approximately 90% of wire used for service drops is aluminum. For the most part, three strand, number four wire is used for residential not withstanding it is only 80% as good as copper in conductivity.
2. Three strand, number 1/0 or 3/500 copper wire which is larger wire is primarily used for commercial service drops because it is a better conductor for load requirements.

Ralph M. Kelmon
Assistant Treasurer
December 12, 1960

[fol. 6003] United States Department of Justice

Schedule IV

Boston Edison Company
182 Tremont Street, Boston 12, Massachusetts

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

None.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

None.

Ralph M. Kelmon
Assistant Treasurer
December 12, 1960

[fol. 6004]

Boston Edison Company
Executive Offices
182 Tremont Street
Boston 12, Massachusetts

November 22, 1960

United States Department of Justice
Washington, D. C.
Atten: Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division

Dear Mr. Bicks:

Your letter of October 11, 1960, (RAB:CLW 60-0-37-256) addressed to our late President, Mr. T. G. Dignan, has been referred to me for reply.

I am forwarding herewith by AIR MAIL the schedules furnishing the information requested.

I regret the delay in preparation of these schedules.

Very truly yours, Albert C. McMenimen, Financial Vice Pres. & Treas.

ACM/NCE/mm

[fol. 6005] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Boston Edison Company
182 Tremont Street, Boston 12, Massachusetts

Type of Overhead Line	Answer in Thousands of Feet[2] (A) 1950	(B) 1955	(C) 1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	None	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	None	None
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	2,844	3,737	2,019
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	5	240	820
3. Copper wire and cable covered and insulated[3]	17	20	230
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

(A) Does not include the length of 6,038 O.H. Services.
(B) Does not include the length of 8,643 O.H. Services.
(C) Does not include the length of 10,823 O.H. Services.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Albert C. McMenimen
Financial Vice Pres. & Treas.
November 22, 1960

[fol. 6006] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Boston Edison Company
182 Tremont Street, Boston 12, Massachusetts

Type of Underground Cable	Answer in Thousands of Feet[2] (A) 1950	(B) 1955	(C) 1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	12	143	106
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	1,354	1,816	2,007
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.
(A) Does not include the length of 2,147 U.G. Services.
(B) Does not include the length of 2,265 U.G. Services.
(C) Does not include the length of 1,034 U.G. Service.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Albert C. McMenimen
Financial Vice Pres. & Treas.
November 22, 1960

[fol. 6007] United States Department of Justice

Schedule III

Boston Edison Company
182 Tremont Street, Boston 12, Massachusetts

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

About the same.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

Albert C. McMenimen
Financial Vice Pres. & Treas.
November 22, 1960

[fol. 6008] United States Department of Justice

Schedule IV

Boston Edison Company
182 Tremont Street, Boston 12, Massachusetts

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

None.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

None.

Albert C. McMenimen
Financial Vice Pres. & Treas.
November 22, 1960

[fol. 6009] Public Service Company of
New Hampshire
Executive Offices
Manchester, N. H.

October 25, 1960

United States Department of Justice
Washington, D. C.
Re: RAB:CLW
60-0-37-256
Att: Robert A. Bicks, Ass't Attorney General

Gentlemen:

We have every desire to cooperate with the Department of Justice in supplying information as to the use by our Company of aluminum and copper conductor as requested in your letter of October 11, 1960.

However, the amount of work involved in collecting the information is so great that we can supply estimates only for the year 1955 and 1959, but have no readily available source of information for the year 1950.

You will find our estimates set forth on the sheets enclosed.

Yours very truly, A. R. Schiller, President.

ARS:L
Enc.

[fol. 6010] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Public Service Co. of N. H.
1087 Elm Street, Manchester, N. H.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare		21,918	725
2. Aluminum and aluminum alloy wire and cable-bare & ACSR		436,454	463,290
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare		3,328	488
2. Aluminum and aluminum alloy wire and cable-bare & ACSR		165,229	2,335,921
3. Copper wire and cable covered and insulated[3]		1,267,898	45,060
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]		2,592,971	3,478,840

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Public Service Co. of N. H.
October 25, 1960

[fol. 6011] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Public Service Co. of N. H.
1087 Elm Street, Manchester, N. H.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper		None	None
2. Aluminum & Aluminum Alloy		None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper		85.173	26.212
2. Aluminum & Aluminum Alloy		None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Public Service Co. of N. H.
October 25, 1960

[fol. 6012] United States Department of Justice

Schedule III

Public Service Co. of N. H.
1087 Elm Street
Manchester, N. H.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No anticipated change.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions imposed.

Public Service Co. of N. H.
October 25, 1960

[fol. 6013] United States Department of Justice

Schedule IV

Public Service Co. of N. H.
1087 Elm Street
Manchester, N. H.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No anticipated change.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Aluminum conductor has never been used in present underground system. Size of existing ducts and space limitations could be considered as primary reason.

Public Service Co. of N. H.
October 25, 1960

[fol. 6014] United States Department of Justice

Schedule I

'Gross Additions' [1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Public Service Electric and Gas Company
80 Park Place, Newark 1, New Jersey

Type of Overhead Line	Answer in Thousands of Feet [2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	—	—	—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	—	548.
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	92.	1,152.	1,208.
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	260.	623.	625.
3. Copper wire and cable covered and insulated [3]	5,515.	11,366.	3,654.
4. Aluminum and aluminum alloy wire and cable covered and insulated [3]	—	14,193.	19,522.

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

Quantities based on purchase orders placed for each size of each construction during the indicated years adjusted for estimated quantities used for maintenance.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

John E. Hunt
Manager of Purchases
November 2, 1960

[fol. 6015] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Public Service Electric and Gas Company
80 Park Place, Newark 1, New Jersey

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	1,365.	1,932.	1,869.
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

Quantities based on purchase orders placed for each size of each construction during the indicated years adjusted for estimated quantities used for maintenance.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

John E. Hunt
Manager of Purchases
November 2, 1960

[fol. 6016] United States Department of Justice

Schedule III

Public Service Electric and Gas Company
80 Park Place
Newark 1, New Jersey

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No change in the present proportionate use of aluminum and copper is foreseen. If the two metals change radically in relative price, the use will be re-evaluated.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions.

(Signature illegible)
General Supt. of Distribution
November 2, 1960

[fol. 6017] United States Department of Justice

Schedule IV

Public Service Electric and Gas Company
80 Park Place
Newark 1, New Jersey

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Same answer as Schedule III A.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Insulated aluminum conductors are acceptable underground only when provided with metallic sheath. Such cables may at certain places be limited by available duct size. This limitation, while completely general, becomes of practical nature on rare occasions.

(Signature illegible)
General Supt. of Distribution
November 2, 1960

[fol. 6018] Board of Public Utilities
City of
Jamestown, New York
Electric Division

October 20, 1960

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Dear Mr. Bicks:

Reference: RAB:CLW
60-0-37-256

Attached are Schedules I through IV with the applicable blanks filled in. These schedules were transmitted with your letter of October 11, 1960.

Very truly yours, Board of Public Utilities, Merle W. Smedberg, Superintendent.

Enclosures

[fol. 6019] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Jamestown Municipal Electric System
200 East Third Street, Jamestown, New York

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	None	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	None	None
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	None	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	None	None
3. Copper wire and cable covered and insulated[3]	292	274	291
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Merle W. Smedberg
Superintendent of Public Utilities
October 20, 1960

[fol. 6020] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Jamestown Municipal Electric System
200 East Third Street, Jamestown, New York

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	35	1	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	6	None	None
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Merle W. Smedberg
Superintendent of Public Utilities
October 20, 1960

[fol. 6021] United States Department of Justice

Schedule III

Jamestown Municipal Electric System
200 East Third Street
Jamestown, New York

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

We have started to use aluminum and aluminum alloy wire covered and insulated in the form of triplex conductor for service drops. It is expected that more of this type of conductor will be used in the future. We are also checking the economics of using covered aluminum alloy wire on distribution lines.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

There is no area in our service area in which we would restrict the use of aluminum conductor.

Merle W. Smedberg
Superintendent of Public Utilities
October 20, 1960

[fol. 6022] United States Department of Justice

Schedule IV

Jamestown Municipal Electric System
200 East Third Street
Jamestown, New York

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Inasmuch as our underground cable installations will be replacements during this year and next year, we will continue the use of copper type of cable for replacements.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Merle W. Smedberg
Superintendent of Public Utilities
October 20, 1960

[fol. 6023] Long Island Lighting Company
Executive Offices
250 Old Country Road
Mineola, N. Y.

November 3, 1960

Robert A. Bicks, Esq.
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.
Your Reference No. 60-0-37-256

Dear Sir:

Enclosed herewith are the schedules which were furnished with your letter dated October 11, 1960.

The information requested in the schedules has been supplied with the exception of data concerning gross additions of electric conductors in the year 1950. Our records for that period, and for several subsequent years, are not in a form that permits this information to be extracted without the expenditure of a substantial amount of time and consequent disruption of other activities. We know, however, that aluminum conductors were generally introduced into the system after 1950. If the information is deemed essential for your purposes, we will undertake to supply it but it would take two to three weeks to make it available.

Very truly yours, Charles R. Pierce.

CRP:CBF
encls.

[fol. 6024] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Long Island Lighting Company
250 Old Country Road, Mineola, New York

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	*	1,131	437
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	*	228	420
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	*	4,677	1,797
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	*	1,105	938
3. Copper wire and cable covered and insulated[3]	*	3,486	1,626
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	*	2,032	1,504

* Information not readily available from Company Records.

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[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

Note: For cable assemblies where the neutral conductor is bare and the power conductors are insulated the single conductor footage for the bare neutral was included under B-1 or B-2 and the footage for the insulated conductors was included under B-3 or B-4.

Line contained in our form and therefore not inserted by company to note any delineation of its note. Ellery R. Fosdick.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Charles E. Elbert,
Secretary
November 3, 1960

[fol. 6025] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Long Island Lighting Company
250 Old Country Road, Mineola, New York

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	*	219	7
2. Aluminum & Aluminum Alloy	*	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	*	507	448
2. Aluminum & Aluminum Alloy	*	464	7

* Information not readily available from Company Records.

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Charles E. Elbert,
Secretary
November 3, 1960

[fol. 6026] United States Department of Justice

Schedule III

Long Island Lighting Company
250 Old Country Road
Mineola, New York

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

The proportion of aluminum to copper usage is expected to remain the same in 1960. Commencing in 1961 the proportion of aluminum to copper usage is expected to increase because of the adoption of aluminum for use as a primary conductor on lines operated at 13 KV.

A further slight increase in aluminum usage is expected for future years if experience permits an enlargement of the area now zoned for aluminum use. The predicted use of aluminum as stated herein assumes the continuance of a price differential in its favor comparable to that which now exists.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

The use of aluminum is restricted to a zoned inland area (approximately 80% of the service territory) because of severe corrosion along the shore caused by salt fog and sand blast on the unprotected conductors and connectors. The boundaries in the aluminum zone were conservatively selected so that with favorable operating experience they could be extended to include a larger area.

The unavailability in the past of suitable aluminum connectors for hot stick operation at 13 KV delayed the application of aluminum as a 13KV primary conductor. Recent improvements in connectors now make this application acceptable.

Charles E. Elbert,
Secretary
November 3, 1960

[fol. 6027] United States Department of Justice

Schedule IV

Long Island Lighting Company
250 Old Country Road
Mineola, New York

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

The use of aluminum for underground cables is expected to be discontinued in 1960 and future years. It is not planned to utilize aluminum for underground cables because test installations indicated this type of cable to be unsatisfactory for our use.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Aluminum underground cable was used only for direct buried street lighting. Experience caused us to change over to copper cable for this use because of difficulty with splicing, connections and extent of conductor damage when faults occurred.

Charles E. Elbert,
Secretary
November 3, 1960

[fol. 6028] Consolidated Edison Company of
New York, Inc.
4 Irving Place
New York 3, N. Y.

October 31, 1960
Re RAB:CLW
60-0-37-256

Hon. Robert A. Bicks
Assistant Attorney General
Anti-Trust Division
Department of Justice
Washington, D. C.

Dear Sir:

In accordance with your letter of October 11-1960, sent to this Company, seeking information as to the relative use of aluminum and copper conductors for new construction and for replacement, we are returning to you the schedules with the information you requested.

We trust that this information is satisfactory.

Very truly yours, C. T. Hatcher, Division Engineer.

Enc
CTH-JC

[fol. 6029] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Consolidated Edison Company of New York, Inc.
4 Irving Place, New York 3, N. Y.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950 Estimated	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	0	2	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	6	0
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	18	198	321
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	0	46
3. Copper wire and cable covered and insulated[3]	5,454	5,817	3,671
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	5,317	6,047

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

C. T. Hatcher
Division Engineer
October 31, 1960

[fol. 6030] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Consolidated Edison Company of New York, Inc.
4 Irving Place, New York 3, N. Y.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950 Estimated	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	67	795
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	11,731	12,294	15,349
2. Aluminum & Aluminum Alloy	0	0	59

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

C. T. Hatcher
Division Engineer
October 31, 1960

[fol. 6031] United States Department of Justice

Schedule III

Consolidated Edison Company of New York, Inc.
4 Irving Place, New York 3, N. Y.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

There has been an increase in the proportion of aluminum conductor to copper conductor used in the last several years and we expect this trend to continue slightly in 1960 and subsequent years.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Our principal use of aluminum is for service drops. The need for line wire on our distribution system is primarily for replacement, rearrangement and extension of our existing copper system. We do not use aluminum conductors for line wire because of additional difficulties in splicing and dead-ending, particularly under emergency conditions.

C. T. Hatcher
Division Engineer
October 31, 1960

[fol. 6032] United States Department of Justice

Schedule IV

Consolidated Edison Company of New York, Inc.
4 Irving Place, New York 3, N. Y.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

We do not use aluminum conductor at the present time and do not expect any increase in use in 1960 and subsequent years unless there is a significant change in the economic picture.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

It is uneconomical to use aluminum conductors on our system at the present time due to increase in duct and splicing box space requirements and the additional difficulties in making interconnections with our existing copper system..

C. T. Hatcher
Division Engineer
October 31, 1960

[fol. 6033] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Niagara Mohawk Power Corporation
300 Erie Boulevard West, Syracuse 2, N. Y.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	1,603,000	148,000	443,000
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	435,000	1,225,000	3,046,000
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	3,285,000	667,000	232,000
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	2,795,000	5,379,000	9,805,000
3. Copper wire and cable covered and insulated[3]	16,878,000	6,446,000	2,866,000
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	278,000	10,841,000	12,783,000

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

(Signature illegible)
Vice President
October 31, 1960

[fol. 6034] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Niagara Mohawk Power Corporation
300 Erie Boulevard West, Syracuse 2, N. Y.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	122,000	301,000	312,000
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	912,000	903,000	1,007,000
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

(Signature illegible)
Vice President
October 31, 1960

[fol. 6035] United States Department of Justice

Schedule III

Niagara Mohawk Power Corporation
300 Erie Boulevard West, Syracuse 2, N. Y.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

(Signature illegible)
Vice President
October 31, 1960

[fol. 6036] United States Department of Justice

Schedule IV

Niagara Mohawk Power Corporation
300 Erie Boulevard West, Syracuse 2, N. Y.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

(Signature illegible)
Vice President
October 31, 1960.

[fol. 6037] Pennsylvania Power & Light Company
Ninth and Hamilton Streets, Allentown, Pa.

June 16, 1961

Mr. Lee Loevinger
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Attention: Mr. W. Wallace Kirkpatrick
First Assistant
Ref: LL:WWK:CLW
60-0-37-256

Dear Sir:

In reference to your telephone request of June 7, 1961, and your letter dated June 9, 1961, attached are the completed Schedules I & II on which we have included the 1959 figures along with the figures previously reported for 1950 & 1955. Please note that on Schedule II—the figure shown for B-1 for 1955 has been changed to 33 from 37—A typographical error was made on the first report. Schedules III & IV remain the same as reported on October 25, 1960, and are therefore not attached.

Also supplementing our letter to Mr. Robert A. Bicks dated December 14, 1960, regarding the estimated amount of wire used for service drops, the estimate for 1959 is as follows:

	Thousands of Feet		
	Copper	Aluminum	Total
Year 1959	1500	7300	8800

This estimated footage is in addition to the 1959 figure given on the attached Schedule I-B. The approximate ratio of copper wire to aluminum wire used for service drops in 1959 is 17% copper and 83% aluminum.

Very truly yours, P. W. Siekman, Vice President, General Services.

Attachs.

[fol. 6038] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Pennsylvania Power & Light Company
9th & Hamilton Streets, Allentown, Pa.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	50	204	12
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	5	405	71
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)**	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	2,766	1,566	842
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	145	4,688	5,954
3. Copper wire and cable covered and insulated[3]	3,822	4,292	449
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	74	17

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

** Service drops are not included since our records do not show kinds of wire used.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is

P. W. Siekman
Vice President, General Services
June 16, 1961

[fol. 6039] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Pennsylvania Power & Light Company
9th & Hamilton Streets, Allentown, Pa.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper.	11	33	34
2. Aluminum & Aluminum Alloy	—	.1	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

P. W. Siekman
Vice President, General Services
June 16, 1961

[fol. 6040] Pennsylvania Power & Light Company
Ninth and Hamilton Streets, Allentown, Pa.

December 14, 1960

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
U. S. Department of Justice
Washington, D. C.

Attention: Mr. Lellery Fosdick
Ref: RAB:CLW
60-0-37-256

Dear Sir:

This will confirm my telephone conversation of today with Messrs. Samuel Karp and Lellery Fosdick, regarding the estimated amount of wire used for service drops during the years 1950, 1955 and 1958.

	Thousands of Feet		
	Copper	Aluminum	Total
1950	7300	0	7300
1955	3500	5200	8700
1958	1800	7300	9100

These estimates are based on stores issues of the size and type of wire normally used for service drops, and in our opinion are fairly accurate estimates.

In 1950 and prior thereto, nearly all service drops were 100% copper. Sometime after 1950, we started using some aluminum wire for service drops. Gradually its use increased so that in 1958, the approximate ratio was 80% aluminum and 20% copper. We expect this ratio to continue in the future, since our specifications require the use of covered aluminum wire for most new residential construction, and covered copper wire for the heavier type service drops and some connections to old copper distribution lines.

The above estimated footage of wire is in addition to those figures given on Schedule I-B, attached to our letter of November 9, 1960.

Very truly yours, P. W. Siekman, Vice President, General Services.

[fol. 6041] Pennsylvania Power & Light Company
Ninth and Hamilton Streets, Allentown, Pa.

November 9, 1960

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
U. S. Department of Justice
Washington, D. C.

Dear Mr. Bicks:

Attached are the completed schedules I to IV, inclusive, which were returned to us for correction of schedules I & II, on which we inadvertently reported data in feet instead of in thousands of feet.

On October 28, 1960, your Mr. Samuel Karp phoned me and requested information on the following:

1. Our general policy on the use of wire for distribution lines.
2. The reason for the decrease in the use of wire in 1958 as shown on Schedule I.
3. The ratio of copper wire to aluminum wire used for service drops.

On November 2, 1960, I phoned Mr. Karp and gave him the information requested. Attached to Schedule I is a supplemental sheet confirming the information which was passed on to Mr. Karp.

Very truly yours, P. W. Siekman, Vice President, General Services.

Attachs.

[fol. 6042] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Pennsylvania Power & Light Company
Ninth & Hamilton Streets, Allentown, Pennsylvania

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1958*
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	50	204	51
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	5	405	1,209
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)**	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	2,766	1,566	240
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	145	4,688	5,289
3. Copper wire and cable covered and insulated[3]	3,822	4,292	1,170
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	74	2

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

* The data for 1959 will not be available for about eight months.

** Service drops are not included since our records do not show kinds of wire used.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

P. W. Siekman
Vice President, General Services
October 25, 1960

[fol. 6043] Explanatory Notes Regarding Schedule I
As Requested by Mr. Karp on 10/28/60

1. *General Policy on Use of Wire for Distribution Lines*

In 1950 and prior thereto, our Company used copper wire for the majority of distribution lines and services constructed. Sometime after 1950, we started to test the use of aluminum wire. Within a few years it had proved worthwhile so that by 1956 the majority of distribution lines constructed were of aluminum. We switched from copper to aluminum because of economic considerations, inasmuch as aluminum wire is substantially cheaper than equivalent copper wire. Some copper wire is still being used, especially for short extensions to existing copper lines where mechanical reasons indicate that matching is desirable.

2. *Reason for the Decrease in the Use of Wire in 1958*

It has been noted that the total wire (copper and aluminum) used for distribution was less in 1958 than in 1955. The reason for the decrease is that less new line construction and fewer line conversions (converting a line to higher capacity) took place in 1958 than in 1955. It has also been noted that we used less covered aluminum wire in 1958 than we did in 1955 (item B-4 on Schedule I). The reason is that during 1955 we had discontinued the use of single conductor covered aluminum wire for overhead primary distribution lines and had substituted bare wire, except in special cases in trees and near other objects where close clearances exist.

3. *Ratio of Copper Wire to Aluminum Wire used for Service Drops*

Our records do not show this information. However, it is estimated that in 1950 nearly all service drops were copper wire. In 1955, approximately 40% were copper and 60% aluminum wire. In 1958, approxi-

mately 20% were copper and 80% aluminum. We expect the 1958 ratio to continue as our specifications require the use of covered aluminum wire for most new residential construction and covered copper wire for the heavier type service drops.

[fol. 6044] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Pennsylvania Power & Light Company
Ninth & Hamilton Streets, Allentown, Pennsylvania

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1958*
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	11	37	20
2. Aluminum & Aluminum Alloy	—	.1	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

* The data for 1959 will not be available for about eight months.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

P. W. Siekman
Vice President, General Services
October 25, 1960

[fol. 6045] United States Department of Justice

Schedule III

Pennsylvania Power & Light Company
Ninth & Hamilton Streets
Allentown, Pennsylvania

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Transmission Lines

We do not now anticipate any change in the proportion of aluminum to copper which will be used in 1960 or in subsequent years.

Distribution Lines

It is expected that the proportion of aluminum to copper will increase gradually.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions are placed on the use of aluminum conductors for overhead transmission and distribution lines.

P. W. Siekman
Vice President, General Services
October 25, 1960

[fol. 6046] United States Department of Justice

Schedule IV

Pennsylvania Power & Light Company
Ninth & Hamilton Streets
Allentown, Pennsylvania

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Transmission Cable

We do not now anticipate any change in the proportion of aluminum to copper which will be used in 1960 or in subsequent years.

Distribution Cable

It is not expected that there will be any substantial change in the proportion of aluminum to copper used in 1960 or in subsequent years.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions are placed on the use of aluminum conductor for underground cables.

P. W. Siekman
Vice President, General Services
October 25, 1960

[fol. 6047] United States Department of Justice

Schedule I

Gross Additions [1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

West Penn Power Co.
Cabin Hill, Greensburg, Pa.

Type of Overhead Line	Answer in Thousands of Feet [2]		
	1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	1434	18	—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	1323	84	445
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	6641	1110	482
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	4231	2962	4601
3. Copper wire and cable covered and insulated [3]	6863	1885	646
4. Aluminum and aluminum alloy wire and cable covered and insulated [3]	2	3037	3700

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

J. O. Chambers
Vice President-Engineering
October 20, 1960.

[fol. 6048] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

West Penn Power Co.
Cabin Hill, Greensburg, Pa.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	2	—	1
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

J. O. Chambers
Vice President Engineering
October 20, 1960.

[fol. 6049] United States Department of Justice

Schedule III

West Penn Power Co.
Cabin Hill, Greensburg, Pa.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Overhead Conductor Trend

If the present price relationship of copper and aluminum continues, the use of copper will be reduced to about 5% of the total use by 1962.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Limited Use of Aluminum Due to Corrosion

No restriction except for a few isolated areas around coke ovens and gob piles.

J. O. Chambers
Vice President-Engineering
October 20, 1960.

[fol. 6050] United States Department of Justice

Schedule IV

West Penn Power Co.
Cabin Hill, Greensburg, Pa.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Underground Cables Trend

There is no change anticipated to the use of aluminum instead of copper in underground cables at the present time.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Limited Use of Aluminum Due to Corrosion

No plans are made to use aluminum cables because of experience of corrosion in the past.

J. O. Chambers
Vice President-Engineering
October 20, 1960.

[fol. 6051] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Philadelphia Electric Company
1000 Chestnut Street, Philadelphia 5, Pa.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	500	1	5
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	2	222	555
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	9,743	2,099	853
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	14,954	15,167
*3. Copper wire and cable covered and insulated[3]	(Amounts included in B-1, above—See Note)		
*4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	(Amounts included in B-2, above—See Note)		

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

* Note: Records do not show bare and covered wire separately.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

George T. Logan
Statistician
November 1, 1960

[fol. 6052] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Philadelphia Electric Company
1000 Chestnut Street, Philadelphia 5, Pa.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	609	8	178
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	2,595	2,813	1,397
2. Aluminum & Aluminum Alloy	None	None	118

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

George T. Logan
Statistician
November 1, 1960

[fol. 6053] United States Department of Justice

Schedule III

Philadelphia Electric Company
1000 Chestnut Street
Philadelphia 5, Pa.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No change anticipated.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions or limitations.

E. B. Shew
Chief Electrical Engineer
November 1, 1960

[fol. 6054] United States Department of Justice

Schedule IV

Philadelphia Electric Company
1000 Chestnut Street
Philadelphia 5, Pa.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No change anticipated.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Use of aluminum conductor is not limited or restricted except by total in place costs to us.

E. B. Shew
Chief Electrical Engineer
November 1, 1960

[fol. 6055] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Duquesne Light Company
435 Sixth Avenue, Pittsburgh 19, Pa.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	7.0	40.1	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	317.4	0	45.5
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	2776.7	2659.8	2139.7
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	12.1	165.5	592.2
3. Copper wire and cable covered and insulated[3]	3113.2	1070.0	1014.9
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	3975.5	3407.0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

E. H. Hegmann
Controller
October 24, 1960

[fol. 6056] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Duquesne Light Company
435 Sixth Avenue, Pittsburgh 19, Pa.

Type of Underground Cable	Answer in Thousands of Feet[2]		
	1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	163.5	204.1	147.5
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

E. H. Hegmann
Controller
October 24, 1960

[fol. 6057] United States Department of Justice

Schedule III

Duquesne Light Company
435 Sixth Avenue, Pgh. 19, Pa.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

There will be no appreciable change during 1960.

It is expected in 1961 and subsequent years that the proportion of aluminum to copper used in Schedule I (Overhead Lines) will be increased. The expected changes will be made from copper to aluminum on 4160 volt distribution.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We have no restrictions on the use of aluminum conductors for overhead lines.

S. Rosenbach
Electrical Engineer
October 25, 1960

[fol. 6058] United States Department of Justice

Schedule IV

Duquesne Light Company
435 Sixth Avenue, Pgh. 19, Pa.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

We do not expect any increase in the proportion of aluminum to copper used in Schedule II (Underground Cables). We presently use no aluminum in this classification.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We restrict the use of aluminum for underground cables because of space limitations, size of existing ducts, corrosion and soil conditions.

S. Rosenbach
Electrical Engineer
October 25, 1960

[fol. 6059] United States Department of Justice

Schedule I

The Narragansett Electric Company
Providence, R. I.

Gross Additions [1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Type of Overhead Line	Answer in Thousands of Feet [2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	90.0	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	229.5	None
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	*	497.6	517.2
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	*	447.7	582.8
3. Copper wire and cable covered and insulated [3]	*	2,294.1	1,131.1
4. Aluminum and aluminum alloy wire and cable covered and insulated [3]	*	404.7	1,151.4

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

E. G. Queskey
President
November 1, 1960

[fol. 6060] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

The Narragansett Electric Company
Providence, R. I.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	73.2	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	*	155.7	192.6
2. Aluminum & Aluminum Alloy	None	None	None

* Data not available.

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

E. G. Queskey
President
November 1, 1960

[fol. 6061] United States Department of Justice

Schedule III

The Narragansett Electric Company
Providence, R. I.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Copper is the preferred material for overhead lines especially in the distribution plant. Use of aluminum is indicated when the cost of that material is more favorable than that of copper, or when the span length between supporting structures is great enough to require conductors having more mechanical strength than copper. We expect that the proportion of aluminum to copper used will be about constant. In 1961, we plan construction of a transmission line paralleling the one built in 1955, and therefore about 230 M. ft. of aluminum alloy wire will be required in that year.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We do not install aluminum wire within one mile of salt water. Our experience with such installations has been unsatisfactory as to corrosion deterioration.

E. G. Queskey
President
November 1, 1960

[fol. 6061a] United States Department of Justice

Schedule IV

The Narragansett Electric Company
Providence, R. I.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

We have no aluminum in the underground plant, and do not expect to use any in the foreseeable future. Should a major expansion be required where direct-buried cable is indicated or new duct lines are to be built, then the choice between aluminum and copper would be based on cost of material for equal carrying capacity.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

It is unfeasible to install aluminum cables in our existing duct lines as the size of ducts would unduly limit the carrying capacity and the manholes would not accommodate the joints and bends.

E. G. Queskey
President
November 1, 1960

[fol. 6062] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Central Vermont Public Service Corporation
77 Grove Street, Rutland, Vermont

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	51.	377.	1.
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	139.	979.	89.
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	744.	206.	72.
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	895.	1514.	1133.
3. Copper wire and cable covered and insulated[3]	601.	331.	175.
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	89.	173.

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Harold L. Durgin
Executive Vice President
October 26, 1960

[fol. 6063] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Central Vermont Public Service Corporation
77 Grove Street, Rutland, Vermont

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	14.	1.	5.
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Harold L. Durgin
Executive Vice President
October 26, 1960

[fol. 6064] United States Department of Justice

Schedule III

Central Vermont Public Service Corporation
77 Grove Street
Rutland, Vermont

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No significant changes in proportion expected.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

Harold L. Durgin
Executive Vice President
October 26, 1960

[fol. 6065] United States Department of Justice

Schedule IV

Central Vermont Public Service Corporation
77 Grove Street
Rutland, Vermont

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

Harold L. Durgin
Executive Vice President
October 26, 1960

[fol. 6066] United States Department of Justice

Schedule I.

Gross Additions [1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Southside Electric Cooperative, Inc.
Crewe, Virginia

Type of Overhead Line	Answer in Thousands of Feet [2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare			
2. Aluminum and aluminum alloy wire and cable-bare & ACSR			
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	1,255.	677.	627.
2. Aluminum and aluminum alloy wire and cable-bare & ACSR			
3. Copper wire and cable covered and insulated [3]	195.	145.	151.
4. Aluminum and aluminum alloy wire and cable covered and insulated [3]			

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

C. S. Hooper, Jr.
Manager
October 25, 1960

[fol. 6067] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Southside Electric Cooperative, Inc.
Crewe, Virginia

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

C. S. Hooper, Jr.
Manager
October 25, 1960

[fol. 6068] United States Department of Justice

Schedule III

Southside Electric Cooperative, Inc.
Crewe, Virginia

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Since this System was constructed when aluminum was not available, no aluminum will be used unless some transmission lines have to be built.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No Restrictions.

Southside Electric Cooperative, Inc.

C. S. Hooper, Jr.
Manager
October 25, 1960

[fol. 6069] United States Department of Justice

Schedule IV

Southside Electric Cooperative, Inc.
Crewe, Virginia

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Since this System was constructed when aluminum was not available, no aluminum will be used unless some transmission lines have to be built.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No Restrictions.

Southside Electric Cooperative, Inc.

C. S. Hooper, Jr.
Manager
October 25, 1960

[fol. 6070] Virginia Electric and Power Company
Richmond, Virginia

November 21, 1960

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Re: RAB:CLW
60-0-37-256

Dear Mr. Bicks:

This will acknowledge your letter of November 18 referring to ours of October 31, 1960 enclosing completed schedules showing the relative use by Virginia Electric and Power Company of aluminum and copper conductor in new construction and replacement.

With regard to Item 5, Schedule I, B reporting service drops in copper and aluminum combined, would advise that our records do not carry a segregation of service drops as between copper and aluminum but we estimate the proportion to be as follows:

	1950	1955	1959
Copper wire—bare and insulated	45%	35%	4%
Aluminum wire—bare and insulated	55%	65%	96%
	100%	100%	100%

The above estimate is based on the ratio of all copper (bare and insulated) and aluminum (bare and insulated) to the total wire used as conductors in distribution lines in each of the periods indicated. We believe this to be a reasonable basis for estimating the amounts of copper service drops and aluminum service drops used by Virginia Electric and Power Company in the periods mentioned.

Very truly yours,

S. E. Ratcliffe
Treasurer

[fol. 6071] Virginia Electric and Power Company
Richmond 9, Virginia

October 31, 1960

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Re: RAB:CLW
60-0-37-256

Dear Mr. Bicks:

We hand you herewith forms which we have completed showing the relative use by our Company of aluminum and copper conductor for new construction and for replacement.

Should you have any question concerning the information shown on these schedules, will you please let us know.

Very truly yours,

S. E. Ratcliffe
Treasurer

[fol. 6072] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Virginia Electric and Power Company
7th and Franklin Streets, Richmond, Virginia

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955[4]	1959[4]
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	203	30	—0—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	503	2,922	1,276
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	10,914	7,326	570
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	17,475	18,970	14,148
3. Copper wire and cable covered and insulated[3]	5,083	3,095	131
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	521	1,476	2,044
5. Service drops—copper and aluminum—bare and insulated[5]	11,870	11,109	11,959

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

[4] Distribution conductor is for 12-month period ending July 31.

[5] Company's records reflect quantity of services by number of conductors and are not separated between copper and aluminum or between bare and insulated. Total feet estimated on basis of average length of 100 feet per service conductor.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

S. E. Ratcliffe
Treasurer
October 31, 1960

[fol. 6073] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Virginia Electric and Power Company
7th and Franklin Streets, Richmond, Virginia

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955[3]	1959[3]
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	1	—0—	3
2. Aluminum & Aluminum Alloy	—0—	—0—	—0—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	225	466	118
2. Aluminum & Aluminum Alloy	—0—	—0—	—0—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

[3] Distribution conductor is for 12-month period ending July 31.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

S. E. Ratcliffe
Treasurer
October 31, 1960

[fol. 6074] United States Department of Justice

Schedule III

Virginia Electric and Power Company
7th and Franklin Streets
Richmond, Virginia

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Expect a slight increase due to the expectation that growth in areas where aluminum is used will be greater than in areas where copper is used exclusively.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Corrosion by salt water.

S. E. Ratcliffe
Treasurer
October 31, 1960

[fol. 6075] United States Department of Justice

Schedule IV

Virginia Electric and Power Company
7th and Franklin Streets
Richmond, Virginia

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Do not anticipate any change.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We have not used any aluminum underground cable because we do not believe there is sufficient economic advantage.

S. E. Ratcliffe
Treasurer
October 31, 1960

[fol. 6076] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Appalachian Power Company
40 Franklin Road, Roanoke, Va.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	41	29	19
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	1519	310	1771
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	6000	410	24
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	24000	3700	2409
3. Copper wire and cable covered and insulated[3]	1800	753	75
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	7200	6777	7458

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true. Subject to the limitations and qualifications as set forth in my letter of November 1, 1960.

Douglas Tonge
Chief Statistician
November 1, 1960

[fol. 6077] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Appalachian Power Company
40 Franklin Road, Roanoke, Va.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	8	98	2
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true. Subject to the limitations and qualifications as set forth in my letter of November 1, 1960.

Douglas Tonge
Chief Statistician
November 1, 1960

[fol. 6078] United States Department of Justice

Schedule III

Appalachian Power Company
40 Franklin Road, Roanoke, Va.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

None.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Salt water not a problem for this area. ACSR used mostly because of resistance to acid corrosion.

Douglas Tonge
Chief Statistician
November 1, 1960

[fol. 6079] United States Department of Justice

Schedule IV

Appalachian Power Company
40 Franklin Road, Roanoke, Va.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Yes. Its use is restricted because we are not sure of the long range effect of corrosion of aluminum in contact with moisture where a limited supply of oxygen is available. We are hopeful for an answer to this problem within the next 5 years.

Douglas Tonge
Chief Statistician
November 1, 1960

[fol. 6090] Utilities

Region: II Great Lakes

State	Name
Illinois	Commonwealth Edison Co.
Illinois	Norris Electric Coop.
Indiana	Indiana & Michigan Electric Co.
Indiana	Public Service Co. of Indiana Inc.
Kentucky	Louisville Gas & Electric Co.
Kentucky	Warren Rural Electric Coop. Corp.
Michigan	Board of Water & Electric Light Commissioners—Lansing
Michigan	Detroit Edison Co.
Michigan	Consumers Power Co.
Ohio	Cincinnati Gas & Electric Co.
Ohio	Cleveland Department of Light & Power
Ohio	Cleveland Electric Illuminating Co.
Ohio	Ohio Edison Co.
Ohio	Ohio Power Co.
Wisconsin	Wisconsin Electric Power Co.

[fol. 6081] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Commonwealth Edison Company
Chicago 90, Illinois

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	—	—	—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	1,775	1,207	946
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	5,330	10,789	6,206
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	371	4,295	5,131
3. Copper wire and cable covered and insulated[3]	15,187	12,413	5,849
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	11,192	11,237

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The above quantities of copper and aluminum are approximations obtained from summarized data concerning gross additions to utility plant for the years indicated. We believe, however, that the indicated relationships between copper and aluminum are reasonable.

Tom Bohon
Plant Accountant
October 26, 1960

[fol. 6082] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Commonwealth Edison Company
Chicago 90, Illinois

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	435	433	58
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	680	1,150	722
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The above quantities of copper and aluminum are approximations obtained from summarized data concerning gross additions to utility plant for the years indicated. We believe, however, that the indicated relationships between copper and aluminum are reasonable.

Tom Bohon
Plant Accountant
October 26, 1960

[fol. 6083] United States Department of Justice

Schedule III

Commonwealth Edison Company
Chicago 90, Illinois

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Depending on economic trends, the use of aluminum will probably continue to increase with proportionate decline in the use of copper. The increase in aluminum has been made possible by the improvement and standardization in designs and tools for terminal fittings and connectors. Copper to aluminum overhead conductor use ratio changed from approximately 1:1.44 ratio in 1959 to 1:2 ratio in 1960 and is expected to reach 1:3 ratio in 1961.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Aluminum conductor has been restricted in the past due to corrosion preventative construction requirements, non-standardization of terminal fittings and connectors with necessary application tools. With improved alloying of aluminum to higher strengths, the use of copper as a messenger on service entrance cable neutrals will no longer be necessary.

R. B. Gear
Director of Purchases
October 26, 1960

[fol. 6084] United States Department of Justice

Schedule IV

Commonwealth Edison Company
Chicago 90, Illinois

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Currently no increase is expected in use of aluminum for underground cables. A small amount has been used for experiment but its use is limited to direct burial in subdivisions. Until these experiments prove satisfactory, no additional aluminum use is expected.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Aluminum is restricted in general use on underground lines by the following:

1. Space limitations in existing duct lines;
2. Costs are higher than copper, paper and lead;
3. Thermal expansion and contraction results in short life of lead sheaths in manholes.

R. B. Gear
Director of Purchases
October 26, 1960

[fol. 6085] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Norris Electric Cooperative
Newton, Illinois

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare			39.248
2. Aluminum and aluminum alloy wire and cable-bare & ACSR			117.744
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	6,314.196	541.970	254.208
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	—	—
3. Copper wire and cable covered and insulated[3]	537.259	89.418	98.651
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Danny Williams
Manager
October 18, 1960

[fol. 6086] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Norris Electric Cooperative
Newton, Illinois

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	none	none	none
2. Aluminum & Aluminum Alloy	none	none	none
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	none	none	none
2. Aluminum & Aluminum Alloy	none	none	none

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Danny Williams
Manager
October 18, 1960

[fol. 6087] United States Department of Justice

Schedule III

Norris Electric Cooperative
Newton, Illinois

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No change.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions.

Danny Williams
Manager
October 18, 1960

[fol. 6088] United States Department of Justice

Schedule IV

Norris Electric Cooperative
Newton, Illinois

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No change.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Have no underground.

Danny Williams
Manager
October 18, 1960

[fol. 6089] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Indiana & Michigan Elec. Co.
2101 Spy Run Ave., Ft. Wayne, Ind.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	0	34	70
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	2610	1596	830
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	910	210	22
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	3651	1894	2145
3. Copper wire and cable covered and insulated[3]	1200	628	40
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	4800	5648	3971

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true. Subject to the limitations and qualifications as set forth in my letter of November 1, 1960.

Douglas Tonge
Chief Statistician
November 1, 1960

[fol. 6090] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Indiana & Michigan Elec. Co.
2101 Spy Run Ave., Ft. Wayne, Ind.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	7	48	0
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true. Subject to the limitations and qualifications as set forth in my letter of November 1, 1960.

Douglas Tonge
Chief Statistician
November 1, 1960

[fol. 6091] United States Department of Justice

Schedule III

Indiana & Michigan Elec. Co.
2101 Spy Run Ave., Fort Wayne, Ind.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

None.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Salt water not a problem in this area. ACSR used mostly because of resistance to acid corrosion.

Douglas Tonge
Chief Statistician
November 1, 1960

[fol. 6092] United States Department of Justice

Schedule IV

Indiana & Michigan Elec. Co.
2101 Spy Run Ave., Fort Wayne, Ind.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Yes. Its use is restricted because we are not sure of the long range effect of corrosion of aluminum in contact with moisture where a limited supply of oxygen is available. We are hopeful for an answer to this problem within the next 5 years.

Douglas Tonge
Chief Statistician
November 1, 1960

[fol. 6093] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Public Service Company of Indiana, Inc.
1000 East Main Street, Plainfield, Indiana

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	691	306	73
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	1,534	2,811	3,893
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	9,045	6,404	7,059
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	38	138	2,334
3. Copper wire and cable covered and insulated[3]	6,832	7,399	3,377
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	572	2,750

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Earl H. Conway
Vice President & Comptroller
October 28, 1960

[fol. 6094] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Public Service Company of Indiana, Inc.
1000 East Main Street, Plainfield, Indiana

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxxx	xxxxxxxxx	xxxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxxx	xxxxxxxxx	xxxxxxxxx
1. Copper	32	30	6
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Earl H. Conway
Vice President & Comptroller
October 28, 1960

[fol. 6095] United States Department of Justice

Schedule III

Public Service Company of Indiana, Inc.
1000 East Main Street, Plainfield, Indiana

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Schedule I—A. Tranmission Lines

No significant change contemplated in 1960 or the next five (5) years.

Schedule I—B. Distribution Lines

It is expected that in 1960 there will be an increase in the ratio of Aluminum to Copper in both bare and covered wires. This trend will continue as long as the cost of aluminum, aluminum alloys and ACSR is less per pound than copper.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No such restrictions or limitations.

Edwin W. Gue
Vice President—Engineering
October 28, 1960

[fol. 6096] United States Department of Justice

Schedule IV

Public Service Company of Indiana, Inc.
1000 East Main Street, Plainfield, Indiana

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Schedule II—A. & B.

No change contemplated in 1960 or in subsequent years until cost of aluminum cable becomes less than the cost of copper cable having an equivalent current carrying capacity. Resolution of certain technical details will also have a bearing on this matter.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No such restrictions or limitations.

Edwin W. Gue
Vice President—Engineering
October 28, 1960

[fol. 6097] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Louisville Gas and Electric Company
311 W. Chestnut Street, Louisville 2, Ky.

Type of Overhead Line	Answer in Thousands of Feet[2]		
	1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	399	11	50
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	22	—	16
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	574	263	1,447
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	13	—	455
3. Copper wire and cable covered and insulated[3]	1,034	427	348
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	38	18

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

F. W. Jewell
Vice President in Charge of Operation
October 21, 1960

[fol. 6098] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Louisville Gas and Electric Company
311 W. Chestnut Street, Louisville 2, Ky.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	62	14	58
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

F. W. Jewell
Vice President in Charge of Operation
October 21, 1960

[fol. 6099] United States Department of Justice

Schedule III

Louisville Gas and Electric Company
311 West Chestnut Street, Louisville 2, Ky.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Economy of aluminum and its use for new construction indicates a gradual increase in 1960 and subsequent years in the proportion of aluminum to copper used.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Our use of aluminum is restricted because the major portion of our system is copper and we do not normally mix conductors. We do not normally use aluminum where many connections are needed because of connector difficulties.

F. W. Jewell
Vice President in Charge of Operation
October 21, 1960

[fols. 6100-6101] United States Department of Justice

Schedule IV

Louisville Gas and Electric Company
311 West Chestnut Street, Louisville 2, Ky.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No aluminum being used.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No aluminum being used.

F. W. Jewell
Vice President in Charge of Operation
October 21, 1960

[fol. 6102] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Warren Rural Electric Cooperative Corporation
Bowling Green, Kentucky

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	None	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	None	None
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	2,343.3	50.7	55.2
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	523.4	975.4	1,360.0
3. Copper wire and cable covered and insulated[3]	620.7	74.5	41.6
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	X	308.1	354.3

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Chas. M. Stewart
Manager
October 14, 1960

[fol. 6103] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1960, 1955 and 1959

Warren Rural Electric Cooperative Corporation
Bowling Green, Kentucky

Type of Underground Cable	Answer in Thousands of Feet[2]		
	1960	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Chas. M. Stewart
Manager
October 14, 1960

[fol. 6104] United States Department of Justice

Schedule III

Warren Rural Electric Cooperative Corporation
Bowling Green, Kentucky

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No change.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions.

Chas. M. Stewart
Manager
October 14, 1960

[fol. 6105] United States Department of Justice

Schedule IV

Warren Rural Electric Cooperative Corporation
Bowling Green, Kentucky

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

None.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

None.

Chas. M. Stewart
Manager
October 14, 1960

[fol. 6106] Water Light Power Heat
Board of Water and Light
Lansing 3, Michigan

October 20, 1960

United States Department of Justice
Washington, D. C.

Att'n: Mr. Robert A. Bicks,
Assistant Attorney General
Antitrust Division

Re: RAB:CLW
60-0-37-256

Gentlemen:

In response to your letter of October 11th, we are enclosing the information you requested so far as we are able to do so.

Very truly yours,

Board of Water and Light
O. E. Eckert
General Manager

OEE:jt

[fol. 6107] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1960, 1955 and 1950

Board of Water and Light
116 West Ottawa Street, Lansing 3, Michigan

Type of Overhead Line	Answer in Thousands of Feet[2] 1960	1955	1950
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	None in service		
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None in service		
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	2.15	10.75	51.05
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	None	101.30
3. Copper wire and cable covered and insulated[3]	834.34	1145.98	779.55
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	None	12.11	115.37

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

O. E. Eckert
General Manager
October 19, 1960

[fol. 6108] United States Department of Justice

Schedule II

Gross Additions [1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Board of Water and Light
116 West Ottawa Street, Lansing 3, Michigan

Type of Underground Cable	Answer in Thousands of Feet [2]		
	1950	1955	1959
A. Transmission cable	XXXXXXXX	XXXXXXXX	XXXXXXXX
1. Copper	None in service		
2. Aluminum & Aluminum Alloy	None in service		
B. Distribution cable	XXXXXXXX	XXXXXXXX	XXXXXXXX
1. Copper *	212.21	135.55	162.71
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

(*) This total included Street Light Underground Cable in the following amounts:

1950	1955	1959
5.81	53.61	99.57

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

O. E. Eckert
General Manager
October 19, 1960

[fol. 6109] United States Department of Justice

Schedule III

Board of Water and Light
116 West Ottawa Street
Lansing 3, Michigan

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

O. E. Eckert
General Manager
October 19, 1960

[fol. 6110] United States Department of Justice

Schedule IV

Board of Water and Light
116 West Ottawa Street
Lansing 3, Michigan

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Restricted by size of existing ducts.

O. E. Eckert
General Manager
October 19, 1960

TBE/mj

[fol. 6111] The Detroit Edison Company
2000 Second Avenue
Detroit 26, Michigan

May 3, 1961

Miss Edna Lingreen, Attorney
Antitrust Division
United States Department of Justice
Washington, D.C.

Dear Miss Lingreen:

This will confirm our conversation on May 3.

In accordance with your suggestion and in response to the subpoena which was delivered to me, I am enclosing schedules I and II showing our gross additions to overhead and underground conductors of the type on which you requested information.

I understand that by sending these schedules, it will not now be necessary for me to appear in the Federal Building in Detroit on Tuesday, May 9, 1961, and that you will confirm this to me in writing.

Very truly yours,

C. F. Ogden

[fol. 6112] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

The Detroit Edison Company
2000 Second Avenue, Detroit 26, Michigan

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	782	364	489
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	1,239	2,359	924
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	15	99	32
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	4,451	3,504	5,039
3. Copper wire and cable covered and insulated[3]	31,680	10,556	4,594
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	25,929	12,300

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

C. F. Cgden
Vice President
May 3, 1961

[fol. 6113] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

The Detroit Edison Company
2000 Second Avenue, Detroit 26, Michigan

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	XXXXXXXX	XXXXXXXX	XXXXXXXX
1. Copper	558	1,001	475
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	XXXXXXXX	XXXXXXXX	XXXXXXXX
1. Copper	1,019	1,066	500
2. Aluminum & Aluthinum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

C. F. Ogden
Vice President
May 3, 1961

[fol. 6114]

Electric and Gas Service
Consumers Power Company
General Offices - Jackson, Michigan

October 27, 1960

Reference RAB:CAW
60-0-37-256

Mr. Robert A. Bicks
United States Department of Justice
Antitrust Division
Washington, D. C.

Dear Mr. Bicks

Attached are the requested Schedules I, II, III and IV supplying information relative to Consumers Power Company use of aluminum and copper conductor for new construction and replacement.

Yours very truly,

Harold T. Belcher

HTB:fl
Attach.

[fol. 6115] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Consumers Power Company
212 West Michigan Avenue, Jackson, Michigan

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	113.5	286.1	178.6
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	5,246.0	6,362.8	2,479.3
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	502.1	319.5	181.7
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	10,241.9	14,540.2	11,589.4
3. Copper wire and cable covered and insulated[3]	16,235.3	1,455.6	1,332.2
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—0—	17,771.4	14,750.1

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Harold T. Belcher
Director of Purchases and Stores
October 27, 1960

[fol. 6116] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Consumers Power Company
212 West Michigan Avenue, Jackson, Michigan

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	2.2	5.6	—0—
2. Aluminum & Aluminum Alloy	—0—	—0—	—0—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	61.8	52.8	81.1
2. Aluminum & Aluminum Alloy	—0—	—0—	—0—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Harold T. Belcher
Director of Purchases and Stores
October 27, 1960

[fol. 6117] United States Department of Justice

Schedule III

Consumers Power Company
212 West Michigan Avenue
Jackson, Michigan

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Expect proportion of aluminum to increase in future. We now use copper conductor for match-up purposes on multicircuit structures and for replacements. This use will become a smaller percentage in the future as the total line mileage increases. There will be some expansion likely of our present broad use of aluminum for distribution secondaries.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

Harold T. Belcher
Director of Purchases and Stores
October 27, 1960

[fol. 6118] United States Department of Justice

Schedule IV

Consumers Power Company
212 West Michigan Avenue
Jackson, Michigan

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Expect aluminum proportion to increase in future as more buried cable (no duct system) is used on our transmission and distribution systems.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Yes, largely because of sizes of ducts in existing duct runs.

Harold T. Belcher
Director of Purchases and Stores
October 27, 1960

[fol. 6119] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

The Cincinnati Gas & Electric Company & Subsidiaries
Cincinnati, Ohio

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	110.7	12.7	5.4
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	99.0	624.7	154.6
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	1400.7	2157.9	1313.0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	198.0	380.0	618.7
3. Copper wire and cable covered and insulated[3]	8432.5	7651.5	11460.8
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	.0	157.5	233.8

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

E. S. Fields
President
October 24, 1960

[fol. 6120] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

The Cincinnati Gas & Electric Company & Subsidiaries
Cincinnati, Ohio

Type of Underground Cable	Answer in Thousands of Feet[2]		
	1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	.0	.0	3.7
2. Aluminum & Aluminum Alloy	.0	.0	.0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	399.2	498.2	500.4
2. Aluminum & Aluminum Alloy	.0	.0	.0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

E. S. Fields
President
October 24, 1960

[fol. 6121] United States Department of Justice

Schedule III

The Cincinnati Gas & Electric Company & Subsidiaries
Cincinnati, Ohio

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

We are using aluminum exclusively for service drops in 1960 so that item B4 will be increased in the amount of 5,000,000 feet and B3 will be reduced by this amount.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We limit the use of aluminum conductor to applications that do not require a large number of tapped connections.

E. S. Fields
President
October 24, 1960

[fol. 6122] United States Department of Justice

Schedule IV

The Cincinnati Gas & Electric Company & Subsidiaries
Cincinnati, Ohio

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We do not use underground construction extensively except in high load density areas where duct sizes limit us to the use of copper.

E. S. Fields
President
October 24, 1960

[fol. 6123]

City of Cleveland
Department of Public Utilities
Division of Utilities Engineering

Sixth Floor, Lincoln Building
Cleveland 14, Ohio

November 21, 1960

Mr. Robert A. Bicks,
Assistant Attorney General
Antitrust Division
U. S. Department of Justice
Washington 25, D.C.

Ref: RAB:CLW
60-0-37-256

Dear Sir:

Your letter of November 16, 1960 was forwarded to this office. We wish to state that up until the last two (2) years, the Division of Light and Power has been using copper for both underground and overhead circuits. For 1961 we intend to use more aluminum than ever for the overhead circuits. The underground circuits will remain in copper.

We are budgeting for the following aluminum and copper wire quantities for 1961:

Quant.	*Description*
33,000′	#4 ACSR—W.P.—Neo/Poly
25,000′	#2 ACSR—W.P.—Neo/Poly
25,000′	1/0 ACSR—W.P.—Neo/Poly
3,000′	3/0 ACSR—W.P.—Neo/Poly
20,000′	366.4 ACSR Bare
100,000′	#4 Al—Str W.P.—Neo/Poly
50,000′	#4 Al—Str Bare
25,000′	#2—Al—Str W.P.—Neo/Poly
25,000′	#2—Al—Str Bare
50,000′	1/0 Al—Str W.P. Neo/Poly
75,000′	#6 Cu, Sol H.D. W.P. Neo/Poly
25,000′	#4 Cu, Sol H.D. W.P. Neo/Poly

[fol. 6124]

Quant.	*Description*
25,000′	#2 Cu, Sol., H.D. W.P. Neo/Poly
5,000′	1/0 Cu, Str. S.D. W.P. Neo/Poly
30,000′	4/0 Cu, Str. S.D. W.P. Neo/Poly
200,000′	Triplex, Poly, Bare Al Neut. #4
50,000′	Triplex, Poly, Bare Al Neut. #2
20,000′	Triplex, Poly, Bare Al Neut. #1/0

Very truly yours,

George C. Paraskeva
Chief Electrical Engr.
622 Lincoln Bldg.
E. 6th & St. Clair Ave.
Cleveland 14, Ohio

GCP/el

[fol. 6125] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

The Cleveland Electric Illuminating Company
55 Public Square

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	289.3	346.9	337.4
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	.0	2,672.1	2,447.4
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	.0	.0	1,133.1
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	.0	.0	467.5
3. Copper wire and cable covered and insulated[3]	11,097.9	10,851.3	1,181.6
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	.0	1,770.3	8,066.4

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

M. S. Shane
Manager, Costs & Record Department
October 26, 1960

[fol. 6126] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

The Cleveland Electric Illuminating Company
55 Public Square

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	328.4	461.3	562.7
2. Aluminum & Aluminum Alloy	.0	.0	.0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	741.1	300.3	266.7
2. Aluminum & Aluminum Alloy	.0	.0	.0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

M. S. Shane
Manager, Costs & Record Department
October 26, 1960

[fol. 6127] United States Department of Justice

Schedule III

The Cleveland Electric Illuminating Company
55 Public Square

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

There are so many factors that must be considered it would be impossible to forecast whether or not any future change would be made in present practice.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

Harold L. Williams
Manager, Trans. & Dist. Engrg. Dept.
October 26, 1960

[fol. 6128] United States Department of Justice

Schedule IV

The Cleveland Electric Illuminating Company
55 Public Square

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

This company does not currently use aluminum conductors for underground installations. There are so many factors that must be considered that it would be impossible to forecast whether or not any future changes in this practice would be made.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

This company does not currently use aluminum conductors for underground installations.

Harold L. Williams
Manager, Trans. & Dist. Engrg. Dept.
October 26, 1960

[fol. 6129] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1960, 1955 and 1959

Ohio Edison Company
47 North Main St., Akron 8, Ohio

Type of Overhead Line	Answer in Thousands of Feet[2] 1960	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	176	176	84
Copperweld wire	109	36	19
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	814	2,655	8,709
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	1,791	658	597
Copperweld wire	25,301	4,343	1,471
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	2,848	34,360	14,531
3. Copper wire and cable covered and insulated[3]	13,431	2,540	783
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	63	9,545

See Note Below

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

Note: Data with respect to the quantity of conductors of each classification shown above used in connection with maintenance are not readily available from the books and records of the company. To compile such data from such books and records would require a detailed analysis of all stores requisitions for each of the three years and would considerably delay the completion of this questionnaire; also would entail considerable effort and expense. It is estimated that the quantities of the respective subject conductors used in connection with maintenance in each of the years indicated above were of minor significance.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Otto Brunenmeister, Jr.
Vice President
November 18, 1960

[fol. 6130] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Ohio Edison Company
47 North Main St., Akron 8, Ohio

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	1	34	5
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	226	369	234
2. Aluminum & Aluminum Alloy	—	—	—

See Note on Sched. I

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Otto Brunenmeister, Jr.
Vice President
November 18, 1960

[fol. 6131] United States Department of Justice

Schedule III

Ohio Edison Company
47 North Main St., Akron 8, Ohio

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

We do not expect any increase or decrease in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines) in 1960 or subsequent years.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We do not restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals. We do not use insulated aluminum conductors for secondary overhead lines (600 volts and below) larger than #2 copper equivalent because of the bulk of these larger size insulated aluminum conductors.

Otto Brunenmeister, Jr.
Vice President
November 18, 1960

[fol. 6132] United States Department of Justice

Schedule IV

Ohio Edison Company
47 North Main St., Akron 8, Ohio

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

We do not expect any increase or decrease in 1960 or subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables).

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We do restrict the use of aluminum conductors for underground cables because of space limitations, size of existing ducts, connector problems and cost.

Otto Brunenmeister, Jr.
Vice President
November 18, 1960

[fol. 6133] United States Department of Justice

Schedule I

Gross Additions [1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1960, 1955 and 1959

Ohio Power Company
301 Cleveland Ave., S.W., Canton, Ohio

Type of Overhead Line	Answer in Thousands of Feet [2] 1960	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	9	253	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	669	6717	700
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	822	284	37
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	3295	2552	3708
3. Copper wire and cable covered and insulated [3]	1500	760	66
4. Aluminum and aluminum alloy wire and cable covered and insulated [3]	6000	6840	6582

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true. Subject to the limitations and qualifications as set forth in my letter of November 1, 1960.

Douglas Junge
Chief Statistician
November 1, 1960

[fol. 6134] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Ohio Power Company
301 Cleveland Ave., S.W., Canton, Ohio

Type of Underground Cable	Answer in Thousands of Feet[2]		
	1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	1.3	58	2.4
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true. Subject to the limtiations and qualifications as set forth in my letter of November 1, 1960.

Douglas Junge
Chief Statistician
November 1, 1960

[fol. 6135] United States Department of Justice

Schedule III

Ohio Power Company
301 Cleveland Ave., S.W., Canton, Ohio

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

None.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Salt water not a problem for this area. ACSR used mostly because of resistance to acid corrosion.

Douglas Junge
Chief Statistician
November 1, 1960

[fol. 6136] United States Department of Justice

Schedule IV

Ohio Power Company
301 Cleveland Ave., S.W., Canton, Ohio

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Yes. Its use is restricted because we are not sure of the long range effect of corrosion of aluminum in contact with moisture where a limited supply of oxygen is available. We are hopeful for an answer to this problem within the next 5 years.

Douglas Junge
Chief Statistician
November 1, 1960

[fol. 6137] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Wisconsin Electric Power Company
231 W. Michigan Street, Milwaukee 1, Wisconsin

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	223	124	—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	616	951	2,055
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	1,434	4,231	1,810
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	687	1,722	1,661
3. Copper wire and cable covered and insulated[3]	9,857	9,536	4,329
4. Aluminum and aluminum alloy wire and cable covered and insulated[4]	—	6,193	12,265

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Alfred Gruhl
Executive Vice President
October 31, 1960

[fol. 6138] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Wisconsin Electric Power Company
231 W. Michigan Street, Milwaukee 1, Wisconsin

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	193	362	474
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	419	507	247
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Alfred Gruhl
Executive Vice President
October 31, 1960

[fol. 6139] United States Department of Justice

Schedule III

Wisconsin Electric Power Company
231 W. Michigan Street
Milwaukee 1, Wisconsin

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

It is expected that the proportion of aluminum conductor used for overhead lines will continue high in 1960. This will probably also be true for subsequent years unless there are price changes which would again favor copper.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

The use of aluminum conductor is not restricted in this company's area because of salt water or other corrosion problems.

Alfred Gruhl
Executive Vice President
October 31, 1960

[fol. 6140] United States Department of Justice

Schedule IV

Wisconsin Electric Power Company
231 W. Michigan Street
Milwaukee 1, Wisconsin

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

It is not expected that there will be any change in the use of copper for underground conductor in 1960 or in subsequent years unless price differentials change substantially.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Space limitations in existing ducts and manholes are a definite factor limiting the use of aluminum conductor.

Alfred Gruhl
Executive Vice President
October 31, 1960

[fol. 6141] Utilities

Region III North Central

State	Name
Iowa	Iowa Power & Light Co.
Kansas	Board of Public Utilities—Kansas City
Kansas	Kansas Gas & Electric Co.
Kansas	Kansas Power & Light Co.
Minn.	Lake Region Co-op Electric Association
Minn.	Northern States Power Co.
Missouri	Kansas City Power & Light Co.
Missouri	Union Electric Co.
Nebraska	———
North Dakota	Nodak Rural Electric Coop Inc.
North Dakota	Otter Tail Power Co.
North Dakota	Montana-Dakota Utilities Co.
South Dakota	Black Hills Power & Light Co.

[fol. 6142] United States Department of Justice

Schedule I

Gross Additions [1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Iowa Power and Light Company
823 Walnut Street

Type of Overhead Line	Answer in Thousands of Feet [2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	18.9	—	—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	—	—
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	332.7	605.7	56.6
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	92.7	18.0	1387.2
3. Copper wire and cable covered and insulated [3]	2176.1	1786.1	963.5
4. Aluminum and aluminum alloy wire and cable covered and insulated [3]	18.3	83.0	390.1

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

H. G. Hally
Engr. in Charge Trans. & Distr.
October 31, 1960

[fol. 6143] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Iowa Power and Light Company
823 Walnut Street

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	66.2	53.6	30.2
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

H. G. Hally
Engr. in Charge Trans. & Distr.
October 31, 1960

[fol. 6144] United States Department of Justice

Schedule III

Iowa Power and Light Company
823 Walnut Street 3, Des Moines, Iowa

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

The proportion of aluminum to copper should remain about the same.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions.

H. G. Hally
Engr. in Charge Trans. & Distr.
October 31, 1960

[fol. 6145] United States Department of Justice

Schedule IV

Iowa Power and Light Company
823 Walnut Street, Des Moines, Iowa

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No change.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions—However the added expense for duct space and insulation have not encouraged us to use aluminum.

H. G. Hally
Engr. in Charge Trans. & Distr.
October 31, 1960

[fol. 6146] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Board of Public Utilities
City Hall, Kansas City 1, Kansas

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	—	—	—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	—	178.6
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	59.8	251.9	363.4
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	47.1	62.2
3. Copper wire and cable covered and insulated[3]	656.1	970.5	558.1
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	—	56.5

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. J. Duvall
Manager of Production and Distribution
November 9, 1960

[fol. 6147] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Board of Public Utilities
City Hall, Kansas City 1, Kansas

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	117.2	49.0	37.0
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. J. Duvall
Manager of Production and Distribution
November 9, 1960

[fol. 6148] United States Department of Justice

Schedule III

Board of Public Utilities
City Hall, Kansas City 1, Kansas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No appreciable increase anticipated.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No limiting conditions.

R. J. Duvall
Manager of Production and Distribution
November 9, 1960

[fol. 6149] United States Department of Justice

Schedule IV

Board of Public Utilities
City Hall, Kansas City 1, Kansas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No changes planned.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions or limitations.

R. J. Duvall
Manager of Production and Distribution
November 9, 1960

[fol. 6150] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Kansas Gas and Electric Company
P. O. Box 208, Wichita 1, Kansas

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	199.98	—	7.33
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	425.86	945.77	34.56
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	6,430.12	3,460.32	950.27
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	402.00	3,268.33	1,812.63
3. Copper wire and cable covered and insulated[3]	6901.5	40	550
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	3645	2245

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

Quantities in total are quite accurate; breakdown between Transmission and Distribution is necessarily estimated.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

S. J. Sickel
Vice President—Operations
December 12, 1960

[fol. 6151] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1960, 1955 and 1959

Kansas Gas and Electric Company
P. O. Box 208, Wichita 1, Kansas

Type of Overhead Line	Answer in Thousands of Feet[2] 1960	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	199.98	—	7.33
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	425.86	945.77	34.56
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	6430.12	3460.32	950.27
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	402.00	3268.33	1812.63
3. Copper wire and cable covered and insulated[3]	negligible	negligible	negligible
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	negligible	negligible	negligible

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

Quantities in total are quite accurate; breakdown between transmission and distribution is necessarily estimated.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

S. J. Sickel
Vice President—Operations
December 2, 1960

[fol. 6152] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Kansas Gas and Electric Company
P. O. Box 208, Wichita 1, Kansas

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	7.97	10.55	11.51
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

S. J. Sickel
Vice President—Operations
December 2, 1960

[fol. 6153] United States Department of Justice

Schedule III

Kansas Gas and Electric Company
P.O. Box 208, Wichita 1, Kansas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Expect 1959 proportion will generally apply in future, unless relative costs change substantially.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No problem hence no limitations.

S. J. Sickel
Vice President—Operations
December 2, 1960

[fol. 6154] United States Department of Justice

Schedule IV

Kansas Gas and Electric Company
P.O. Box 208, Wichita 1, Kansas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No change anticipated unless relative costs change substantially.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions.

S. J. Sickel
Vice President—Operations
December 2, 1960

[fol. 6155] The Kansas Power and Light Company
800 Kansas Avenue
Topeka, Kansas

December 13, 1960.

Mr. Robert A. Bicks,
Assistant Attorney General,
Antitrust Division,
United States Department of Justice,
Washington, D.C.

Dear Mr. Bicks: Re: RAB:CLW
60-0-37-256

At your request, we have prepared revised Schedule I to show estimated feet in place of pounds of wire in the various categories of distribution lines. It is enclosed herewith together with Schedules II to IV, inclusive, which we have re-executed under current date on forms supplied by you with your letter of December 6, 1960.

Very truly yours,

Balfour S. Jeffry,
President.

[fol. 6156] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for each of the Years 1950, 1955 and 1959[4]

The Kansas Power and Light Company
800 Kansas Avenue, Topeka, Kansas

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare[4]	806	408	8
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	152	1256	604
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)[3]	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare[4]	8951	1306	346
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	212	71	1247
3. Copper wire and cable covered and insulated[5, 4]	2936	1059	281
4. Aluminum and aluminum alloy wire and cable covered and insulated[5]	60	22	371

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

[4] Includes Copperweld.

[5] Estimated (See below)*

[6] Revised Report.

* Because records are kept primarily on the basis of pounds, the indicated figures are estimated on the basis of feet per pound for the type of wire used in each category.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Balfour S. Jeffry
President
December 13, 1960

[fol. 6157] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1960, 1955 and 1959

The Kansas Power and Light Company
800 Kansas Avenue, Topeka, Kansas

Type of Underground Cable	Answer in Thousands of Feet[2] 1960	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper			
2. Aluminum & Aluminum Alloy			
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	4	4	5
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Balfour S. Jeffry
President
December 13, 1960

[fol. 6158] United States Department of Justice

Schedule III

The Kansas Power and Light Company
800 Kansas Avenue
Topeka, Kansas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No, not appreciably. Decisions, however are made on the basis of relative costs and particular job requirements.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

Balfour S. Jeffry
President
December 13, 1960

[fol. 6159] United States Department of Justice

Schedule IV

The Kansas Power and Light Company
800 Kansas Avenue
Topeka, Kansas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Probably not, because of present superior qualities of copper.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Yes, for reasons of corrosion and size.

Balfour S. Jeffry
President
December 13, 1960

[fols. 6160-6161] United States Department of Justice

Schedule I

Gross Additions [1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

The Kansas Power and Light Company
800 Kansas Avenue, Topeka, Kansas
See Attached Sheet

Type of Overhead Line	Answer in Thousands of Feet [2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare [4]			
2. Aluminum and aluminum alloy wire and cable-bare & ACSR [4]			
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare [4]			
2. Aluminum and aluminum alloy wire and cable-bare & ACSR [4]			
3. Copper wire and cable covered and insulated [3, 4]			
4. Aluminum and aluminum alloy wire and cable covered and insulated [3, 4]			

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

[4] Company statistics are not maintained which would enable us to readily furnish data in above categories. On an attached sheet are shown all types of conductor in M-ft. and conductors by metal in M-lbs.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Balfour S. Jeffry
President
October 20, 1960

[fol. 6162] **Schedule I**

Gross Additions of Overhead Electrical Conductor to Electric Utility Plant for each of the Years 1950, 1955 and 1959.

The Kansas Power and Light Company
800 Kansas Avenue, Topeka, Kansas

	1950	1955	1959
A. Transmission Lines			
1 & 2 All types of conductors in thousands of feet	273	508	201
Conductor in thousands of pounds by kind			
Copper	31	10	2
Copperweld	193	37	1
Aluminum	7	736	12
B. Distribution Lines			
1-4 All types of conductor in thousands of feet	12,159	2,458	2,245
Conductor in thousands of pounds by kind			
Copper	425	320	77
Copperweld	612	173	41
Aluminum	21	150	235

[fol. 6163] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

The Kansas Power and Light Company
800 Kansas Avenue, Topeka, Kansas

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	4	4	5
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Balfour S. Jeffry
President
October 20, 1960

[fol. 6164] United States Department of Justice

Schednle III

The Kansas Power and Light Company
800 Kansas Avenue
Topeka, Kansas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No, not appreciably. Decisions, however are made on the basis of relative costs and particular job requirements.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

Balfour S. Jeffry
President
October 20, 1960

[fol. 6165] United States Department of Justice

Schedule IV

The Kansas Power and Light Company
800 Kansas Avenue
Topeka, Kansas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Probably not, because of present superior qualities of copper.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Yes, for reasons of corrosion and size.

Balfour S. Jeffry
President
October 20, 1960

[fol. 6166] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Lake Region Co-op. Electric Ass'n.
Pelican Rapids, Minnesota

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	—0—	—0—	—0—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	316.8	—0—	—0—
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	—0—	—0—	—0—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	2,275.6	528.0	372.5
3. Copper wire and cable covered and insulated[3]	227	—0—	—0—
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—0—	37.5	52.5

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Clarence W. Peterson
Manager
October 25, 1960

[fol. 6167] United States Department of Justice

Schedule III

Lake Region Co-op Electrical Ass'n.
Pelican Rapids, Minnesota

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No increase is contemplated primarily because we now use aluminum extensively.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No limitations placed on the use of aluminum. Experience with aluminum conductors has been very favorable, in fact, mechanically it has proven more favorable than copper.

Clarence W. Peterson
Manager
October 25, 1960

[fol. 6168] Northern States Power Company
Minneapolis 2, Minnesota

October 31, 1960

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D.C.

Dear Mr. Bicks: Subject: RAB:CLW
60-0-37-256

In response to your request of October 11th, we are attaching data with respect to our use of aluminum and copper conductor for calendar years 1950-1955 and 1959 and answers to the other questions included in the questionnaire attached thereto. This data relates to our Northern States Power Co. (Minn.) operations.

The figures, as to transmission and distribution overhead and underground lines, have been developed from our statistical and property records. Considering the fact that it would not be possible to produce actual quantities of service wire subdivided between copper and aluminum and an actual count of the number of 2 wire versus 3 wire services, for the three years under consideration within the time allotted, we have calculated these quantities based on an estimate as outlined in note (a) on the questionnaire.

We trust that you will find our figures compiled as above indicated entirely satisfactory and acceptable for your purpose.

Very truly yours, A. H. Hamilton, Manager of Purchasing.

AHHamilton:mm

[fol. 6169] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Northern States Power Co. (Minn.)
Minneapolis 2, Minnesota

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	89	136	44
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	1216	4609	1671
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	2976	1227	406
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	788	2420	4395
3. Copper wire and cable covered and insulated[3]	7110(a)	4554(a)	1228(a)
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	3524(a)	5242(a)	8734(a)

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

Note (a) Total includes estimated quantity of service conductor (at average length of 77 ft) as follows:

1950 Actual number of services 20422—30% Copper 70% aluminum
1955 Actual number of services 21653— 5% Copper 95% aluminum
1959 Actual number of services 23027— 5% Copper 95% aluminum

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true. See exception as per note (a).

A. H. Hamilton
Manager of Purchasing
October 31, 1960

[fol. 6170] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Northern States Power Co. (Minn.)
Minneapolis 2, Minnesota

Type of Underground Cable	Answer in Thousands of Feet[2]		
	1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	18	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	266	487	97
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

A. H. Hamilton
Manager of Purchasing
October 31, 1960

[fol. 6171] United States Department of Justice

Schedule III

Northern States Power Co. (Minn.)
Minneapolis 2, Minnesota

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No change expected.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restriction or limitation on the use of aluminum.

A. H. Hamilton
Manager of Purchasing
October 31, 1960

[fol. 6172] United States Department of Justice

Schedule IV

Northern States Power Co. (Minn.)
Minneapolis 2, Minnesota

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No change expected.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

The use of aluminum conductor for underground cables is limited because of size of existing ducts.

A. H. Hamilton
Manager of Purchasing
October 31, 1960

[fol. 6172a] Kansas City Power & Light Company
1330 Baltimore Avenue
Kansas City 41, Missouri

October 20, 1960

Mr. Robert A. Bicks
Asst. Attorney General
United States Department of Justice
Washington, D. C.

RE: 60-0-37-256

Dear Mr. Bicks:

At the request of Mr. R. B. Harman of the Federal Bureau of Investigation we are attaching four schedules covering information concerning the relative use of aluminum and copper conductor in our company.

In preparing this data it was necessary for us to make some assumptions with respect to minor items such as our service drops and street light standards but in our opinion the assumptions we made would not influence the total picture.

Yours very truly, R. O. Linville.

ROL:mn
attach.

cc: Mr. R. B. Harman
Federal Bureau of Investigation
Box 2449
Kansas City, Missouri
Mr. R. A. Olson

[fol. 6173] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Kansas City Power & Light Company
1330 Baltimore Avenue, Kansas City, Missouri

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	108	10	38
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	42	370	212
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	2,463	1,515	477
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	238	3,592	2,012
3. Copper wire and cable covered and insulated[3]	2,919	2,082	394
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	2,475	5,854	4,743

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. O. Linville
Controller
October 20, 1960

[fol. 6174] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Kansas City Power & Light Company
1330 Baltimore Avenue, Kansas City, Missouri

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	43
2. Aluminum & Aluminum Alloy			
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	557	369	338
2. Aluminum & Aluminum Alloy			

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. O. Linville
Controller
October 20, 1960

[fol. 6175] United States Department of Justice

Schedule III

Kansas City Power & Light Company
1330 Baltimore Avenue
Kansas City, Missouri

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

The company is using substantially all aluminum conductor for its overhead lines at the present time. We do not contemplate any change in this arrangement.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We have no restrictions concerning the limits for the use of aluminum conductor because of corrosion or other reasons.

R. O. Linville
Controller
October 20, 1960

[fol. 6176] United States Department of Justice

Schedule IV

Kansas City Power & Light Company
1330 Baltimore Avenue
Kansas City, Missouri

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

The company is using copper conductor entirely in its underground system except in a few minor experimental areas. We do not contemplate any change in this program in the near future.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We have no restrictions on the use of aluminum conductor for underground cable except the normal economic restrictions that have existed for some time.

R. O. Linville
Controller
October 20, 1960

[fol. 6177] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Union Electric Company
St. Louis, Missouri

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	520	5	—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	178	1,081	2,535
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	3,014	3,573	2,251
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	3,460	3,438	4,579
3. Copper wire and cable covered and insulated[3]	10,421	7,761	5,223
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	75	4,384	5,576

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

M. B. Covell
Superintendent of Supply Service
November 10, 1960

[fol. 6178] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Union Electric Company
St. Louis, Missouri

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	XXXXXXXX	XXXXXXXX	XXXXXXXX
1. Copper	16	7	9
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	XXXXXXXX	XXXXXXXX	XXXXXXXX
1. Copper	570	549	570
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

M. B. Covell
Superintendent of Supply Service
November 10, 1960

[fol. 6179] United States Department of Justice

Schedule III

Union Electric Company
St. Louis, Missouri

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

We do not anticipate any significant change in the proportion of aluminum to copper to be purchased for use in the classification of Schedule I (Overhead Lines). Our selection of the appropriate metal for several years has been premised on the relative installed economy of the two types of conductors of comparable capacity.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We have no current restrictions or limitations on the use of aluminum conductors for overhead lines because of corrosion. Problems were experienced with connectors in the early years of use several years ago but developments subsequently overcame these difficulties.

M. B. Covell
Superintendent of Supply Service
November 10, 1960

[fol. 6180] United States Department of Justice

Schedule IV

Union Electric Company
St. Louis, Missouri

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No comments. See "B" below.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We have not found it economical to utilize aluminum conductors for underground applications. The relative size of the aluminum conductor of comparable carrying capacity to copper appears to preclude any possible use for underground applications as this element substantially effects the total cost of installed circuits of comparable load carrying capacity.

M. B. Covell
Superintendent of Supply Service
November 10, 1960

[fol. 6181] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Nodak Rural Electric Cooperative, Inc.
Grand Forks, North Dakota

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare			
2. Aluminum and aluminum alloy wire and cable-bare & ACSR			
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare		690	403
2. Aluminum and aluminum alloy wire and cable-bare & ACSR		642	306
3. Copper wire and cable covered and insulated[3]		108	119
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]		—0—	44

[2] Detailed records not available.

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

James F. Coleman
Manager
October 27, 1960

[fol. 6182] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Nodak Rural Electric Cooperative, Inc.
Grand Forks, North Dakota

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper			
2. Aluminum & Aluminum Alloy			
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper			
2. Aluminum & Aluminum Alloy		—0—	1

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

James F. Coleman
Manager
October 27, 1960

[fol. 6183] United States Department of Justice

Schedule III

Nodak Rural Electric Cooperative, Inc.
Grand Forks, North Dakota

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

If prices between copper and aluminum remain on the present ratio, we anticipate that future construction on our overhead main multiphase line will consist almost entirely of aluminum ACSR conductor. Most of the anticipated system improvements will be in the larger sizes of conductor (1/0, 2/0, and 3/0). The construction economics are highly favorable toward aluminum in these sizes.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We do not incur salt water conditions in this area; however, do find at substation locations serving chemical installations, copper seems more resistant to corrosion.

James F. Coleman
Manager
October 27, 1960

[fol. 6184] United States Department of Justice

Schedule IV

Nodak Rural Electric Cooperative, Inc.
Grand Forks, North Dakota

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Due to the small amount of underground cable used in our operations, our anticipated use would be almost exclusively copper.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Due to the small amount of underground cable used in our operations, our anticipated use would be almost exclusively copper. Copper underground cable preferred on small quantity basis because of space limitations in ducts and greater resistance, due to soil conditions.

James F. Coleman
Manager
October 27, 1960

[fol. 6185] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Otter Tail Power Company
Fergus Falls, Minnesota

Type of Overhead Line	Answer in Thousands of Feet[2]		
	1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	235	9	559
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	4,114	3,223	2,560
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	533	355	705
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	554	717	420
3. Copper wire and cable covered and insulated[3]	1,832	723	437
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	373	1,457	2,397

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

[4] All of our accounting records indicate conductors in pounds. We have used an average weight per foot conversion factor in each classification to give you the information requested.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Wannler Nye
Vice President
October 20, 1960

[fol. 6186] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Otter Tail Power Company
Fergus Falls, Minnesota

Type of Underground Cable	Answer in Thousands of Feet[2]		
	1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Wannler Nye
Vice President
October 20, 1960

[fol. 6187] United States Department of Justice

Schedule III

Otter Tail Power Company
Fergus Falls, Minnesota

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

None of the copper used in the years shown represents new purchases, except a portion of item B-3. We will continue to use the copper we now have on the system as it becomes available from salvaging and reconductoring operations.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

Wannler Nye
Vice President
October 20, 1960

[fol. 6188] United States Department of Justice

Schedule IV

Otter Tail Power Company
Fergus Falls, Minnesota

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

We have used no underground cable and do not anticipate future usage at this time.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

Wannler Nye
Vice President
October 20, 1960

[fol. 6188a] Montana-Dakota Utilities Co.
Montana-Dakota Utilities Bldg.
831 Second Avenue South
Minneapolis 2

October 31, 1960

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Your File 60-0-37-256

Dear Sir:

As requested in your letter of October 11, 1960, to Mr. C. W. Smith, we enclose our data as to relative use of aluminum and copper conductor during the years 1950, 1955, and 1959.

Due to the widespread nature of our operations, it is impossible to state, within the time limit imposed on our reply, the footage of conductor actually installed. We have, therefore, shown the amounts received from suppliers during the years shown. The distortion of the relative amounts of aluminum and copper resulting from this substitution should be negligible.

Very truly yours, H. L. Pearson, Assistant Vice President.

HLP:L
Enc.
cc Mr. A. F. Anderson—Office

[fol. 6189] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Montana-Dakota Utilities Co.
831 Second Avenue South, Minneapolis 2, Minnesota

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	None	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	217	5082	2636
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	353	181	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	None	None
3. Copper wire and cable covered and insulated[3]	2440	197	None
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	None	1282	586

[1] Electrical conductor received for new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

H. L. Pearson
Assistant Vice President
October 31, 1960

[fol. 6190] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Montana-Dakota Utilities Co.
831 Second Avenue South, Minneapolis 2, Minnesota

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

H. L. Pearson
Assistant Vice President
October 31, 1960

[fol. 6191] United States Department of Justice

Schedule III

Montana-Dakota Utilities Co.
831 Second Avenue South
Minneapolis 2, Minnesota

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No changes foreseen.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions except in minor isolated instances.

H. L. Pearson
Assistant Vice President
October 31, 1960

[fol. 6192] United States Department of Justice

Schedule IV

Montana-Dakota Utilities Co.
831 Second Avenue South
Minneapolis 2, Minnesota

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No underground system.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

H. L. Pearson
Assistant Vice President
October 31, 1960

[fol. 6193] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Black Hills Power and Light Company
P. O. Box 1951, Rapid City, South Dakota

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	328.4	58.3	41.1
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	555.0	278.1
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	434.6	165.4	37.2
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	501.8	823.5
3. Copper wire and cable covered and insulated[3]	972.2	352.7	22.9
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	470.3	622.8

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Robert G. Asheim
Vice President–Operations
October 28, 1960

[fol. 6194] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Black Hills Power and Light Company
P. O. Box 1951, Rapid City, South Dakota

Type of Underground Cable We have no underground.	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction, and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Robert G. Asheim
Vice President–Operations
October 28, 1960

[fol. 6195] United States Department of Justice

Schedule III

Black Hills Power and Light Company
P. O. Box 1951, Rapid City, South Dakota

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

We will be using aluminum and ACSR exclusively in the future, except when retired conductor is reusable.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions.

Robert G. Asheim
Vice President–Operations
October 28, 1960

[fol. 6196] United States Department of Justice

Schedule IV

Black Hills Power and Light Company
P. O. Box 1951, Rapid City, South Dakota

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

We have no underground now; however if the demand for underground should develop, we will make a decision at that time.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions or limitations because we have no underground.

Robert G. Asheim
Vice President–Operations
October 28, 1960

[fol. 6197] UNITED STATES DISTRICT COURT

Schedules Prepared by Electric Utilities Showing Use of Copper and Aluminum Conductor

Regions IV, V, VI and VII

[fol. 6198] Utilities

Region: IV Northwestern

State	Name
Idaho	Idaho Power Co.
Montana	Fergus Electric Coop. Inc.
Montana	Montana Power Co.
Oregon	Pacific Power & Light Co.
Washington	Inland Power & Light Co.
Washington	Seattle Department of Lighting
Washington	Tacoma Department of Public Utilities (Light Div.)
Washington	Washington Water Power Co.
Wyoming	Cheyenne Light Fuel & Power Co.
Wyoming	Lincoln Service Corp.

[fol. 6199] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Idaho Power Company
1220 Idaho Street, Boise, Idaho

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	92	3	36
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	4,251	550	2,899
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)[3]	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	8,473	3,038	1,055
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	154	4,738	5,080
3. Copper wire and cable covered and insulated[3]	6,371	969	518
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	None	1,690	2,283

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

N. L. Scott
Purchasing Agent
October 28, 1960

[fol. 6200] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Idaho Power Company
1220 Idaho Street, Boise, Idaho

Type of Underground Cable	Answer in Thousands of Feet[2]		
	1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	82	37	3
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

N. L. Scott
Purchasing Agent
October 28, 1960

[fol. 6201] United States Department of Justice

Schedule III

Idaho Power Company
1220 Idaho Street, Boise, Idaho

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

N. L. Scott
Purchasing Agent
October 28, 1960

[Vol. 6202] United States Department of Justice

Schedule IV

Idaho Power Company
1220 Idaho Street, Boise, Idaho

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Yes—for the reasons stated above.

N. L. Scott
Purchasing Agent
October 28, 1960

[fol. 6203] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1960, 1955 and 1959

Fergus Electric Cooperative, Inc.
Lewistown, Montana

Type of Overhead Line	Answer in Thousands of Feet[2] 1960	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare			
2. Aluminum and aluminum alloy wire and cable-bare & ACSR			700,272'
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	115,157'	285,666'	
2. Aluminum and aluminum alloy wire and cable-bare & ACSR		1,090,280	433,255
3. Copper wire and cable covered and insulated[3]	32,276'		
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]		41,745'	69,120'

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

J. F. Sharp
Assistant Manager
October 21, 1960

[fol. 6204] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Fergus Electric Cooperative, Inc.
Lewistown, Montana

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	XXXXXXXX	XXXXXXXX	XXXXXXXX
1. Copper	—0—	—0—	—0—
2. Aluminum & Aluminum Alloy	—0—	—0—	—0—
B. Distribution cable	XXXXXXXX	XXXXXXXX	XXXXXXXX
1. Copper	—0—	—0—	—0—
2. Aluminum & Aluminum Alloy	—0—	—0—	—0—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

None used.

J. F. Sharp
Assistant Manager
October 21, 1960

[fol. 6205] United States Department of Justice

Schedule III

Fergus Electric Cooperative, Inc.
Lewistown, Montana

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

If the price of copper conductors comes down we would use more copper wire.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions.

J. F. Sharp
Assistant Manager
October 21, 1960

[fol. 6206] United States Department of Justice

Schedule IV

Fergus Electric Cooperative, Inc.
Lewistown, Montana

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

None.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

None.

J. F. Sharp
Assistant Manager
October 21, 1960

[fol. 6207] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

The Montana Power Co.
40 East Broadway
Butte, Montana

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	175	15	3,525
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	232	498	1,644
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	5,924	659	566
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	3,016	4,588
3. Copper wire and cable covered and insulated[3]	1,767	141	34
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	1,612	1,508

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Sam. B. Chase
Vice President
October 25, 1960

[fol. 6208] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

The Montana Power Co.
40 East Broadway
Butte, Montana

Type of Underground Cable.	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	15	13	29
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Sam. B. Chase
Vice President
October 25, 1960

[fol. 6209] United States Department of Justice

Schedule III

The Montana Power Co.
40 East Broadway
Butte, Montana

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Proportion of Aluminum will probably increase for overhead transmission lines; for distribution lines the proportion will remain about the same.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No such restriction in our service area.

Copper conductor was required in Yellowstone National Park construction in 1959 by government specification.

Sam. B. Chase
Vice President
October 25, 1960

[fol. 6210] United States Department of Justice

Schedule IV

The Montana Power Co.
40 East Broadway
Butte, Montana

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No change contemplated.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Very little underground conductor has been used in our system to date.

Sam. B. Chase
Vice President
October 25, 1960

[fol. 6211] Pacific Power & Light Company
Public Service Building
Portland 4, Oregon
December 9, 1960

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Attention: Mr. Ellery R. Fosdick

Dear Mr. Bicks:

In reply to the telephone inquiry of your Mr. Fosdick regarding the completed schedules submitted in response to your letter of October 11, 1960, we submit the following additional information.

1. The amounts shown in the schedules were compiled from our Purchasing Department records. However, as our inventories of wire and cable remain very stable from month to month, it is our opinion that the installation of wire and cable is very close to the amount of purchases in any year, and consequently, any difference is nominal.

2. The amount of wire and cable used in maintenance is negligible and therefore would not effect the quantity of wire installed in any year.

3. The general trend in our service area in the use of conductors, in both transmission and distribution, is toward aluminum conductors, except in areas adjacent to the Pacific Ocean which represent a small portion of our system.

Very truly yours,

Albert Bauer
General Manager

AB:ab

[fol. 6212] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Pacific Power & Light Company
Portland, Oregon

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
*A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	39	23	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	207	2,432	1,633
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	2,473	4,592	1,741
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	220	2,426	2,869
3. Copper wire and cable covered and insulated[3]	10,448	1,822	1,837
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	150	3,419	4,952

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

* Because of the extreme difficulty to completely prepare an accurate statement of the amount of wire installed each year, the amount of wire purchased is used instead.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

D. R. McClung
President
10-24-60

[fol. 6213] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Pacific Power & Light Company
Portland, Oregon

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
*A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
*B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	46	22	56
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

* Because of the extreme difficulty to completely prepare an accurate statement of the amount of wire installed each year, the amount of wire purchased is used instead.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

D. R. McClung
President
10-24-60

[fol. 6214] United States Department of Justice

Schedule III

Pacific Power & Light Company
Portland, Oregon

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

We do not expect any increase or decrease in the proportion of aluminum to copper in 1960 or subsequent years. However, this will depend upon the proportion of conductor needed for transmission and distribution.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We do limit the use of aluminum in a very few areas adjacent to the Pacific Ocean due to corrosion of aluminum by fog and salt contamination.

D. R. McClung
President
10-24-60

[fol. 6215] United States Department of Justice

Schedule IV

Pacific Power & Light Company
Portland, Oregon

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

We do not expect to increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper use in any classification of underground cables.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Use of aluminum conductors for Underground cables is restricted due to space limitations in the size of existing ducts and also due to maintaining splice connections on aluminum underground cables because of cold flow of metals and tight connection problems.

D. R. McClung
President
10-24-60

[fol. 6216]

Inland Power & Light Co.
E. 320 Second Ave.
Spokane 3, Washington
Phone RIverside 7-7151

December 1, 1960

Reference: RAB:CLW 60-0-37-256

Budget Bureau No. 43-6005, Approval Exp. 12-31-60

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Dear Mr. Bicks:

I am returning the questionnaire your office has asked us to complete regarding the use of aluminum and copper conductor in our operation.

It has been impossible for us to find time to do an accurate recount of the footage for those years; however, we have supplied information based on statistics for the years 1951, 1955, and 1958. The year of 1951 would be quite comparable to 1950, and the year of 1958 would approximate the year 1959.

Even in the figures submitted, the complete accuracy cannot be guaranteed; however, the relative percentages of aluminum versus copper we feel to be very close to the actual ratio.

I certainly hope that our delay in getting this information for you has not been a problem and that the questionnaire will be useful to you.

Very truly yours, Inland Power & Light Co., Vincent P. Slatt, Manager.

VPS:dkl
Enclosures (4)

[fol. 6217] United States Department of Justice

Schedule J

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Inland Power & Light Co.
E 320-2nd Ave., Spokane 3, Wash.

Type of Overhead Line	Answer in Thousands of Feet[2] 1951	1955	1958
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	None	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	None	None
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	None	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	404.7	186.3	426.1
3. Copper wire and cable covered and insulated[3]	52.6	53.7	106.6
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Above are estimates of our work.

Time not sufficient for an accurate footage figure.

V. P. Slatt
Manager
12-1-60

[fol. 6218] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Inland Power & Light Co.
E 330-2nd Ave., Spokane 3, Wash.

Type of Underground Cable	Answer in Thousands of Feet[2]		
	1951	1955	1958
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	2.0	2.0	2.0
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been estimated and to the best of my knowledge and belief is true.

V. P. Slatt
Manager
12-1-60

[fol. 6219] United States Department of Justice

Schedule III

Inland Power & Light Co.
East 320-2nd Ave., Spokane 3, Wash.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No change expected.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No limitations on primary base. However, our utility has standardized on copper service drops. One reason is possible chemical reactions where aluminum enter older transformer secondary bushings and when attached to copper meter loops on residences or poles.

V. P. Slatt
Manager
12-1-60

[fol. 6220] United States Department of Justice

Schedule IV

Inland Power & Light Co.
East 320-2nd Ave., Spokane 3, Wash.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No change.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

V. P. Slatt
Manager
12-1-60

[fol. 6221]

The City of Seattle
Department of Lighting
City Light Building
1015 Third Avenue
Seattle 4, Washington
Gordon S. Clinton, Mayor

October 26, 1960.

Antitrust Division
United States Department of Justice
Washington, D. C.

Attention: Mr. Robert A. Bicks,
Assistant Attorney General

Your Reference: RAB:CLW, 60-0-37-256

Gentlemen:

In accordance with your request dated October 11, 1960, we are submitting the attached questionnaire schedules numbered I, II, III and IV, relating to the use of aluminum and copper as conductor materials by the Department of Lighting of the City of Seattle.

You will note that we were unable to supply all the information required on Schedule I for the years 1950 and 1955; part of the reason for this is that some of our past records do not reflect, in respect to wire and cable use, the schedule's identification of "maintenance" as distinct from "new construction and replacement." We trust that the comments we offer on Schedule III will be sufficient to indicate the trend of our choices in regard to the two metals.

Yours very truly, Paul J. Raver, Superintendent of Lighting.

DP:gn
Attached: Schedules I, II, III, IV

[fol. 6222] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Seattle Department of Lighting
1015 Third Avenue, Seattle 4, Washington

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	0	0	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	123	0
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	No Record	293	200
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	No Record	140	487
3. Copper wire and cable covered and insulated[3]	No Record	No Record	3,600
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	0	1,059

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Paul J. Raver
Superintendent of Lighting
October 26, 1960

[fol. 6223] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Seattle Department of Lighting
1015 Third Avenue, Seattle 4, Washington

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	79.513	139.047	219.303
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Paul J. Raver
Superintendent of Lighting
October 26, 1960

[fol. 6224] United States Department of Justice

Schedule III

Seattle Department of Lighting
1015 Third Avenue, Seattle 4, Washington

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

230-KV & 115 KV Transmission: Aluminum (ACSR) will be used exclusively.

26-KV Subtransmission: No change from exclusive use of bare aluminum wire—standard since 1956—is foreseen. Bare copper wire was standard until 1956. *Primary (4-KV) & Secondary Distribution:* Covered and insulated copper wire will continue to be used almost exclusively.

Services: Aluminum Triplex wire was adopted as standard in 1956 for residential and other small services. No change is contemplated.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Transmission & Subtransmission Lines: No restriction of aluminum conductor use on account of corrosion. Aluminum preferred on basis of economic considerations, including cost of conductor and supports for required conductor diameter and current rating. Distribution Lines: Problems associated with the making and changing of many copper-to-aluminum connections on the existing system are the principal limitation on use of aluminum conductor for low-voltage overhead lines.

Paul J. Raver
Superintendent of Lighting
October 26, 1960

[fol. 6225] United States Department of Justice

Schedule IV
Seattle Department of Lighting
1015 Third Avenue, Seattle 4, Washington

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No use of aluminum underground cables is contemplated for 1960 or expected in immediately subsequent years.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Use of aluminum conductor for underground cables has not been adopted for three reasons:

1. Insufficient progress has been made in simplifying splices and terminations of aluminum conductor;
2. Insufficient progress in solving corrosion problems encountered with aluminum underground cables has been achieved; and
3. For a given conduit size, current-carrying capacity of aluminum cables is considerably less than that of copper; in the case of 500-MCM network cables, 330 amperes for aluminum as against 405 amperes for copper.

Paul J. Raver
Superintendent of Lighting
October 26, 1960

[fol. 6226] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Department of Public Utilities
P. O. Box 1639, Tacoma 1, Wash.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	140	—	—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	108	112
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	185	25	152
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	341	183
3. Copper wire and cable covered and insulated[3]	995	138	9
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	227	674

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. M. Boyles
Chief Electrical Engineer
October 21, 1960

[fol. 6227] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Department of Public Utilities
P. O. Box 1639, Tacoma 1, Wash.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	38	36	29
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. M. Boyles
Chief Electrical Engineer
October 21, 1960

[fol. 6228] United States Department of Justice

Schedule III

Department of Public Utilities
P. O. Box 1639, Tacoma 1, Washington

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No increase indicated on subsequent use of copper and aluminum conductors to date.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor

No restrictions or limitations imposed.

R. M. Boyles
Chief Electrical Engineer
October 21, 1960

[fol. 6229] United States Department of Justice

Schedule IV

Department of Public Utilities.
P. O. Box 1639, Tacoma 1, Washington

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Use of aluminum conductor power cable not anticipated at this time.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Use of aluminum conductors in existing copper underground system would increase inventory of connectors and cable.

R. M. Boyles
Chief Electrical Engineer
October 21, 1960

[fol. 6230] The Washington Water Power Company
Post Office Drawer 1445
Spokane 10, Washington

December 12, 1960.

United States Department of Justice,
Antitrust Division,
Washington, D. C.

Aluminum & Copper Conductor, RAB:CLW 60-0-37-256

Gentlemen:

Attached you will find Schedule No. 2 containing information on aluminum and copper underground electrical conductors, revised to eliminate control cables, as requested in your letter of December 6, 1960.

Very truly yours, C. E. Cannon, Chief Engineer.

CEC:1
Enc

[fol. 6231] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

The Washington Water Power Company
P. O. Box 1445, Spokane 10, Washington

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	1899	5	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	98	865	3701
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	3068	1946	675
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	240	3299	1612
3. Copper wire and cable covered and insulated[3]	3620	144	63
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	1832	1566

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

C. E. Cannon
Chief Engineer
October 28, 1960

[fol. 6232] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

The Washington Water Power Company
P. O. Box 1445, Spokane 10, Washington

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	29	13	17
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

C. E. Cannon
Chief Engineer
December 12, 1960

[fol. 6233] United States Department of Justice

Schedule III

The Washington Water Power Company
P. O. Box 1445, Spokane 10, Washington

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No change is expected in the proportion of aluminum to copper indicated by the figures for 1959 in Schedule I.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions.

C. E. Cannon
Chief Engineer
October 28, 1960

[fol. 6234] United States Department of Justice

Schedule IV

The Washington Water Power Company
P. O. Box 1445, Spokane 10, Washington

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

For years, subsequent to 1960, there may be some increase in the use of aluminum for underground distribution cables.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Size of existing ducts is a factor in determining the economic feasibility of using aluminum underground distribution cables.

C. E. Cannon
Chief Engineer
October 28, 1960

[fol. 6235] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Cheyenne Light, Fuel & Power Company
108 West 18th Street, Cheyenne, Wyoming

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959[4]
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	0	0	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	0	0
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	10	83	26
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	50	176	463
3. Copper wire and cable covered and insulated[3]	167	76	48
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	80	175

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

[4] These figures are partially estimated as the records are not completely closed for this year's work.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

W. D. Virtue
Vice-President
October 31, 1960

[fol. 6236] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Cheyenne Light, Fuel & Power Company
108 West 18th Street, Cheyenne, Wyoming

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959[3]
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	1	1
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

[3] These figures are partially estimated as the records are not completely closed for this year's work.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

W. D. Virtue
Vice-President
October 31, 1960

[fol. 6237] United States Department of Justice

Schedule III

Cheyenne Light, Fuel and Power Company
108 West 18th Street, Cheyenne, Wyoming

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No change from 1959.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions.

W. D. Virtue
Vice-President
October 31, 1960

[fol. 6238] United States Department of Justice

Schedule IV

Cheyenne Light, Fuel and Power Company
108 West 18th Street, Cheyenne, Wyoming

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No change.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

It is considered that aluminum cable has not been proven as a satisfactory conductor for underground use.

W. D. Virtue
Vice-President
October 31, 1960

[fol. 6239] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Lincoln Service Corporation
Frontier, Wyoming

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	0	0	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	0	90
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	0	0	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	0	354
3. Copper wire and cable covered and insulated[3]	0	0	0
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

V. A. Bair
General Manager
October 25, 1960

[fol. 6240] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Lincoln Service Corporation
Frontier, Wyoming

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

V. A. Bair
General Manager
October 25, 1960

[fol. 6241] United States Department of Justice

Schedule III

Lincoln. Service Corporation
Frontier, Wyoming

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Our specifications call for all aluminum or ACSR wire to be used in replacement and building of new transmission and distribution lines.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

V. A. Bair
General Manager
October 25, 1960

[fol. 6242] United States Department of Justice

Schedule IV

Lincoln Service Corporation
Frontier, Wyoming

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

At present our specifications do not call for underground cable of any type.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

V. A. Bair
General Manager
October 25, 1960

[fol. 6243] Utilities

Region: V Southwestern

State	Name
Arizona	Arizona Public Service Co.
Arizona	Salt River Project Agriculture Improvement & Power District
California	Imperial Irrigation District
California	Los Angeles Department of Water & Power
California	Pacific Gas & Electric Co.
California	Pasadena Municipal Light & Power Department
California	Southern California Edison Co.
Colorado	Mountain View Electric Association
Colorado	Public Service Co. of Colorado
Colorado	Southeast Colorado Power Association
New Mexico	Public Service Co. of New Mexico
Nevada	Southern Nevada Power Co.
Utah	Utah Power & Light Co.

[fol. 6244] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Arizona Public Service Company
P. O. Box 2591, Phoenix, Arizona

Type of Overhead Line	Answer in Thousands of Feet[2] 1950[4]	1955[4]	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	1,050 M ft	3,000 ft.	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	12,526 M ft	932 M ft
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	4,206 M ft	302 M ft	378 M ft
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	6,875 M ft	8,654 M ft
3. Copper wire and cable covered and insulated[3]	2,523 M ft	190 M ft	240 M ft
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0 M ft	4,120 M ft	5,136 M ft

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

[4] The above figures for 1959 are actual from purchasing records and pole line mile records from FPC reports. The 1950 and 1955 figures are based on FPC reports, pole line mile records and estimates based on kva of load added during those years. Since some of the quantities are estimated there may be a variance with actual Purchase Orders.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

G. H. Foreman
Exec. Vice President
October 27, 1960

[fol. 6245] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Arizona Public Service Company
P. O. Box 2591, Phoenix, Arizona

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper			
2. Aluminum & Aluminum Alloy			
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	29 M ft	100 M ft	57 M ft
2. Aluminum & Aluminum Alloy			

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

G. H. Foreman
Exec. Vice President
October 27, 1960

[fol. 6246] United States Department of Justice

Schedule III

Arizona Public Service Company
P. O. Box 2591, Phoenix, Arizona

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

G. H. Foreman
Exec. Vice President
October 10, 1960

[fol. 6247] United States Department of Justice

Schedule IV

Arizona Public Service Company
P. O. Box 2591, Phoenix, Arizona

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No. However we will investigate use of aluminum underground cable and results of these studies may indicate that aluminum may become economical for underground use.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Do not use.

G. H. Foreman
Exec. Vice President
October 27, 1960

[fol. 6248] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Salt River Project Agricultural Improvement and Power District
P. O. Box 1980, Phoenix, Arizona

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	646.27	103.28	8.24
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0.0	208.61	712.32
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	1,089,785	2,995,563	1,228,074
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	none	26,880	5,672,034
3. Copper wire and cable covered and insulated[3]	408,660	74,360	169,842
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	none	2,180,862	3,213,244

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

G. W. Brandow
Assistant General Manager
October 25, 1960

[fol. 6249] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Salt River Project Agricultural Improvement and Power District
P. O. Box 1980, Phoenix, Arizona

Type of Underground Cable	Answer in Thousands of Feet[2]		
	1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	No Additions	21.8	24.7
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

G. W. Brandow
Assistant General Manager
October 25, 1960

[fol. 6250] United States Department of Justice

Schedule III

Salt River Project Agricultural Improvement
and Power District
P. O. Box 1980, Phoenix, Arizona

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

1960-61 uses will be aluminum except for minor re-use of copper conductor presently existing in warehouse stock.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No. Arizona has no problems with salt water or chemical corrosion.

G. W. Brandow
Assistant General Manager
October 25, 1960

[fol. 6251] United States Department of Justice

Schedule IV

Salt River Project Agricultural Improvement
and Power District
P. O. Box 1980, Phoenix, Arizona

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Will continue to use copper cable except as stated in Item 'B' below.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We will continue to use copper cable in the 5 and 15 KV class due to size and economics. We may start using aluminum cable of the 600 volt class for distribution secondaries and services in residential subdivisions.

G. W. Brandow
Assistant General Manager
October 25, 1960

[fol. 6252] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Imperial Irrigation District
Imperial, California

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	0	0	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	10.6	269.1	0
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	184.9	88.4	173.0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	127.2	1,538.6	1,123.0
3. Copper wire and cable covered and insulated[3]	339.8	375.5	319.6
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	418.8	1,620.8	795.5

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. F. Carter
General Manager
December 5, 1960

[fol. 6253] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Imperial Irrigation District
Imperial, California

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. F. Carter
General Manager
December 5, 1960

[fol. 6254] United States Department of Justice

Schedule III

Imperial Irrigation District
Imperial, California

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

None.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

None.

R. F. Carter
General Manager
December 5, 1960

[fol. 6255] United States Department of Justice

Schedule IV

Imperial Irrigation District
Imperial, California

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

None.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

None.

R. F. Carter
General Manager
December 5, 1960

[fol. 6256] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959[*]
Department of Water and Power

City of Los Angeles
Box 3669, Terminal Annex
Los Angeles 54, California

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines[**]	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	None	None	323.25
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	845	None
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	1,820	2,834	2,581
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	173	515
3. Copper wire and cable covered and insulated[3]	14,612	10,732	7,560
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	620	2,059

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

[*] Fiscal Year Ending June 30 of Year Indicated.

[**] Transmission line construction by years is highly variable. In some years there will be no transmission lines built; in other years large transmission line projects will be constructed.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Ivan L. Bateman
Chief Electrical Engineer
and Assistant Manager
October 31, 1960

[fol. 6257] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959
Department of Water and Power

City of Los Angeles
Box 3669, Terminal Annex
Los Angeles 54, California

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	187	150
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	1,349	1,363	1,595
2. Aluminum & Aluminum Alloy	—	—	16

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Ivan L. Bateman
Chief Electrical Engineer
and Assistant Manager
October 31, 1960

[fol. 6258] United States Department of Justice

Schedule III

Department of Water and Power, City of Los Angeles
Box 3669 Terminal Annex, Los Angeles 54, California

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I

(overhead lines). If so, describe the changes indicating when they will occur.

The Department expects the use of copper for overhead distribution lines to stabilize at the present amount or at a slightly smaller amount. The use of aluminum should increase but at a lesser rate than the 1955-59 usage indicates.

The copper conductor for overhead transmission lines shown in 1958-59 was used in an area close to the ocean where severe corrosion problems exist. It is believed that in the future the Department of Water and Power will use little, if any, copper conductor in overhead transmission lines, assuming that the present differential in price between copper and aluminum continues.

In general new construction or replacement will be with aluminum, ACSR, or aluminum alloy conductors. Occasionally small quantities of copper may be used in relocating short sections of existing lines which have copper conductors.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

At present the Department uses aluminum for overhead distribution lines only in the San Fernando Valley north of Mulholland Drive. This territory is very dry. Its use is anticipated south of Mulholland Drive but we do not plan on using aluminum in the coastal area because of corrosion due to salt spray being carried inland by on-shore winds.

For overhead transmission lines to be located in close proximity to the ocean, aluminum would not be used due to severe corrosion problems encountered in such areas. In most cases, aluminum would be considered satisfactory if the distance from the ocean is more than two miles. It is not anticipated that the Depart-

ment of Water and Power will construct any overhead transmission lines in close proximity to the ocean in the near future.

Ivan L. Bateman
Chief Electrical Engineer
and Assistant Manager
October 31, 1960

[fol. 6259] United States Department of Justice

Schedule IV

Department of Water and Power, City of Los Angeles
Box 3669 Terminal Annex, Los Angeles 54, California

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Proportion of aluminum to copper usage will decrease to zero in 1960 and later years and will remain so until relative installed costs favor installation of aluminum.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Use of aluminum conductors is restricted to areas which are relatively free of ground water or other factors which may contribute to corrosion.

Ivan L. Bateman
Chief Electrical Engineer
and Assistant Manager
October 31, 1960

[fol. 6260] Pacific Gas and Electric Company
245 Market Street
San Francisco 6
SUtter 1-4211

Richard H. Peterson
General Counsel
F. T. Searls
General Attorney

November 17, 1960

Air Mail

Mr. Robert A. Bicks
Assistant Attorney General
Anti-Trust Division
U. S. Department of Justice
Washington, D. C.

Re: Your File RAB:CLW, 60-0-37-256

Dear Mr. Bicks:

Attached hereto are the schedules seeking information as to the relative use by electric utilities of aluminum and copper conductor which you forwarded to Mr. N. R. Sutherland with your letter of October 11, 1960. We have completed these schedules to the best of our ability and some comment on the information submitted is in order.

The quantities shown for the years 1950 and 1955 represent gross withdrawals and are not reduced by overdrawn quantities subsequently returned to storerooms for credit. They also include reusable copper conductor salvaged from plant retirements. During the year 1955 substantial quantities of bare and insulated copper wire used for overhead construction were reprocessed for Company use from copper wire salvaged in our own operations.

Due to the introduction of more modern accounting equipment after 1955 we were able to exclude from the totals on the attached schedules for the year 1959 overdrawn quantities subsequently returned to storerooms for credit. However, these totals do include reusable copper conductor salvaged from plant retirements.

Certain sizes of copper and aluminum conductors are used in distribution as well as transmission lines. Quantities of such conductors included for all years have been allocated [fol. 6261] between distribution and transmission on the basis of the best available information.

In obtaining the desired information from our records it was not possible, without referring to each requisition, to determine the quantities used for maintenance purposes and therefore the quantities reported by us on the attached schedules include conductor used for this purpose. However; such quantities are negligible in comparison to the totals.

Very truly yours, Richard H. Peterson.

PAC:TC.
Enclosures

[fol. 6262] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Pacific Gas and Electric Company
245 Market Street
San Francisco 6, California

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	228.2	1[illegible]8.2	137.4
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	1,965.0	1,937.3	4,029.3
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	34,200.5	34,899.0	6,801.9
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	15,247.7	18,822.0	41,708.3
3. Copper wire and cable covered and insulated[3]	33,072.1	26,200.9	3,398.1
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	2,237.5	21,847.0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

L. W. Coughlan
Comptroller
November 17, 1960

[fol. 6263] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Pacific Gas and Electric Company
245 Market Street
San Francisco 6, California

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	.1	—	4.2
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	1,301.1	1,229.8	758.1
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

L. W. Coughlan
Comptroller
November 17, 1960

[fol. 6264] United States Department of Justice

Schedule III

Pacific Gas and Electric Company
245 Market Street
San Francisco 6, California

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No changes expected.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Aluminum conductor is not used for any distribution lines in a narrow coastal zone (averaging approximately ½ mile in width) because of possible corrosion of conductors and connections.

Aluminum conductor is not used for primary distribution circuits (except express sections of large conductor) in a broader coastal zone because of possible connection troubles from corrosion.

Use of aluminum conductor for transmission lines is not restricted because relatively large conductors and few connections minimize risk of corrosion trouble.

John F. Bonner
Vice President in Chg. of Engineering
November 17, 1960

[fol. 6265] United States Department of Justice

Schedule IV

Pacific Gas and Electric Company
245 Market Street
San Francisco 6, California

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No changes expected.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Aluminum conductor is not used for underground cables because savings in first cost of installations are marginal and do not justify risks of corrosion, connector troubles, etc.

John F. Bonner
Vice President in Chg. of Engineering
November 17, 1960

[fol. 6266] City of Pasadena
Light and Power Department

November 22, 1960.

United States Department of Justice
Washington, D. C.
Attention Robert A. Bicks,
Assistant Attorney General
Antitrust Division

Gentlemen:

RAB:CLW 60-0-37-256

The amount of electrical conductor used by us as shown under each category on the questionnaire as sent us is in feet as you surmized and not in thousands of feet as requested. We have placed the decimal point in the proper place on the copies sent us. The corrected copy is attached. Thank you for calling this to our attention.

In answer to your second question, the total amount of conductor shown under Item B-1, Schedule I is for grounds. We do not use bare copper wire in our system except for voltages of 15,000 volts or higher, and even here the only bare copper we have was installed several years ago. Our present practice calls for the installation of aluminum at these higher voltages where bare wire is required.

We are sorry that the correct answers were not given originally. If further information is desired do not hesitate to contact us.

Very truly yours, T. M. Goodrich, General Manager and Chief Engineer, Municipal Light and Power Department

AWC:rp
Encl.

Live Better . . . Electrically.

[fol. 6267] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Pasadena Municipal Light & Power Department
100 North Garfield, Pasadena, California

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	0	0	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	34.317	.654
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare (Grounds)	xxxxxxxx	xxxxxxxx	xxxxxxxx
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	0	0
3. Copper wire and cable covered and insulated[3]	1,044.666	633.252	118.523
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	23.623	503.703

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

All changes and corrections on Schedules I & II were made by the City of Pasadena.

Ellery R. Fosdick

T. M. Goodrich
General Manager and Chief Engineer
Municipal Light and Power Department
October 26, 1960

[fol. 6268] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Pasadena Municipal Light & Power Department
100 North Garfield, Pasadena, California

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	34.846	.113
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	211.467	481.289	323.085
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

T. M. Goodrich
General Manager and Chief Engineer
October 26, 1960

[fol. 6269] United States Department of Justice

Schedule III

Pasadena Municipal Light and Power Department
100 North Garfield, Pasadena, California

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Our policy is to use aluminum conductors for overhead lines except for transformer tops and ground wires. We also use copper for repairing of and small extensions to existing copper lines. The use of copper should show a slight proportional decrease through the coming years as more existing lines are replaced.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We do not limit or restrict the use of aluminum conductors for overhead lines.

T. M. Goodrich
General Manager and Chief Engineer
October 26, 1960

[fol. 6270] United States Department of Justice

Schedule IV

Pasadena Municipal Light and Power Department
100 North Garfield, Pasadena, California

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

We do not use aluminum for underground cables and do not contemplate any change in the near future.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We restrict the use of aluminum conductors in underground cable because of space, size of existing ducts, and difficulties in splicing.

T. M. Goodrich
General Manager and Chief Engineer
October 26, 1960

[fol. 6271] Southern California Edison Company
Edison Building, P.O. Box 351
Los Angeles 53, California

Law Department

January 13, 1961.

Our File No. A-5790

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Attention: Mr. Karp

Gentlemen:

Your Reference: RAB:CLW, 60-0-37-256.

Supplementing my earlier letter of January 6, 1961, there is transmitted herewith the statistical information which you requested from our Company by your letter of December 23, 1960.

Very truly yours, Rollin E. Woodbury, General Counsel.

REW:co
Enclosures

[fol. 6272] United States Department of Justice

Schedule I.

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Southern California Edison Company
601 West Fifth Street, Los Angeles, California

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	1,920	30	41
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	1,893	2,039	5,057
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	29,568	9,904	6,610
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	19,042	23,112
3. Copper wire and cable covered and insulated[3]	37,380	11,983	4,712
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	29,817	25,731

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

W. E. Montgomery
Vice President
January 13, 1961

[fol. 6273] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Southern California Edison Company
601 West Fifth Street, Los Angeles, California

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	1,340	1,656	1,483
2. Aluminum & Aluminum Alloy	0	0	723

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

W. E. Montgomery
Vice President
January 13, 1961

[fol. 6274] United States Department of Justice

Schedule III

Southern California Edison Company
601 West Fifth Street, Los Angeles, California

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

We do not presently anticipate any significant increase or decrease in the near future in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines)

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We do not restrict or limit the use of aluminum conductors on overhead high voltage transmission lines, including lines in coastal areas. However, distribution lines within one mile of contaminated coastal areas have been constructed of copper conductors.

We also have used copper conductors for all connections to the terminals of line equipment or apparatus, (i.e., transformers, switches, reclosers, etc.). It has been our experience that while some equipment terminals are suitable for aluminum conductors, others have been unsatisfactory. To maintain standard construction practices by our field forces, copper conductor is used for all such connections.

W. E. Montgomery
Vice President
January 13, 1961

[fol. 6275] United States Department of Justice

Schedule IV

Southern California Edison Company
601 West Fifth Street, Los Angeles, California

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Changes are expected to be made only to the extent that the total installed costs of aluminum and copper change. We expect to use aluminum and copper interchangeably on the basis of least costs, giving due recognition to material costs, installation costs, electrical losses, reliability and permanency. Changes from one to the other will not be made on a day to day, or other short time, basis.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Restrictions in the use of aluminum may occur in some instances because of insufficient duct size in existing facilities. The extra cost of increased duct size in new facilities, due to the use of aluminum, is recognized as an added cost to the aluminum conductors.

To date, we have found no other reasons, other than those stated above, to limit the use of aluminum; however, we expect to be guided by operating experience.

W. E. Montgomery
Vice President
January 13, 1961

[fol. 6276] Southern California Edison Company
Edison Building, P.O. Box 351
Los Angeles 53, California

Law Department

January 6, 1961.

Our File No. A-5790

Air Mail

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Attention: Mr. Karp

Gentlemen:

Your Reference: RAB:CLW, 60-0-37-256

As a result of your letter of December 23, 1960 and our recent telephone conversation, wherein you indicated that the information in the Federal Power Commission reports did not fully serve your purposes and requesting that we furnish information as indicated on the schedules transmitted with your letter relative to our Company's use of certain overhead and underground conductors, I have requested, since the information desired is statistical, the affected departments of our Company to provide the statistical information requested to the extent that such information can be supplied from our Company's books and records.

I inquired of such departments as to the time that they estimated would be required to collect the data, and was advised that such time would be a week or ten days. As soon as it has been collected, I will transmit it to you.

Yours very truly, Rollin E. Woodbury, General Counsel.

REW:eb

[fol. 6277] Southern California Edison Company
Edison Building, P.O. Box 351
Los Angeles 53, California
Law Department

October 18, 1960.

Our File No. A-4593-M

United States Department of Justice
Washington, D. C.
Attention: Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division

Dear Mr. Bicks:

Re: Your File RAB:CLW, 60-0-37-256

Your letter of October 11, 1960, addressed to Mr. Horton and bearing the above reference number, has been referred to me for reply.

As indicated in your earlier correspondence with Mr. Marx of our legal department, you were previously advised that our Company has consistently taken the position, in connection with inquiries for information from its files involved in litigation in which it was not a party, to request that such information be obtained where appropriate through subpoena; this position has been predicated upon our Company's desire to be neutral and impartial in connection with any litigation in which it is not a party.

In connection with your most recent request, it appears that certain of the information which you desire is reflected in portions of the public reports which are filed by our Company and other utilities with the Federal Power Commission in Washington, D. C. I am advised that the Federal Power Commission Form 1 for Class A and B electric utilities and licenses includes a statistical report on transmission lines added during the year, being reported in the section dealing with transmission line statistics, and that similar information may be derived from statistics in a somewhat different form which appear in Federal Power Com-

mission Form 12 also filed with the Federal Power Com-
[fol. 6278] mission in Schedule 18-A. Since we are not fully apprised as to your purposes in connection with this inquiry, I am of course not certain that the above-mentioned statistical information will be satisfactory to you, but I am calling it to your attention in the hopes that it may be helpful.

Sincerely yours, Rollin E. Woodbury, General Counsel.

REW:eb

[fol. 6279] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Mountain View Electric Association, Inc.
Limon, Colorado

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	None	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	None	2,000
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	2,471	223	217
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	1,012	237	240
3. Copper wire and cable covered and insulated[3]	27	63	17
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	None	11	12

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

A. C. Payne
Assistant Manager
October 26, 1960

[fol. 6280] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Mountain View Electric Association, Inc.
Limon, Colorado

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A: Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

A. C. Payne
Assistant Manager
October 26, 1960

[fol. 6281] United States Department of Justice

Schedule III

Mountain View Electric Association, Inc.
Limon, Colorado

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

There will be approximately 70% more aluminum used than copper.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

A. C. Payne
Assistant Manager
October 26, 1960

[fol. 6282] United States Department of Justice

Schedule IV

Mountain View Electric Association, Inc.
Limon, Colorado

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No Underground.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

A. C. Payne
Assistant Manager
October 26, 1960

[fol. 6283] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Public Service Company of Colorado
900 15th Street, Denver, Colorado

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959 *
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	0	20	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	502	1,591
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	1,357	2,520	453
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	232	4,471	4,984
3. Copper wire and cable covered and insulated[3]	4,583	2,645	643
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	2,651	4,875

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

* These figures are partially estimated as the records are not completely closed for this year's work.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

W. D. Winters
Executive Vice-President
October 31, 1960

[fol. 6284] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1960, 1955 and 1959

Public Service Company of Colorado
900 15th Street, Denver, Colorado

Type of Underground Cable	Answer in Thousands of Feet[2] 1960	1955	1959[3]
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	28	85	85
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

[3] These figures are partially estimated as the records are not completely closed for this year's work.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

W. D. Winters
Executive Vice-President
October 31, 1960

[fol. 6285] United States Department of Justice

Schedule III

Public Service Company of Colorado
900 15th Street, Denver, Colorado

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No change from 1959.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions.

W. D. Winters
Executive Vice-President
October 31, 1960

[fol. 6285a] United States Department of Justice

Schedule IV

Public Service Company of Colorado
900 15th Street, Denver, Colorado

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No change.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

It is considered that aluminum cable has not been proven as a satisfactory conductor for underground use.

W. D. Winters
Executive Vice-President
October 31, 1960

[fol. 6286] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Southeast Colorado Power Association
901 West Third Street
La Junta, Colorado

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare			
2. Aluminum and aluminum alloy wire and cable-bare & ACSR			211
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare			25
2. Aluminum and aluminum alloy wire and cable-bare & ACSR			836
3. Copper wire and cable covered and insulated[3]			11
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]			119

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

James N. Myers
Manager
October 24, 1960

[fol. 6287] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Southeast Colorado Power Association
901 West Third Street
La Junta, Colorado

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper			
2. Aluminum & Aluminum Alloy			
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper			
2. Aluminum & Aluminum Alloy			

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

James N. Myers
Manager
October 24, 1960

[Vol. 6288] United States Department of Justice

Schedule III

Southeast Colorado Power Association
901 West Third Street
La Junta, Colorado

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

We consider that the price of copper makes it too expensive for us to use. About 5 years ago we started eliminating the use of copper in all places possible. We will continue to reduce the use of copper in all places possible, although we are using proportionately about as small an amount of copper as we can.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Aluminum overhead conductor gives us no problems in our area. We find it more economical than copper and very satisfactory.

James N. Myers
Manager
October 24, 1960

[fol. 6289] United States Department of Justice

Schedule IV

Southeast Colorado Power Association
901 West Third Street
La Junta, Colorado

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Very small amounts of underground cable used.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

[No answer]

James N. Myers
Manager
October 24, 1960

[fol. 6290] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Public Service Company of New Mexico
Albuquerque, New Mexico

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	10	256	2
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	191	1,707
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	73	558	73
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	9	1,294	1,924
3. Copper wire and cable covered and insulated[3]	2,772	1,645	50
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	9	2,159

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

M. R. Wells
Supervisor, Plant and Property Department
October 19, 1960

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Public Service Company of New Mexico
Albuquerque, New Mexico

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

G. A. Schreiber
Executive Vice President
October 21, 1960

[fol. 6292] United States Department of Justice

Schedule III

Public Service Company of New Mexico
Albuquerque, New Mexico

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

There will be little if any change in the proportion, unless there is a change in the economic relationship of Copper and Aluminum.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions in overhead lines.

G. A. Schreiber
Executive Vice President
October 21, 1960

[fol. 6293] United States Department of Justice

Schedule IV

Public Service Company of New Mexico
Albuquerque, New Mexico

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

There may be a slight tendency toward Aluminum in insulated underground cables.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Direct burial bare conductor for grounding is limited to copper, mainly because of the alkaline conditions of the soil.

G. A. Schreiber
Executive Vice President
October 21, 1960

[fol. 6294] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Southern Nevada Power Co.
Las Vegas, Nevada

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	71	16	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	303	195
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	See Note		136
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	See Note		636
3. Copper wire and cable covered and insulated[3]	See Note		176
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	See Note		670

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

Note—Complete information on distribution lines not available for years 1950 and 1955. No aluminum conductor installed in distribution lines in 1950.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Harry Allen
Vice President
October 27, 1960

[fol. 6295] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Southern Nevada Power Co.
Las Vegas, Nevada

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Harry Allen
Vice President
October 27, 1960

[fol. 6296] United States Department of Justice

Schedule III

Southern Nevada Power Co.
Las Vegas, Nevada

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No change.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

None.

Harry Allen
Vice President
October 27, 1960

[fol. 6297] United States Department of Justice

Schedule IV

Southern Nevada Power Co.
Las Vegas, Nevada

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No change.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

None.

Harry Allen
Vice President
October 27, 1960

[fol. 6298] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Utah Power & Light Company
1407 West North Temple Street
P. O. Box 899
Salt Lake City 10, Utah

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	236	1	—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	362	4604	4814
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	3457	4156	1654
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	3049	6011
3. Copper wire and cable covered and insulated[3]	3093	1270	275
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	1504	3280

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Paul A. Blanchard
Vice President
October 28, 1960

[fol. 6299] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Utah Power & Light Company
1407 West North Temple Street
P. O. Box 899
Salt Lake City 10, Utah

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	10	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	19	100	63
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Paul A. Blanchard
Vice President
October 28, 1960

[fol. 6300] United States Department of Justice

Schedule III

Utah Power & Light Company
1407 West North Temple Street
P. O. Box 899
Salt Lake City 10, Utah

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

Paul A. Blanchard
Vice President
October 28, 1960

[fol. 6301] United States Department of Justice

Schedule IV

Utah Power & Light Company
1407 West North Temple Street
P. O. Box 899
Salt Lake City 10, Utah

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

The use of aluminum conductor for underground cables has been restricted because of size and cost of installation, particularly in existing ducts.

Paul A. Blanchard
Vice President
October 28, 1960

[fol. 6302] Utilities

Region: VI South Central

State	Name
Arkansas	Arkansas Power & Light Co.
Arkansas	Craighead Electric Coop. Corp.
Louisiana	Louisiana Power & Light Co.
Louisiana	New Orleans Public Service, Inc.
Oklahoma	Oklahoma Gas & Electric Co.
Oklahoma	Public Service Co. of Oklahoma
Texas	City Public Service Board—San Antonio
Texas	Houston Lighting & Power Co.
Texas	Lower Colorado River Electric Coop. Inc.

[fol. 6303] Arkansas Power & Light Company
Helping Build Arkansas
Pine Bluff, Arkansas

November 4, 1960.

RAB:CLW 60-0-37-256

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Dear Mr. Bicks:

In accordance with your letter dated October 11, 1960, to Arkansas Power & Light Company we are attaching completed schedules showing the related use of aluminum and copper conductor by this company.

Very truly yours, W. M. Harrell, Treasurer.

WMH/rg,
Attach.

[fol. 6304] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Arkansas Power & Light Company
Pine Bluff, Arkansas
(See Note A)

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	2	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	1253	847	395
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	16203	3355	5324
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	7907	6318
3. Copper wire and cable covered and insulated[3]	1664	1503	633
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	None	None	5669

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

Note A—See letter of transmittal dated November 4, 1960 for basis of compiling data.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

W. M. Harrell
Treasurer
November 4, 1960

[fol. 6305] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Arkansas Power & Light Company
Pine Bluff, Arkansas
(See Note A)

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	61	49	15
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

Note A—See letter of transmittal dated November 4, 1960 for basis of compiling data.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

W. M. Harrell
Treasurer
November 4, 1960

[fol. 6306] United States Department of Justice

Schedule III

Arkansas Power & Light Company
Pine Bluff, Arkansas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Any proportionate change in the use of aluminum to copper used in any classification of Schedule I (overhead lines) will be determined on price differential at the time of purchase.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

W. M. Harrell
Treasurer
November 4, 1960

[fol. 6307] United States Department of Justice

Schedule IV

Arkansas Power & Light Company
Pine Bluff, Arkansas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Any proportionate change in the use of aluminum to copper used in any classification of Schedule II (underground cables) will be determined on price differential at the time of purchase.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

On existing systems restrictions on the use of aluminum cables for replacement purposes would be attributable to space limitations and size of the existing ducts. On proposed extensions or expansions the use of aluminum cables presently would be restricted due to lack of experience with aluminum cables in underground distribution systems. Also, there is presently no economic advantage in the use of aluminum cables in lieu of copper cables.

W. M. Harrell
Treasurer
November 4, 1960

[fol. 6308] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Craighead Electric Coop. Corp.
Jonesboro, Ark.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	0	0	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	0	0
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	193	0	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	220	37	53
3. Copper wire and cable covered and insulated[3]	433	238	0
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	54	246

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Dale Reaves
Purchasing Agent
October 14, 1960

[fol. 6309] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Craighead Electric Coop. Corp.
Jonesboro, Ark.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Dale Reaves
Purchasing Agent
October 14, 1960

[fol. 6310] United States Department of Justice

Schedule III

Craighead Electric Coop. Corp.
Jonesboro, Ark.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

We expect to use all aluminum for all new construction, both primary and services. Some copper will be used for replacement of small sizes of copper.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions except we do not string aluminum under copper.

Dale Reaves
Purchasing Agent
October 14, 1960

[fol. 6311] United States Department of Justice

Schedule IV

Craighead Electric Coop. Corp.
Jonesboro, Ark.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No experience with underground cable.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Dale Reaves
Purchasing Agent
October 14, 1960

[fol. 6312] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Louisiana Power & Light Company
142 Delaronde Street
New Orleans 14, Louisiana

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	1	1	—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	1,230	931	581
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	6,062	2,842	636
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	7,831	9,256	10,027
3. Copper wire and cable covered and insulated[3]	5,068	654	86
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	89	3,262	4,711

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

Note: Wire and cable purchased in feet and pounds. The wire purchased in pounds was converted to feet by using conversion tables from manufacturer's catalogue.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

G. C. Rawls
President
October 27, 1960

[fol. 6313] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Louisiana Power & Light Company
142 Delaronde Street
New Orleans 14, Louisiana

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	12
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	4	28	1
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

G. C. Rawls
President
October 27, 1960

[fol. 6314] United States Department of Justice

Schedule III

Louisiana Power & Light Company
142 Delaronde Street
New Orleans 14, Louisiana

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No significant change expected in 1960. The Company purchases its transmission and distribution conductor on the basis of its dollars buying the most electrical conductivity. Hence price relationships would determine the conductor purchased.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We do not use aluminum conductor within three miles of the Gulf of Mexico.

G. C. Rawls
President
October 27, 1960

[fol. 6315] United States Department of Justice

Schedule IV

Louisiana Power & Light Company
142 Delaronde Street
New Orleans 14, Louisiana

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No significant change expected in 1960. The Company purchases its transmission and distribution conductor on the basis of its dollars buying the most electrical conductivity. Hence price relationships would determine the conductor purchased.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Company does not use aluminum conductor in underground cable installations due to misgivings concerning chemical reactions.

G. C. Rawls
President
October 27, 1960

[fol. 6316] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

New Orleans Public Service Inc.
317 Baronne St., New Orleans, La.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	—	21	18
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	—	31
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	1,008	1,389	61
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	51	875
3. Copper wire and cable covered and insulated[3]	1,182	1,354	33
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	—	2,329

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

_____,
Executive Vice President
October 24, 1960.

[fol. 6317] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

New Orleans Public Service Inc.
317 Baronne St., New Orleans, La.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	75	382	131
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

——— ———,
Executive Vice President
October 24, 1960

[fol. 6318] United States Department of Justice

Schedule III

New Orleans Public Service Inc.
317 Baronne St., New Orleans, La.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No appreciable increase or decrease in proportion of aluminum to copper for overhead conductors is anticipated.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions or limits for use of aluminum conductors for overhead construction.

____ ____,
Executive Vice President
October 24, 1960

[fol. 6319] United States Department of Justice

Schedule IV

New Orleans Public Service Inc.
317 Baronne St., New Orleans, La.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No appreciable increase or decrease in proportion of aluminum to copper for underground conductors is anticipated.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Copper is used exclusively in our underground installations for: 1. Existing duct size limitations: 2. Ease of splicing in vaults, and manholes.

——— ———,
Executive Vice President
October 24, 1960

[fol. 6320] Oklahoma Gas & Electric Company
321 North Harvey
Oklahoma City 1, Okla.
Phone CE 2-3366
Post Office Box 1498

November 29, 1960.

Antitrust Division
United States Department of Justice
Washington, D. C.

Attention: Mr. Robert A. Bicks, Assistant Attorney General
Your Reference: RAB-CLW, 60-0-36-256

Dear Sir:

In accordance with instruction from Mr. Samuel Karp of the Department of Justice, we have converted pounds to feet on our aluminum and copper conductors for the years, 1950, 1955 and 1959, which is in response to your letter dated October 11, 1960 and in further connection with our letter to you October 26, 1960.

The attachments to your schedules show the trends in the use of copper and aluminum conductors in our Company and the method of conversion we have used in arriving at the footage of these conductors.

Yours very truly, H. H. Ferrin, Vice President and Treasurer

HHF/em
encls.

[fol. 6321] Oklahoma Gas & Electric Company
321 North Harvey
Oklahoma City 1, Okla.

October 26, 1960.

Antitrust Division
United States Department of Justice
Washington, D. C.

Attention: Mr. Robert A. Bicks, Assistant Attorney General

Your Reference: RAB-CLW, 60-0-36-256

Dear Sir:

This letter is in response to your letter dated October 11, 1960, stating that the Department of Justice is seeking information as to the relative use by electric utilities of aluminum and copper conductor for new construction and for replacement.

With your letter were forms of schedules to be completed showing additions in our system of quantities in thousands of feet of transmission line copper wire and cable-bare and of aluminum and aluminum alloy wire. The schedule also requires an answer in thousands of feet of distribution line electrical conductor (with certain exceptions) in 4 categories in thousands of feet for each of the years 1950, 1955, 1959.

The second page of the schedules requires an estimate as to any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification. This page also calls for a statement as to limitations or restrictions on use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals.

Your letter requires an answer by October 31, 1960, with an affirmation of verity. We have given every serious consideration to responding to your request despite the problems involved in correctly stating the information you seek from us. The information requested is not available in the required detail from our Plant Accounting Records. Conductor accounts are not stated in our accounts in feet. We do not segregate bare and covered conductor in the distribution accounts.

[fol. 6322] To comply with your request with the degree of accuracy which we believe would be necessary to fulfill your requirements for exactitude would take a great deal of time and research into original individual job orders and stores requisitions dating back to 10 years. It would be impossible to comply within the time limit stated by you and it would by impraticable to estimate any period of time within which we could complete the research necessary to respond truthfully within the terms of the affirmation you prescribe.

Yours truly, Oklahoma Gas and Electric Co., By H. H. Ferrin, Vice President and Treasurer.

HHF*pw

[fol. 6323] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Oklahoma Gas and Electric Company
321 N. Harvey, Oklahoma City, Okla.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	321	68	23
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	4,069	1,269	1,725
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable–bare and insulated	1,943	1,369	2,201
2. Aluminum and aluminum alloy wire and cable–bare & ACSR and insulated	5,787	7,118	7,734
3. Copper wire and cable covered and insulated[3] *			
4. Aluminum and aluminum alloy wire and cable covered and insulated[3] *			

* Not available.

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all size, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

H. H. Ferrin
Vice President and Treasurer
November 29, 1960

[fol. 6324] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Oklahoma Gas and Electric Company
321 N. Harvey, Oklahoma City, Okla.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	3	28	90
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

H. H. Ferrin
Vice President and Treasurer
November 29, 1960

[fol. 6325] United States Department of Justice

Schedule III

Oklahoma Gas and Electric Company
321 N. Harvey—Oklahoma City, Oklahoma

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

See attached statement.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

See attached statement.

H. H. Ferrin
Vice President and Treasurer
November 29, 1960

[fol. 6326] United States Department of Justice

Schedule IV

Oklahoma Gas and Electric Company
321 N. Harvey—Oklahoma City, Oklahoma

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of alumimum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

See attached statement.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

See attached statement.

H. H. Ferrin
Vice President and Treasurer
November 29, 1960

[fol. 6327] Trends in the Use of Copper and

Aluminum Conductors

The Past. Prior to about 1926, Oklahoma Gas and Electric Company used copper exclusively for all normal transmission and distribution purposes.

The long term trend since then has been toward aluminum, first on transmission, then on rural lines, then on urban distribution systems, until today this metal is used for all transmission and nearly all overhead distribution purposes. Copper is used for underground and for a few special overhead applications.

The Future. We see nothing, except change in the relative price of the two metals, which would cause our Company to go back to copper on any large scale basis. We have no salt or contaminated atmosphere of consequence in our service area in Oklahoma and Arkansas. More trouble is experienced with connections to aluminum than to copper conductors but not enough to change the relative economics. Both metals are good electrical conductors. Copper is the better conductor on volume (circular mil) basis; aluminum is the better conductor on the basis of equal weight.

If underground systems in residential areas should grow in popularity, there is a strong possibility that our Company would use aluminum extensively, especially for the direct burial portions.

Transmission. Since 1946, all transmission lines have been constructed of acsr (Aluminum Conductor Steel Reinforced), except where old conductor was reused. Between 1926 and 1946 both copper and acsr were used according to price differential and other factors.

Rural Lines. Between the late 1920's and the late 1930's both copper and acsr were used in rural areas. Since then, acsr has been used almost exclusively.

Urban Distribution. Copper was used exclusively until 1947. Since then aluminum, with and without steel reinforcing, has been used almost exclusively for all overhead purposes including primary, secondary and service drops.

Coverings on Conductors. About 1930, our Company ceased the use of coverings on all overhead conductors except for service drops and a few special situations.

[fol. 6328] Method of Conversion from Pounds to Feet

Overhead Lines

A. Transmission

Pounds of copper and pounds of aluminum conductor converted from pounds to feet for each job order on the basis of the size of conductor installed on each order.

B. Distribution

Total pounds of copper and pounds of aluminum conductor installed converted to feet on the basis of an average conversion ratio.

An average conversion ratio was calculated from total pounds for each size of conductor issued from stores during 1959 and resulting footage for each size to obtain an average feet per pound for all issues from stores.

This average was used to convert number of pounds of conductor installed in distribution plant number of feet.

The average for 1959 with changes for known variations was used to convert 1950 and 1955.

Underground Cable

Actual footage of underground cable is shown for the periods reported.

[fol. 6329] Public Service Company of Oklahoma
General Offices, P.O. Box 201
Tulsa 2, Oklahoma

December 12, 1960.

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Re: RAB:CLW, 60-0-37-256

Dear Mr. Bicks:

Following out the telephone conversation which I had last month with Mr. Samuel Karp of your staff, I am enclosing herewith our schedules concerning the relative use of aluminum and copper conductor.

We found we could not accomplish our objectives by going on the basis of engineering estimates so we put on a night staff and accomplished your request by analysis of our book records which I believe to be substantially correct.

Yours very truly, Elmer K. Higley, Controller

EKH:cy
cc: DJTuepker, RONewman
Enclosures

The Electric Power of Oklahoma's Progress for Nearly 50 Years.

[fol. 6330] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Public Service Company of Oklahoma
Tulsa, Oklahoma

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	30	1	3
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	359	1,749	1,799
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	1,359	1,282	392
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	1,003	4,444	3,108
3. Copper wire and cable covered and insulated[3]	5,655	7,714	766
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	2	310	3,521

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Elmer K. Higley
Controller
December 12, 1960

[fol. 6331] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Public Service Company of Oklahoma
Tulsa, Oklahoma

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—0—	—0—	—0—
2. Aluminum & Aluminum Alloy	—0—	—0—	—0—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	60	60	20
2. Aluminum & Aluminum Alloy	—0—	—0—	—0—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Elmer K. Higley
Controller
December 12, 1960

[fol. 6332] United States Department of Justice

Schedule III

Public Service Company of Oklahoma
Tulsa, Oklahoma

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Only a slight increase in proportion of aluminum to copper over 1959 ratio.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No corrosion or chemical restrictions on overhead conductors.

Elmer K. Higley
Controller
December 12, 1960

[fol. 6333] United States Department of Justice

Schedule IV

Public Service Company of Oklahoma
Tulsa, Oklahoma

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No.

Elmer K. Higley
Controller
December 12, 1960

[fol. 6334] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

City Public Service Board
Navarro at Villita Street, San Antonio, Texas

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	8.2	3.4	—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	610.7	61.0	189.8
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	3,072.4	276.2	739.6
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	930.7	3,513.7	2,304.3
3. Copper wire and cable covered and insulated[3]	206.1	166.7	41.4
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	.1	3,781.0	4,903.3

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Harold Tynan
Manager Electric System
October 25, 1960

[fol. 6335] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

City Public Service Board
Navarro at Villita Street, San Antonio, Texas

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	—	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	45.2	62.9	13.7
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Harold Tynan
Manager Electric System
October 25, 1960

[fol. 6336] United States Department of Justice

Schedule III

City Public Service Board
Navarro at Villita Street - San Antonio, Texas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

1. For 1960, there should not be any substantial increase (with no decrease) in the use of Al. or Cu. in this system.

2. A considerable increase in the use of aluminum by this Utility is planned for the years 1961, 1962 and 1963, particularly in *transmission lines,* as indicated below: (Thousands of feet)

1961	1962	1963
10,058.4 ft.	39,093.1 ft.	58,085.2 ft.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

None.

Harold Tynan
Manager Electric System
October 25, 1960

[fol. 6337] United States Department of Justice

Schedule IV

City Public Service Board
Navarro at Villita Street - San Antonio, Texas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No plans at present to change proportions.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

The City Public Service Board's use of aluminum conductor for underground cables is restricted because of cold flow of the conductor in terminating.

Harold Tynan
Manager Electric System
October 25, 1960

[fol. 6338] Houston Lighting & Power Company
Electric Building, Houston 1, Texas

October 27, 1960.

Mr. Robert A. Bicks, Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Your Reference No.: RAB-CLW, 60-0-37-256

Dear Mr. Bicks:

In accordance with the request made in your letter of October 11, 1960 to Mr. T. H. Wharton, we have assembled certain information concerning our use of copper and aluminum conductors. The schedules which accompanied your letter have been completed and are being returned to you herewith.

We wish to point out that the quantities in Schedule I–B are approximate, for the following reason. Our records are kept by groups of sizes rather than by individual specific sizes of conductors; also our records are kept in pounds rather than in feet: Therefore to convert from pounds of conductor of assorted sizes to feet of conductor, we have had to use our best judgment and choose one size for each group which, in our opinion, would represent the weighted average of the group. Pounds of this size were then converted to feet to get the answers in the units which you requested. However we believe that this procedure gives a reasonably accurate final figure in feet.

We trust that the information here supplied will be satisfactory.

Yours very truly,

J. F. Estill, Jr., Vice President.

JFE/bw
encl.

[fol. 6339] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Houston Lighting & Power Co.
Electric Building, Houston 1, Texas

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	281	23	9
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	487	1,286	2,152
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	6,506	1,468	1,537
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	760	5,593	8,469
3. Copper wire and cable covered and insulated[3]	6,743	1,511	796
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	8,405	7,090

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

J. F. Estill, Jr.
Vice President
October 27, 1960

[fol. 6340] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Houston Lighting & Power Co.
Electric Building, Houston 1, Texas

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	383	887	936
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

J. F. Estill, Jr.
Vice President
October 27, 1960

[fol. 6341] United States Department of Justice

Schedule III

Houston Lighting & Power Co.
Electric Building
Houston 1, Texas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

The proportion of aluminum and copper used will depend on the relative prices and the relative availability of the two metals. Since we can not predict these factors with any degree of accuracy, we do not feel that we should make statements as to the future use of copper and aluminum relative to each other.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

In very limited areas around certain chemical plants and in a very narrowly defined area adjacent to the gulf coast we restrict the use of aluminum. In these areas copper is used because it gives greater resistance to the corrosive effort ef certain chemicals in the atmosphere and to salt spray.

J. F. Estill, Jr.
Vice President
October 27, 1960

[fol. 6342] United States Department of Justice

Schedule IV

Houston Lighting & Power Co.
Electric Building
Houston 1, Texas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

At present we use copper for underground cables. We expect no change in that practice in 1960.
The use of aluminum in underground cables will continue to be given thought and study, but we do not feel that we can make a prediction as to when, if ever, our present practice will change. However, as aluminum cable could not be used in the present duct system, we do not expect any drastic change in the proportion of copper to aluminum in the next few years.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We do restrict the use of aluminum conductor for underground cable to the extent of using no aluminum; in other words copper is used altogether in this area. The reason for our taking this position is two-fold:

1. We believe that the cost of the duct and cable system is less for copper than for aluminum.
2. In our opinion, a more satisfactory splicing job can be done with copper than with aluminum.

J. F. Estill, Jr.
Vice President
October 27, 1960

[fol. 6343] Pedernales Lower Colorado River
Electric Cooperative
"Texas Corporations"
P. O. Box 1153
Austin 63, Texas

December 6, 1960

Robert A. Bicks
Assistant Attorney General
Antitrust Division
U. S. Department of Justice
Washington, D. C.

Re: RAB; CLW 60-0-37-256

Dear Mr. Bicks:

Attached please find questionnaires for the Pedernales Electric Cooperative, Inc. and the Lower Colorado River Electric Cooperative, Inc. giving schedules of conductors used for the years 1950, 1955, and 1959. The amount of conductors shown on the attached schedules was arrived at by past purchases for the two above mentioned Cooperative's. The amount shown on these schedules is the amount that was purchased during these years except in the case of the Pedernales Electric Cooperative for the year 1950.

In 1950 the Pedernales Electric Cooperative did not purchase any conductor other than covered copper conductor and cables. This conductor was used for service drops. Therefore, we checked the purchases for 1949, assuming that a portion of this wire was used in 1950.

According to our records, the Pedernales Electric Cooperative constructed 109 miles of line in the year of 1950. This includes all types of lines constructed.

If we can be of further assistance, please call us.

Very truly yours, M. G. Hyltin, General Manager

MGH:DM:mc
Attachments

[fol. 6344] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Lower Colorado River Electric Cooperative, Inc.
Giddings, Texas

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	None	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	None	None
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Amerductor Wire ***	None	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	596.1	1,369.0	584.8
3. Copper wire and cable covered and insulated[3]	265.1	59.5	12.6
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	None	26.0	147.5

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

*** This conductor is composed of galvanized steel conductors and copper conductors stranded together.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

M. G. Hyltin
General Manager
December 6, 1960

[fol. 6345] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Lower Colorado River Electric Cooperative, Inc.
Giddings, Texas

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

M. G. Hyltin
General Manager
December 6, 1960

[fol. 6346] United States Department of Justice

Schedule III

Lower Colorado River Electric Cooperative, Inc.
Giddings, Texas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

We do not expect any substantial increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I. We have found that ACSR conductors in most cases are more economical to use than copper or copperweld conductors. This economy is brought about mainly by the light weight of aluminum conductors for any given current carrying capacity. In recent years, we have adopted the practice of using ACSR and or aluminum triplex and quadriplex cables for service wire due to the greater economy of using aluminum.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

We have experienced no problems in this area because of corrosion by salt water and chemicals and for these reasons we expect to continue use of ACSR in constructing lines.

M. G. Hyltin
General Manager
December 6, 1960

[fol. 6347] United States Department of Justice

Schedule IV

Lower Colorado River Electric Cooperative, Inc.
Giddings, Texas

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

This Cooperative does not employ use of underground cables for purposes of serving our members.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

This Cooperative does not employ use of underground cables for purposes of serving our members.

M. G. Hyltin
General Manager
December 6, 1960

[fol. 6348] Utilities

Region: VII Southeastern

State	Name
Alabama	Alabama Power Co.
Florida	Clay Electric Coop. Inc.
Florida	Florida Power and Light Co.
Georgia	Georgia Power Co.
Mississippi	Mississippi Power & Light Co.
Mississippi	Southern Pine Electric Power Assn.
North Carolina	Carolina Power & Light Co.
North Carolina	Duke Power Co.
South Carolina	South Carolina Electric & Gas Co.
South Carolina	South Carolina Public Service Authority
Tennessee	Kingsport Utilities, Inc.
Tennessee	Memphis Light Gas & Water Division

[fol. 6349] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Alabama Power Company
600 N. 18th Street, Birmingham, Alabama

Type of Overhead Line	[2]Answer in Thousands of Feet[2] 1950	1955	1959.
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	139.7	134.0	—
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	1,136.9	1,215.4	6,646.8
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	3,916.56	3,141.27	1,087.23
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	23,158.77	14,465.58	13,247.63
3. Copper wire and cable covered and insulated[3]	9,271.15	8,262.85	5,041.95
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	32.89	3,254.86	12,720.69

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

Note: The quantities reported above are in feet of wire of all sizes installed as phase or neutral conductors in gross additions and replacements to the transmission and distribution systems and consist of both newly acquired and reusable materials.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. L. Harris
Vice President–Electric Operations
November 7, 1960

[fol. 6350] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Alabama Power Company
600 N. 18th Street, Birmingham, Alabama

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	—	14.6	—
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	141.02	50.60	32.98
2. Aluminum & Aluminum Alloy	—	.28	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

Note: The quantities reported above are in feet of wire of all sizes installed as phase or neutral conductors in gross additions and replacements to the transmission and distribution systems and consist of both newly acquired and reusable materials.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. L. Harris
Vice President–Electric Operations
November 7, 1960

[fol. 6351] United States Department of Justice

Schedule III

Alabama Power Company
600 N. 18th Street, Birmingham, Alabama

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

In all cases, the choice between use of aluminum conductor and copper conductor is influenced to a material extent by economics, i.e. by comparative quoted delivered costs per 1,000 feet of the respective conductors at the time of need. Other factors considered in the choice are (1) the effect of sag comparative characteristics on installed costs; (2) the effect of relative physical size in high voltage transmission; (3) breaking strength required in comparison with relative breaking strength available in equivalent capacity conductors of small sizes of the respective materials; (4) local conditions in areas where installations are to be made; and (5) material of existing conductors where to be paralleled by additional conductors on the same poles.

It is our opinion that proportion of aluminum to copper will tend to continue to increase in all classifications of Schedule I but further changes will be gradual and cannot be timed.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No rigid restriction or limit has been specified for use of either copper or aluminum. In general but not

without exception copper has been and is continuing to be used where exposure to salt spray is moderate to severe. Where aluminum is used in such locations, precautions are observed in order to prevent or minimize corrosive action of the salt spray on aluminum and composite steel and aluminum conductors.

R. L. Harris
Vice President–Electric Operations
November 7, 1960

[fol. 6352] United States Department of Justice

Schedule IV

Alabama Power Company
600 N. 18th Street, Birmingham, Alabama

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Transmission lines have not heretofore been regularly installed underground. Such as have been so installed consist of relatively short lines or short extension lines added at irregular intervals during the last 15 years. No worthwhile opinions or conclusions relative to proportions of aluminum to copper in possible future installations can be drawn from projection of such limited and irregular experience.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Underground distribution installations have been made at four widely separated locations. Installations at three locations were started prior to 1941 using copper

conductor in the cable. Installation at the fourth location was started after 1950 using aluminum conductor in the cable. Those installations originally started with copper have continued to be expanded with copper and the one started with aluminum has continued to be expanded with aluminum:—principal considerations being economics in maintaining minimum stocks of wire sizes, connectors, fittings, etc., and in experience of maintenance personnel with the particular materials.

No rigid restriction or limit has been specified for use of either copper or aluminum which would be determinative for any future underground installation.

R. L. Harris
Vice President–Electric Operations
November 7, 1960

[fol. 6353] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Clay Electric Cooperative, Inc.
Keystone Heights, Florida

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	0	0	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	500,000′	0	250,000′
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	200,000′	0	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	7,000,000′	6,000,000′	5,000,000′
3. Copper wire and cable covered and insulated[3]	200,000′	100,000′	0
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	250,000′	460,000′

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

C. H. G. Handorfer
Manager
December 12, 1960

[fol. 6354] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Clay Electric Cooperative, Inc.
Keystone Heights, Florida

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

C. H. G. Handorfer
Manager
December 12, 1960

[fol. 6355] United States Department of Justice

Schedule III

Clay Electric Cooperative, Inc.
Keystone Heights, Florida

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

None.

Will continue to use only aluminum.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

None.

Not in salt area.

C. H. G. Handorfer
Manager
December 12, 1960

[fol. 6356] United States Department of Justice

Schedule IV

Clay Electric Cooperative, Inc.
Keystone Heights, Florida

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

None.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

None.

C. H. G. Handorfer
Manager
December 12, 1960

[fol. 6357] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Florida Power & Light Company
Miami, Florida

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	560	208	82
2. Aluminum and aluminum alloy wire and cable-bare & ACSR.	—	442	720
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	19,180	5,940	7,183
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	—	18,250	22,091
3. Copper wire and cable covered and insulated[3]	18,580	798	847
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	—	16,880	17,943

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. L. Poor
Assistant Purchasing Agent
October 24, 1960

[fol. 6358] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Florida Power & Light Company
Miami, Florida

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	39
2. Aluminum & Aluminum Alloy	—	—	—
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	150	37	233
2. Aluminum & Aluminum Alloy	—	—	—

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. L. Poor
Assistant Purchasing Agent
October 24, 1960

[fol. 6359] United States Department of Justice

Schedule III

Florida Power & Light Company
Miami, Florida

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Expect proportion of aluminum to copper to remain approximately the same since usage of one versus the other is determined by geographic boundries, with rate of growth about the same in both areas. This is based upon the present price comparison.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Use of aluminum conductor for overhead lines is limited to areas where severe corrosion due to salt spray is not anticipated. In general this prohibits the use of aluminum within two miles of the ocean or gulf.

R. L. Poor
Assistant Purchasing Agent
October 24, 1960

[fol. 6360] United States Department of Justice

Schedule IV

Florida Power & Light Company
Miami, Florida

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

Aluminum underground cables not used, except a small amount installed by private developer and later acquired by Florida Power & Light Company.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Do not install aluminum underground cables because of anticipated corrosion problems due to salt water and soil conditions.

R. L. Poor
Assistant Purchasing Agent
October 24, 1960

[fol. 6361] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Georgia Power Company
Atlanta, Georgia

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	637	269	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	5,359	3,998	798
B. Distribution lines (all wire and cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
conductors used in distribution lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
up to and including service drops	xxxxxxxx	xxxxxxxx	xxxxxxxx
but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	9,455	6,603	2,894
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	5,771	5,898	11,802
3. Copper wire and cable covered and insulated[3]	19,245	13,766	4,706
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	3,654	9,301

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. E. L. O'Hirley
Asst. to V. Pres. & Gen. Mgr.
October 28, 1960

[fol. 6362] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Georgia Power Company
Atlanta, Georgia

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	38.8	38.2
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	214.3	123.3	111.7
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. E. L. O'Hirley
Asst. to V. Pres. & Gen. Mgr.
October 28, 1960

[fol. 6363] United States Department of Justice

Schedule III

Georgia Power Company
Atlanta, Georgia

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

It is anticipated that the use of bare and covered copper conductor will continue to decrease in 1960. It is estimated that 15% less copper conductor will be used in 1960 than was used in 1959 and that the use of bare and covered ACSR conductor will increase by approximately this amount.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

ACSR is used in all areas except those along the seacoast. We do not use ACSR in these areas due to corrosion by salt water.

R. E. L. O'Hirley
Asst. to V. Pres. & Gen. Mgr.
October 28, 1960

[fol. 6364] United States Department of Justice

Schedule IV

Georgia Power Company
Atlanta, Georgia

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of alumimum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No change expected.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

The size of the existing ducts (4" inside diameter) and size of existing cable manholes make it desirable to install copper conductors to provide the maximum current carrying capacity for the installed cable. Due to existing structures of other utilities in the street it is impractical and in some cases impossible to construct larger cable manholes in existing duct lines or in newly constructed duct lines.

R. E. L. O'Hirley
Asst. to V. Pres. & Gen. Mgr.
October 28, 1960

[fol. 6365] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Mississippi Power & Light Company
P. O. Box 1640
Jackson, Mississippi

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	None	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	1,907	1,402	1,063
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	4,303	1,328	869
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	5,387	5,595	2,871
3. Copper wire and cable covered and insulated[3]	3,215	812	123
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	1	3,433	4,409

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Alex Rogers
Vice-President
October 27, 1960

[fol. 6366] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Mississippi Power & Light Company
P. O. Box 1640
Jackson, Mississippi

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	51	13	10
2. Aluminum & Aluminum Alloy	None	None	3

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

Alex Rogers
Vice-President
October 27, 1960

[fol. 6367] United States Department of Justice

Schedule III

Mississippi Power & Light Company
P. O. Box 1640, Jackson, Mississippi

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

It is expected that the proportion of aluminum to copper will continue to increase on a gradual basis.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions.

Alex Rogers
Vice-President
October 27, 1960

[fol. 6368] United States Department of Justice

Schedule IV

Mississippi Power & Light Company
P. O. Box 1640, Jackson, Mississippi

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

The proportion of aluminum to copper is expected to increase in subsequent years due to the use of underground conductor in residential areas.

The change will be on a gradual basis.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions.

Alex Rogers
Vice-President
October 27, 1960

[fol. 6369] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Southern Pine Electric Power Association
Taylorsville, Mississippi

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	None	None	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	None	None
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	75,985	43,457	80,760
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	2,352,548	1,166,745	1,812,425
3. Copper wire and cable covered and insulated[3]	520,641	545,364	9,810
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	136,308	582,814

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

O. H. McFarland
Chief Engineer
November 30, 1960

[fol. 6370] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Southern Pine Electric Power Association
Taylorsville, Mississippi

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

O. H. McFarland
Chief Engineer
November 30, 1960

[fol. 6371] United States Department of Justice

Schedule III

Southern Pine Electric Power Association
Taylorsville, Mississippi

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

The proportion of aluminum to copper used is expected to remain constant in 1960 and subsequent years.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restriction of the use of aluminum because of corrosion by salt water or chemicals. The only restrictions are custom and personal preference.

O. H. McFarland
Chief Engineer
November 30, 1960

[fol. 6372] United States Department of Justice

Schedule IV.

Southern Pine Electric Power Association
Taylorsville, Mississippi

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No Change.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No restrictions.

O. H. McFarland
Chief Engineer
November 30, 1960

[fol. 6373] Carolina Power & Light Company
Raleigh, North Carolina

December 20, 1960.

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Your File: AB:CLW, 60-0-37-256

Dear Mr. Bicks:

We are not in a position to furnish to you the information as requested in your letter of October 11, 1960, addressed to our President, Mr. L. V. Sutton. We are enclosing information as to "conductor Purchased for the Years 1950, 1955, and 1959".

Our situation was discussed over the telephone with Mr. Samuel Karp and Mr. Fosdick in the Justice Department.

Very truly yours, W. H. Weatherspoon, Vice President and General Counsel.

WHW:c
Enc.

[fol. 6374] United States Department of Justice

Schedule I

Conductor Purchased for Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Carolina Power & Light Company
Raleigh, North Carolina

Type of Overhead Line	Answer in Thousands of Feet [1] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	3.2	0	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	1,136.8	756.2	2,330.5
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	10,360.0	338.8	524.0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	2,727.6	11,651.2	7,788.5
3. Copper wire and cable covered and insulated [2]	9,290.2	499.1	362.8
4. Aluminum and aluminum alloy wire and cable covered and insulated [2]	0	7,850.3	4,971.6

[1] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[2] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

W. R. Doar
Chief Engineer of Lines
December 20, 1960

[fol. 6375] United States Department of Justice

Schedule II

Cable Purchased for Gross Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Carolina Power & Light Company
Raleigh, North Carolina

Type of Underground Cable	Answer in Thousands of Feet [1] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper			
2. Aluminum & Aluminum Alloy			
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	1.2	0.9	0
2. Aluminum & Aluminum Alloy	0	0	0

[1] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

W. R. Doar
Chief Engineer of Lines
December 20, 1960

[fol. 6376] United States Department of Justice

Schedule III

Carolina Power & Light Company
Raleigh, North Carolina

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No change expected.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Yes. ACSR & aluminum usage restricted in areas of salty atmosphere or chemical contamination due to their corrosive effects.

W. R. Doar
Chief Engineer of Lines
December 20, 1960

[fol. 6377] United States Department of Justice

Schedule IV

Carolina Power & Light Company
Raleigh, North Carolina

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Do not use aluminum for any underground work at present.

W. R. Doar
Chief Engineer of Lines
December 20, 1960

[fol. 6378] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955, and 1959

Duke Power Company
Charlotte, North Carolina

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	186	15	158
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	997	2,826	2,684
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	2,900	847	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	22,107	26,935	26,179
3. Copper wire and cable covered and insulated[3]	26,465	8,829	1,785
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	8,295	11,033

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

O. F. Miller
Executive Vice President
October 26, 1960

[fol. 6379] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Duke Power Company
Charlotte, North Carolina

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	None	None	None
2. Aluminum & Aluminum Alloy	None	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

O. F. Miller
Executive Vice President
October 26, 1960

[fol. 6380] United States Department of Justice

Schedule III

Duke Power Company
Charlotte, North Carolina

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

Not until ratio of copper price per pound to price of aluminum per pound is reduced very materially.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No, these factors are not applicable to our service area.

O. F. Miller
Executive Vice President
October 26, 1960

[fol. 6381] United States Department of Justice

Schedule IV

Duke Power Company
Charlotte, North Carolina

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

——, ——.

[fol. 6382] South Carolina Electric & Gas Company
Post Office Box 390
Columbia, South Carolina

December 7, 1960.

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Dear Mr. Bicks:

In a letter dated October 11 your office requested statements of the use of copper and aluminum wire and cable for electric power line construction during several specified calendar years.

On October 20 we wrote you that the information could not be compiled in the time allowed and that any information this Company supplies will necessarily involve estimates which would render the form of certification inappropriate.

On November 17 your Mr. Karp telephoned to request that we prepare such compilations (including estimates) as could be done without undue hardship and submit them for your examination and possible use.

Accordingly, we enclose a statement showing for the years indicated the estimated feet used in the several categories.

Very truly yours, W. J. Ready.

WJR:lt
Enclosure

[fol. 6383]

Schedule I

"Estimated"

	1950	1955	1959
Overhead Lines			
A. Transmission Lines			
1. Copper Wire and Cable-Bare	145	4	1
2 Aluminum and Aluminum Alloy-Bare	499	743	132
B. Distribution System			
1. Copper Wire and Cable-Bare	4,531	3,978	2,240
2. Aluminum and Aluminum Alloy-Bare	2,517	4,129	4,453
3. Copper Wire and Cable-Covered	3,287	3,456	1,473
4. Aluminum and Aluminum Alloy-Covered	1	309	871

Schedule II

"Estimated"

Underground Lines			
A. Transmission Lines			
1. Copper (Submarine)		4	
B. Distribution Lines			
1. Copper	5	26	16

Note:

1. The above figures are stated in thousands of feet.
2. South Carolina Electric & Gas issues Copper and Aluminum wire in pounds, which necessitated using wire charts to convert from pounds to feet. Consequently we have estimates in the following areas.
   (a) When it was not known whether copper wire was stranded or solid in converting from lbs. to feet the multiplier for solid wire was used.
   (b) In converting aluminum conductor from lbs. to feet in many cases it was not known whether the conductor was 6 or 7 strand. The 6 strand multiplier was used.
3. In some cases it was necessary to estimate the number of feet of wire used for each leg of a service. Past experience indicate that 85 feet per leg should be used.

[fol. 6384] South Carolina Electric & Gas Company
Post Office Box 390
Columbia, South Carolina

October 20, 1960.

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Dear Mr. Bicks:

This is in reply to your letter of October 11, addressed to Mr. S. C. McMeekin, President of this Company, requesting by October 31, 1960 statements of the thousands of feet of copper and aluminum conductor used by this Company during the years 1954, 1955 and 1959. We regret to state that it will be impossible within the time indicated to compile and supply the requested information.

Furthermore, even if substantial additional time were available, it is unlikely that we could prepare the information with sufficient exactitude to permit the type of representation prescribed for the signatory due to the necessity of making estimates for sundry periods and the conversion to feet from the units appearing in the records.

Very truly yours, W. J. Ready.

WJR:lt
CC: Mr. Arthur M. Williams, Jr., Staff Counsel

[fol. 6385] South Carolina Electric & Gas Company
Post Office Box 390
Columbia, South Carolina

December 23, 1960.

Mr. Robert A. Bicks
Assistant Attorney General
Antitrust Division
United States Department of Justice
Washington, D. C.

Attention: Mr. Fosdick

Dear Sirs:

Supplementing our letter of December 7, 1960 and in response to a telephone call from your office on December 16, 1960, I enclose a sheet showing the break down of covered aluminum wire for the years 1955 and 1959 between triplex and quadruplex, and also showing the total wire feet in each case.

The attachment also provides responses to items appearing on Schedules III and IV.

Very truly yours, W. J. Ready.

WJR:lt
Enclosure

[fol. 6386]

Schedule I

	Year	Single Wire	Total Wire Feet
Service Drops			
Alum. Triplex	1955	309	927
Alum. Triplex	1959	788	2,364
Alum. Quadruplex	1959	34	136
Distribution Secondary			
Alum. Triplex	1959	49	147

Schedule III

A. Transmission lines will be constructed entirely of aluminum conductor. Distribution lines will be constructed in almost the same ratio as 1959 aluminum to copper.

B. For distribution construction we use copper in coastal areas and certain industrial areas.

Schedule IV

A. At this time we have no aluminum underground lines. We have no major underground construction program scheduled for the immediate future.

B. At this time our underground system is small and it would not be economically feasible to stock quantities of aluminum underground fittings and tools.

FCA
12-23-60

[fol. 6387] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

S. C. Public Service Authority
Moncks Corner, South Carolina

Type of Overhead Line	Answer in Thousands of Feet[2] 1950 (1)	1955 (1)	1959 (1)
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	26.072	62.076	None
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	None	117.512	27,677.878 (2)
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	(3)	68.3021	111.505
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	(3)	3.728	None
3. Copper wire and cable covered and insulated[3]	(3)	287.129	299.179
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	(3)	None	None

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

Note (1) Figures are for fiscal year ending June 30. This date and quantities are for additions to property ledgers during the year.
(2) This figure includes a major transmission expansion.
(3) No accurate figures available for this year as adjustment to actual physical inventory was made June 30, 1950.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. M. Jefferies
General Manager
November 18, 1960

[fol. 6388] United States Department of Justice

Schedule II (Not Applicable)

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

S. C. Public Service Authority
Moncks Corner, South Carolina

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper			
2. Aluminum & Aluminum Alloy			
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper			
2. Aluminum & Aluminum Alloy			

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

R. M. Jefferies
General Manager
November 18, 1960

[fol. 6389] United States Department of Justice

Schedule III

S. C. Public Service Authority
Moncks Corner, South Carolina

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Copper is used in close proximity to beaches served by the Authority.

R. M. Jefferies
General Manager
November 18, 1960

[fol. 6390] United States Department of Justice

Schedule IV (Not Applicable)

S. C. Public Service Authority
Moncks Corner, South Carolina

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

R. M. Jefferies
General Manager
November 18, 1960

[fol. 6391] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Kingsport Utilities, Inc.
422 Broad St., Kingsport, Tenn.

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	0	11	0
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	135	76
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx	xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
1. Copper wire and cable-bare	84	33	2
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	340	302	189
3. Copper wire and cable covered and insulated[3]	75	45	4
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	300	405	347

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true. Subject to the limitations and qualifications as set forth in my letter of November 1, 1960.

Douglas Tonge
Chief Statistician
November 1, 1960

[fol. 6392] United States Department of Justice

Schedule II

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Kingsport Utilities, Inc.
422 Broad St., Kingsport, Tenn.

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	0	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	2.7	0
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true. Subject to the limitations and qualifications as set forth in my letter of November 1, 1960.

Douglas Tonge
Chief Statistician
November 1, 1960

[fol. 6393] United States Department of Justice

Schedule III

Kingsport Utilities, Inc.
422 Broad St., Kingsport, Tenn.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

None.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Salt water not a problem for this area. ACSR used mostly because of resistance to acid corrosion.

Douglas Tonge
Chief Statistician
November 1, 1960

[fol. 6394] United States Department of Justice

Schedule IV

Kingsport Utilities, Inc.
422 Broad St., Kingsport, Tenn.

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

No.

B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

Yes. Its use is restricted because we are not sure of long range effect of corrosion of aluminum in contact with moisture where a limited supply of oxygen is available. We are hopeful for an answer to this problem within the next 5 years.

Douglas Tonge
Chief Statistician
November 1, 1960

[fol. 6395] United States Department of Justice

Schedule I

Gross Additions[1] of Overhead Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Memphis Light, Gas & Water Division
179 Madison Avenue
Memphis, Tennessee

Type of Overhead Line	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission Lines	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	465	1	91
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	0	0	3,985*
B. Distribution lines (all wire and cable conductors used in distribution lines up to and including service drops but excluding service entrance cable)	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper wire and cable-bare	1,664	1,191	473
2. Aluminum and aluminum alloy wire and cable-bare & ACSR	63	601	1,610
3. Copper wire and cable covered and insulated[3]	3,650	2,560	473
4. Aluminum and aluminum alloy wire and cable covered and insulated[3]	0	102	1,700

* Includes 1,330,000 Ft. of Aluminum conductors on existing lines purchased from TVA.

[1] Electrical conductor installed in new construction and for replacement, exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor.

[3] In answering for self-supporting aerial cable, service drop, and other multiple conductor cable, include total feet of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

W. R. Moyers, Jr.
Vice President
November 29, 1960

[fol. 6396] United States Department of Justice

Schedule II

November 22, 1960.

Gross Additions[1] of Underground Electrical Conductor to Electric Utility Plant for Each of the Years 1950, 1955 and 1959

Memphis Light, Gas & Water Division
179 Madison Avenue
Memphis, Tennessee

Type of Underground Cable	Answer in Thousands of Feet[2] 1950	1955	1959
A. Transmission cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	0	124	0
2. Aluminum & Aluminum Alloy	0	0	0
B. Distribution cable	xxxxxxxx	xxxxxxxx	xxxxxxxx
1. Copper	139	89	49
2. Aluminum & Aluminum Alloy	0	0	0

[1] Electrical conductor installed in new construction and for replacement exclusive of conductor used for maintenance.

[2] In answering for each classification give the total, for all sizes, in thousands of feet of single conductor cable. In cases of multiple conductor cable, include the total of single conductor constituting each cable.

The aforesaid information has been supplied from books and records maintained by this utility in the regular course of business and to the best of my knowledge and belief is true.

W. R. Moyers, Jr.
Vice President
November 29, 1960

[fol. 6397] United States Department of Justice

Schedule III

Memphis Light, Gas & Water Division
179 Madison Avenue
Memphis, Tennessee

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule I (overhead lines). If so, describe the changes indicating when they will occur.

In 1960 the proportion of copper and aluminum will be the same as 1959. We expect to use aluminum on all primary lines and on some of the secondary lines. Copper is still used on secondary lines and will be for some time.

B. State whether you restrict or limit the use of aluminum conductor for overhead lines because of corrosion by salt water or chemicals, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

No limitation.

W. R. Moyers, Jr.
Vice President
November 29, 1960

[fol. 6398] United States Department of Justice

Schedule IV

Memphis Light, Gas & Water Division
179 Madison Avenue
Memphis, Tennessee

A. State whether you expect any increase or decrease in 1960 or in subsequent years in the proportion of aluminum to copper used in any classification of Schedule II (underground cables). If so, describe the changes indicating when they will occur.

We expect no change.
Aluminum will not be used in underground work.

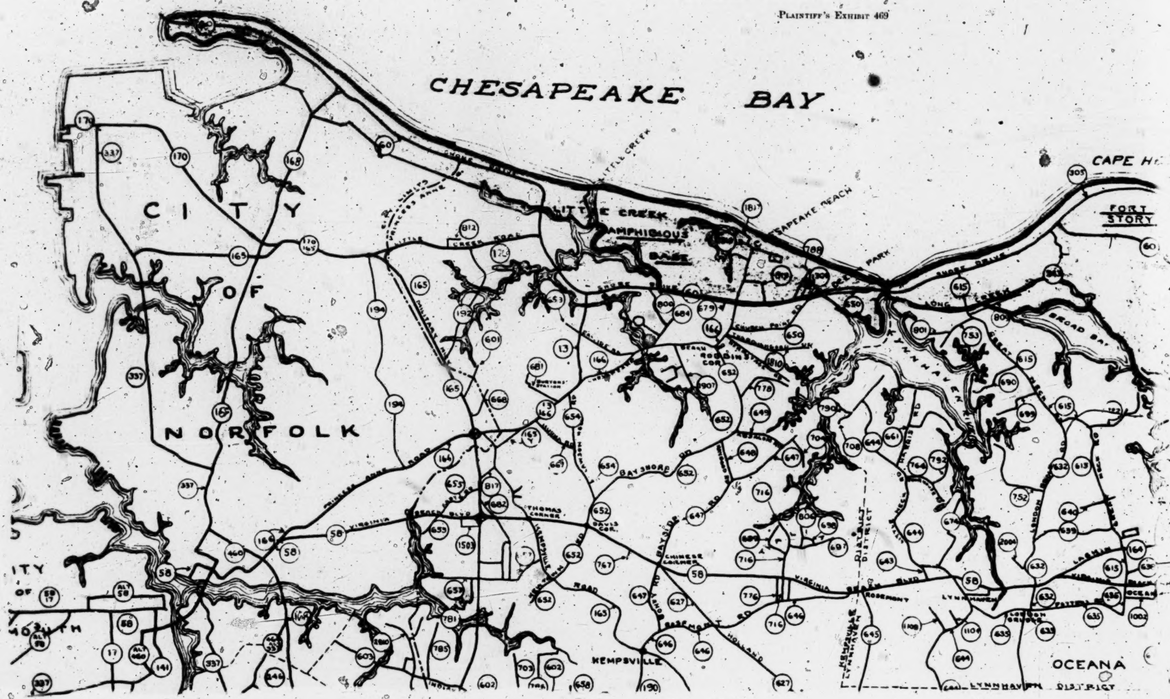
B. State whether you restrict or limit the use of aluminum conductor for underground cables because of space limitations, size of existing ducts, corrosion by salt water, soil conditions, or for other reasons. If so, describe the restrictions or limitations and give the reasons therefor.

In existing underground conduits we do not use aluminum because of insufficient space for aluminum cables. In new conduit we do not use aluminum cable because of the expense of the larger conduits required by the aluminum cables.

W. R. Moyers, Jr.
Vice President
November 29, 1960

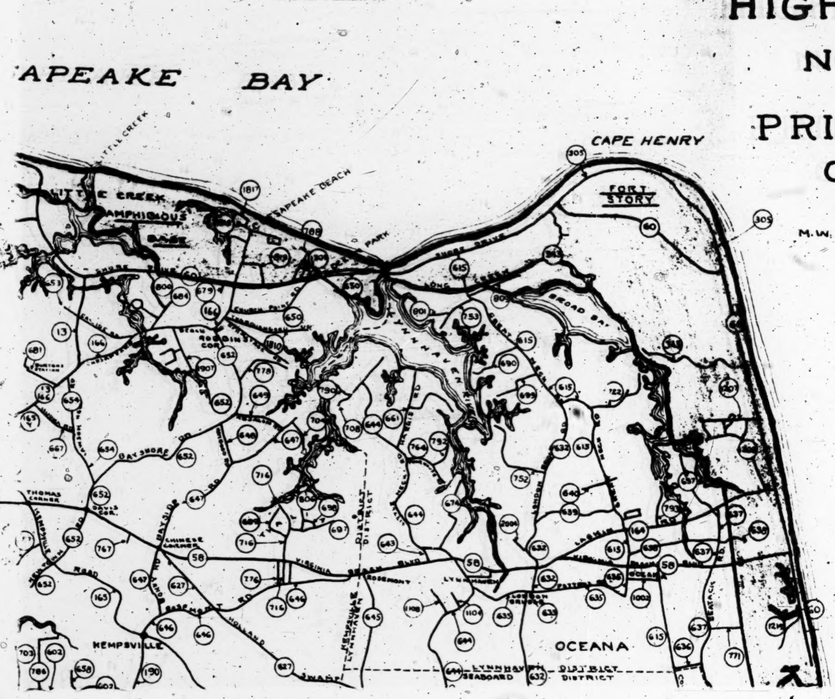
[fol. 6399] In United States District Court

Plaintiff's Exhibit 469



[fol. 6399] In United States District Court

Plaintiff's Exhibit 469



HIGHWAY MAP

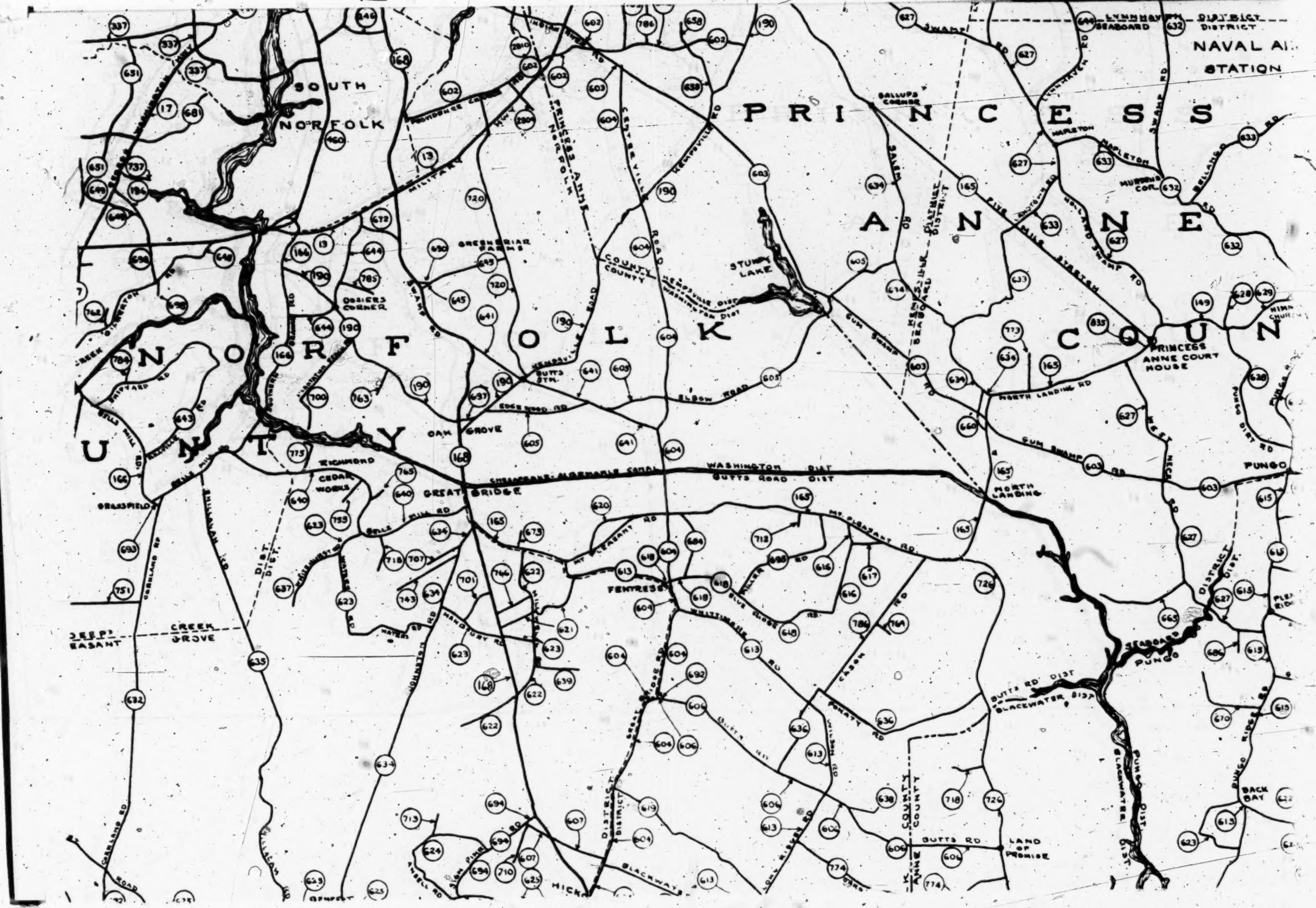
NORFOLK AND PRINCESS ANNE COUNTIES

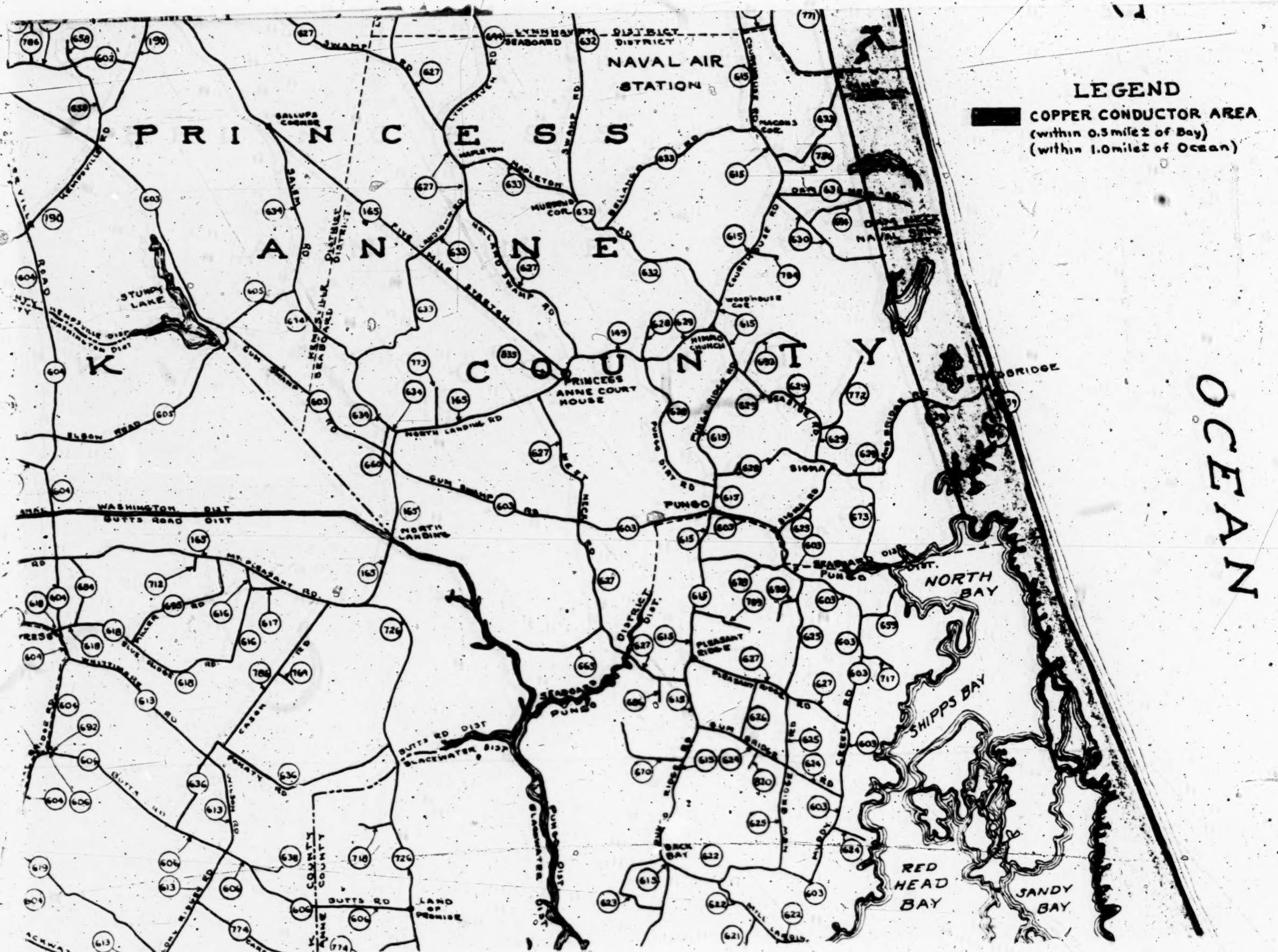
SCALE - 1 INCH = 1 MILE

M. W. BARRETT

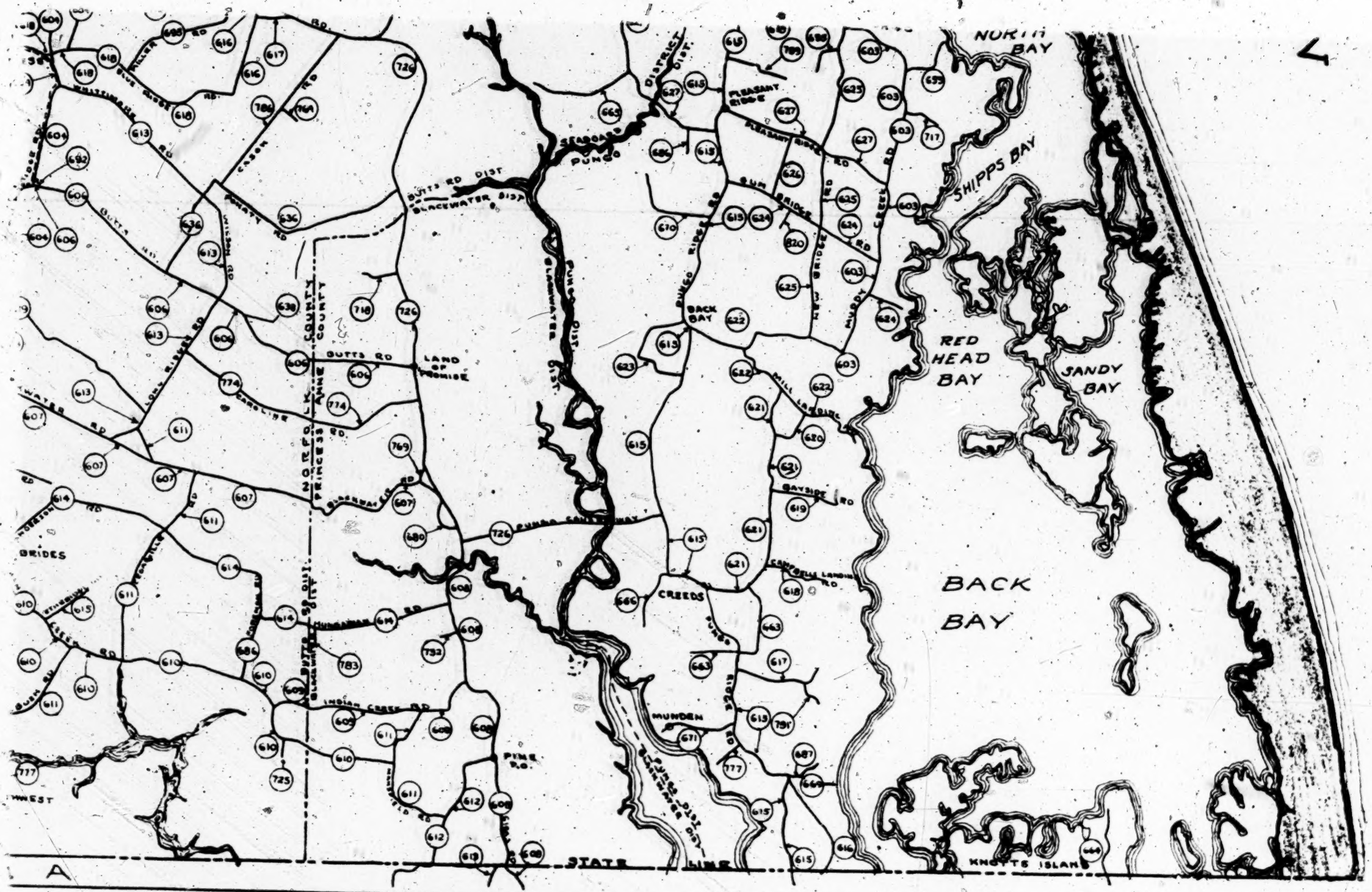
MAY 16, 1856
Revised Aug 1957 MG
Revised Aug 5 1958 MG

ATLANTIC


SOUTH
NORFOLK
NORFOLK
COUNTY
PRINCESS
ANNE
COUNTY
NAVAL AIR
STATION
GREAT BRIDGE
FENTRESS
OAK GROVE
CREEK
DEEP
CREEK
GRASSFIELD
RICHMOND
CEDAR
WORKS
OFFICERS
CORNER
GREENBRIAR
FARMS
STUMP
LAKE
NORTH LANDING
PRINCESS
ANNE COURT
HOUSE
PUNGO
BACK
BAY
LAND
OF
PROMISE
SALUDA
CORNER
HAMPTON
HUMPHREYS
CORNER
LYNNHAVEN
SEABOARD
DISTRICT
DISTRICT
WASHINGTON DIST
BUTTS ROAD DIST
BLACKWATER DIST
PUNGO DIST
SWAMP
MILITARY
HIGHWAY
ELBOW ROAD
GUM SWAMP
BUTTS RD
BUTTS RD DIST
BLACKWATER DIST
PUNGO DIST
DISTRICT
DISTRICT
DIST.
DIST.
DIST.

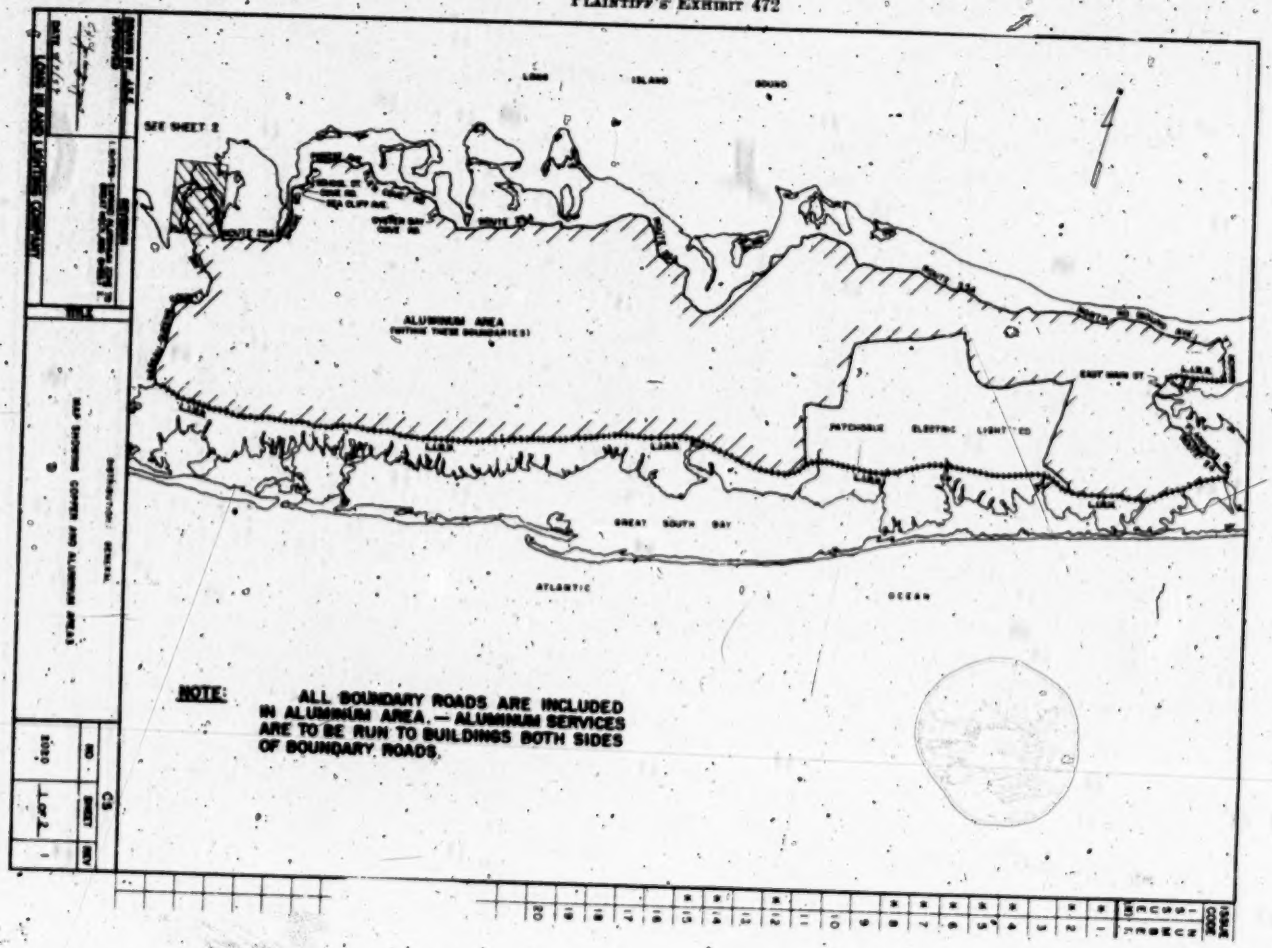

LEGEND
COPPER CONDUCTOR AREA
(within 0.5 mile ± of Bay)
(within 1.0 mile ± of Ocean)
PRINCESS ANNE COUNTY
NAVAL AIR STATION
LYNNHAVEN SEABOARD DISTRICT
DISTRICT
SWAMP
RD
LYNNHAVEN RD
SWAMP RD
COURTHOUSE RD
WAGONS COR.
HAPLETON
HAPLETON
HUBBARD COR.
BELLAMY RD
COURTHOUSE RD
WOODHOUSE COR.
DAM
DAM NECK NAVAL STATION
GALLUPS CORNER
SALEM
SALEM RD
DISTRICT
FIVE MILE
FIVE MILE BRANCH
SWAMP RD
STUMPY LAKE
NORFOLK CITY
KEMPSVILLE DIST
WASHINGTON DIST
KEMPSVILLE RD
GUM SWAMP
BEECH GROVE DISTRICT
ELBOW ROAD
PRINCESS ANNE COURT HOUSE
NORTH LANDING RD
GUM SWAMP RD
NECK RD
WEST NECK
WASHINGTON DIST
BUTTS ROAD DIST
NORTH LANDING
MT. PLEASANT RD
BLUE GRASS RD
WHITEHURST RD
CASON RD
POMATY RD
WILSON RD
BUTTS RD DIST
BLACKWATER DIST
PUNGO DIST
PUNGO
PUNGO DIST RD
PUNGO
PUNGO
BRADFORD DIST.
BRADFORD
PUNGO
PUNGO DIST
PLEASANT RIDGE
PLEASANT RIDGE RD
GUM BRIDGE
GUM BRIDGE RD
RED CREEK RD
RED CREEK
MUDDY
BRICK BAY
BRICK BAY
MILL LANDING
BUTTS RD
LAND OF PROMISE
COUNTY
COUNTY
SCHWATKA
NORTH BAY
SHIPPS BAY
RED HEAD BAY
SANDY BAY
OCEAN

DEEP CREEK
PEASANT GROVE
CORINTH
DIST
DIST
FENTRESS
BUTTS RD DIST
BLACKWATER DIST
PUNGO
DISTRICT
DISTRICT
COUNTY
COUNTY
BUTTS RD
LAND OF PROMISE
BENEFIT
HICKORY
GERTIE
NORTHWEST
ST. BRIDES
CREEDS
MUNDEN
PINE P.O.
BACK BAY
STATE LINE
NORTH CAROLINA
STATE LINE

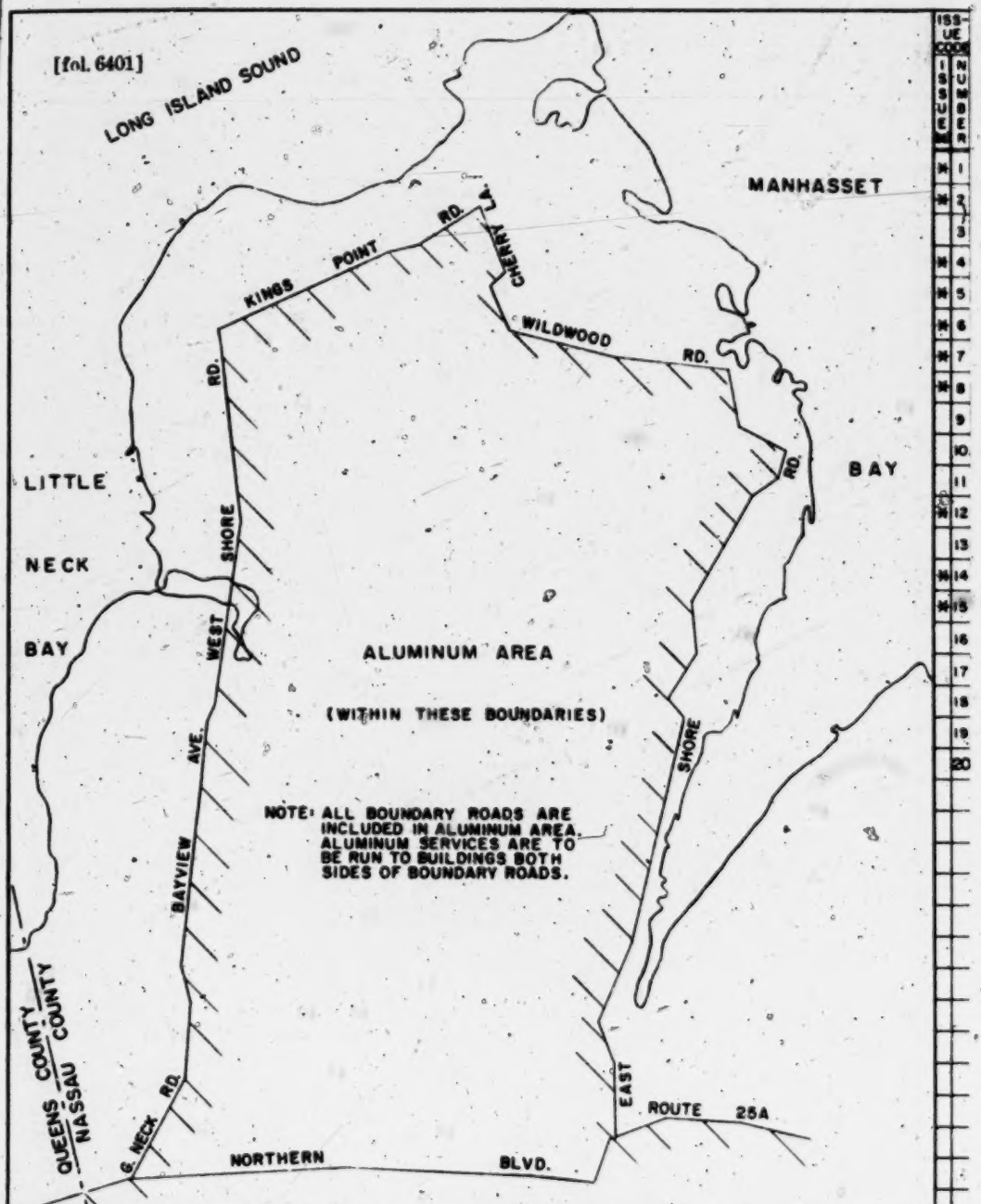

NORTH BAY
SHIPPS BAY
RED HEAD BAY
SANDY BAY
BACK BAY
KNOTTS ISLAND
STATE LINE
BUTTS RD DIST
BLACKWATER DIST
PUNGO DIST
PUNGO
BACK BAY
MUNDEN
CREEDS
BRIDES
WEST
PINE RD.
LAND OF PROMISE
COUNTY LINE
PRINCESS ANNE COUNTY
PLEASANT RIDGE RD
GUM RIDGE RD
MURDY CREEK RD
MILL LANDING
GAYSIDE RD
CARTERET LANDING RD
INDIAN CREEK RD
WHITTINGHAM RD
BLUE RIDGE RD
WILSON RD
CAROLINE
LOCK KEEPERS RD
BUSH RD
ETHERIDGE
A

[fol. 6400] In United States District Court

Plaintiff's Exhibit 472



[fol. 6401]



ISSUE CODE

ISSUE	RECISION
*	1
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	3
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*	14
*	15
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	18
	19
	20

DRAWN BY A.E.F. | REVISION

APPROVED

DATE 11-2-60

LONG ISLAND LIGHTING COMPANY

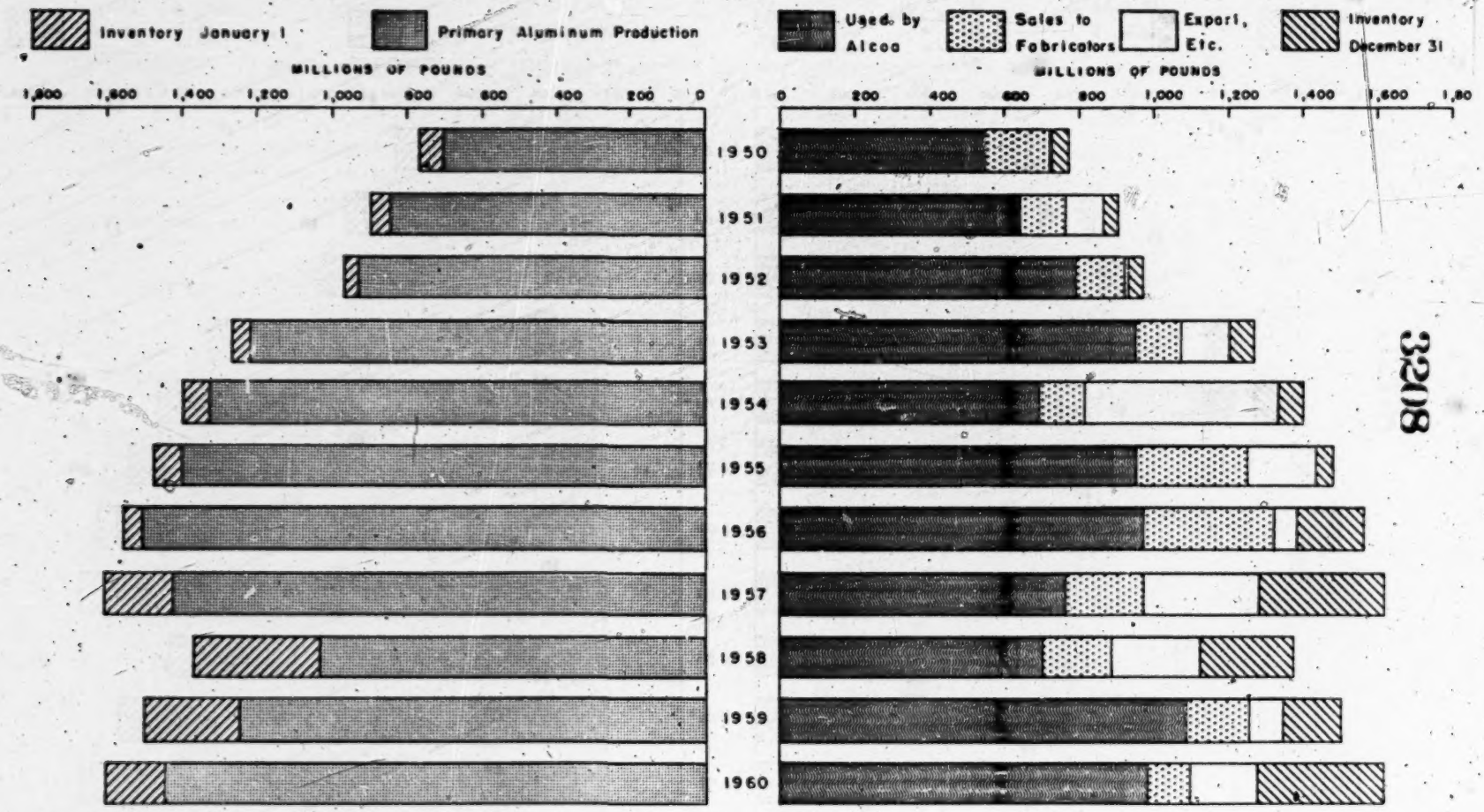
DISTRIBUTION: GENERAL

MAP SHOWING
COPPER AND ALUMINUM AREAS
IN GREAT NECK

CS NO	SHEET	REV
2020	2 of 2	

Plaintiff's Exhibit 502

ALCOA PRIMARY ALUMINUM PRODUCTION, SOLD TO CUSTOMERS, AND USED BY ALCOA



Source: Defendants' Exhibits AR44 and AR44(A).

8123

[fol. 6403]

Alcoa Primary Aluminum Production, Sold to Customers and Used By Alcoa
(000's of lbs.)

	1950	1951	1952	1953	1954	1955
Primary Aluminum Production	707,954	851,080	935,136	1,222,614	1,331,874	1,404,461
Inventory January 1	61,591	46,643	34,949	44,223	71,691	74,457
Total Available for Sales or Use	769,545	897,723	970,085	1,266,837	1,403,565	1,478,918
Sales to Fabricators	167,495	119,209	126,690	119,925	115,082	294,723
Exports, etc.[1]	562	98,996	8,631	128,448	520,450	182,174
Used by Alcoa	554,843	644,569	790,541	946,773	693,576	950,955
Inventory December 31	46,643	34,949	44,223	71,691	74,457	51,066
	769,543	897,723	970,085	1,266,837	1,403,565	1,478,918

	1956	1957	1958	1959	1960
Primary Aluminum Production	1,512,278	1,424,095	1,041,724	1,253,585	1,453,970
Inventory January 1	51,066	187,277	332,143	250,579	157,002
Total Available for Sales or Use	1,563,344	1,611,372	1,373,867	1,504,164	1,610,972
Sales to Fabricators	348,386	209,119	175,499	169,004	113,732
Exports, etc.[1]	59,912	306,910	243,043	94,209	184,150
Used by Alcoa	967,769	763,200	704,746	1,083,949	976,497
Inventory December 31	187,277	332,143	250,579	157,002	336,593
	1,563,344	1,611,372	1,373,867	1,504,164	1,610,972

[1] Exports, Stockpile, Toll Conversion, Exchange and Sales to Other Primary Producers.

Source: Defendants' Exhibits AR44 and AR44 (A).

[fol. 6404] IN UNITED STATES DISTRICT COURT

DEFENDANT'S EXHIBIT 4

U. S. Department of Commerce

Business and Defense Services Administration Aluminum and Magnesium Division

Shipments of Wire by Primary Producers or Affiliates (Including Merged Companies) and Other Producers, 1954–1960 [1]
(Thousands of Pounds)

	Total	Primary producers or affiliates	Other producers
		Bare Wire	
1954	47,242	32,763	14,479
1955	63,116	44,642	18,474
1956	63,136	44,207	18,929
1957	53,585	36,235	17,350
1958	46,465	30,844	15,621
1959	66,740	45,493	21,247
1960	57,097	37,681	19,416
		Insulated or Covered Wire & Cable	
1954	25,009	17,059	7,950
1955	40,091	29,190	10,901
1956	57,588	36,024	21,564
1957	50,753	32,287	18,466
1958	51,346	36,056	15,290
1959	61,153	41,641	19,512
1960	64,215	43,197	21,018

Source: Reports on Form BDSAF-122.

[1] Primary producers or affiliates included, for all years 1954–1960, are Aluminum Company of America, Anaconda Wire & Cable Co., Kaiser Aluminum and Chemical Corp., Olin Mathieson Chemical Corp., and Reynolds Metals Co., and the merged companies included for years prior to merger are Rome Cable Corp., Southern Electrical Corp., and U. S. Rubber Co. "Other producers" include captive plants in all years. These figures are consequently different from figures previously released on integrated and nonintegrated shipments.

USCOMM-DC

November 8, 1961

[fol. 6405] IN UNITED STATES DISTRICT COURT

DEFENDANT'S EXHIBIT 5

Directory of Aluminum Suppliers
Revised, April 1, 1961

This Directory was Prepared for Use Only in the Aluminum and Magnesium Division and Should Not Be Construed As Being A Complete Or Official Listing.

U. S. Department of Commerce

Business and Defense Services Administration

[fol. 6406] Directory of Aluminum Suppliers

Classification	No. of Companies	Page
Primary Ingot	6	1-7
Secondary Ingot	84	8-10
Extrusion Billet	68	11-13
Sheet and Plate	34	14
Foil	16	15
Rolled Structural Shapes	2	16
Rolled Rod and Bar	9	16
Wire, bare, conductor and nonconductor	28	17
ACSR and Aluminum Cable, bare	11	18
Wire and Cable, insulated or covered	29	19
Extruded Shapes	129	20-24
Drawn Tube	17	25
Welded Tube	10	26
Powder and Paste	9	26
Forgings	41	27-28
Captive Plants (included in above products) 33 companies.		29-30
Total	493*	

* Including companies listed in more than one classification.

[fol. 6407]

Aluminum Company of America

Main Office, 1501 Alcoa Building, 425 Sixth Ave., Pittsburgh 19, Pa. Ring Bldg., 1200—18th St., N. W. Washington 6, D. C.

	Plants:		
Primary Ingot	Alcoa, Tenn.	Badin, N.C.	*Evansville, Ind.
	Massena, N.Y.	Point Comfort, Tex.	Rockdale, Tex.
Extrusion Billet	Vancouver, Wash.	Wenatchee, Wash.	
	Cleveland, Ohio	Cressona, Pa.	Detroit, Mich.
	Lafayette, Ind.	Los Angeles, Cal.	New Kensington, Pa.
Sheet and Plate	Rockdale, Tex.	Vancouver, Wash.	
Foil	Alcoa, Tenn.	Davenport, Iowa	*Edgewater, N.J.
	Alcoa, Tenn.	Davenport, Iowa	Edgewater, N.J.
Rolled Structural Shapes	New Kensington, Pa.		
	Massena, N.Y.	Vancouver, Wash.	
Rolled Rod and Bar	Massena, N.Y.	Vancouver, Wash.	
Wire, bare Conductor and nonconductor	Massena, N.Y.	Vancouver, Wash.	
ACSR and Aluminum Cable, bare	Massena, N.Y.	Vancouver, Wash.	
Wire and Cable, insulated or covered	Ft. Wayne, Ind.	Lafayette, Ind.	Massena, N.Y.
Extruded Shapes	Cressona, Pa.	Lafayette, Ind.	Los Angeles, Cal.
	New Kensington, Pa.	Vancouver, Wash.	
Drawn Tube	Lafayette, Ind.	Los Angeles, Cal.	New Kensington, Pa.
Welded Tube	Alcoa, Tenn.		
Powder and Paste	Alcoa, Tenn.	New Kensington, Pa.	
Forgings	Cleveland, Ohio	Edgewater, N.J.	Los Angeles, Cal.

* Reduction plant supplying aluminum in molten metal form.

[fol. 6408]

Subsidiaries:	Plants:		
Cupples Products Corp.			
Extrusion Billets	St. Louis, Mo.		
Extruded Shapes			
Rea Magnet Wire Co., Inc.			
Wire and Cable, insulated or covered	Ft. Wayne, Ind.	Lafayette, Ind.	
Rome Cable Corp.			
Rolled Rod and Bar	Rome, N.Y.		
Wire, bare, conductor and nonconductor			
ACSR and Aluminum Cable, bare			
Wire, and Cable, insulated or covered			

[fol. 6409]

Anaconda Company, The	Main Office, 25 Broadway, New York City 4, N.Y. 1511 "K" St., N. W., Washington 5, D. C.
(Subsidiaries)	
Anaconda Aluminum Company	1430 South 13th Street, Louisville 1, Kentucky
	Plants:
Primary Ingot	Columbia Falls, Montana
Extrusion Billet	Columbia Falls, Montana
	Terre Haute, Indiana
Sheet and Plate	Louisville, Kentucky
	Terre Haute, Indiana
Foil	Louisville, Kentucky
Rolled Rod and Bar	Terre Haute, Indiana
Extruded Shapes	Terre Haute, Indiana
Drawn Tube	Terre Haute, Indiana
Anaconda Wire & Cable Co.	25 Broadway, New York 4, N.Y.
	Plants:
Wire, bare, conductor and nonconductor	Great Falls, Mont., Hastings-on-Hudson, N.Y., Orange, Calif., Sycamore, Ill., Watkinsville, Ga.
ACSR and Aluminum Cable, bare	Great Falls, Mont., Hastings-on-Hudson, N.Y., Orange, Calif., Sycamore, Ill., Watkinsville, Ga.
Wire and Cable, insulated or covered	Hastings-on-Hudson, N.Y., Marion, Ind., Orange, Calif., Sycamore, Ill., Watkinsville, Ga.

[fol. 6410]

Harvey Aluminum (Incorporated)	Main Office, 19200 South Western Ave. Torrance, Calif. 1001 Connecticut Ave., N. W., Washington, D. C.
	Plants:
Primary Ingot	The Dalles, Ore.
Extrusion Billet	Torrance, Calif.
Rolled Rod and Bar	" "
Extruded Shapes	" "
Drawn Tube	" "
Welded Tube	" "
Forgings	" "

[fol. 6411]

Kaiser Aluminum & Chemical Corporation	Main Office, 300 Lakeside Dr., Oakland 12, California 1625 Eye St., N. W., Washington 6, D. C.	
	Plants:	
Primary Ingot	Chalmette, La.	Ravenswood, W. Va.
	Spokane, Wash.	Takoma, Wash.
Extrusion Billet	Chalmette, La.	Dolton, Ill.
	Halethorpe, Md.	Newark, Ohio
Sheet and Plate	Ravenswood, W. Va.	Spokane, Wash.
Foil	Ravenswood, W. Va.	Permanente, Cal.
Rolled Rod and Bar	Newark, Ohio	
Wire, bare, conductor and nonconductor	Bristol, R. I.	Newark, Ohio
ACSR and Aluminum Cable, bare	Newark, Ohio	
Wire and Cable, insulated or covered	Bristol, R. I.	Newark, Ohio
Extruded Shapes	Dolton, Ill.	Halethorpe, Md.
Drawn Tube	Dolton, Ill.	Halethorpe, Md.
Welded Tube	Spokane, Wash.	
Forgings	Erie, Pa.	

[fol. 6412]

Ormet Corporation	Hannibal (Omal) Ohio Producers for Olin Mathieson Chemical Corp., and Revere Copper and Brass Inc.
Primary Ingot	Hannibal (Omal) Ohio
Extrusion Billet	Hannibal (Omal) Ohio
Olin Mathieson Chemical Corporation	Main Office, Metals Division—8th Floor, 400 Park Ave., New York 22, N.Y. 1730 "K" Street, N.W., Washington 6, D.C.
Extrusion Billet	Gulfport, Miss.
Sheet and Plate	Hannibal (Omal) Ohio
Extruded Shapes	Gulfport, Miss., New Haven, Conn., and Almetco, Inc.-Subsidiary, Nesquehoning, Pa.
Wire, bare, conductor and nonconductor	Chattanooga, Tenn.
ACSR and Aluminum Cable, bare	Chattanooga, Tenn.
Wire and Cable, insulated or covered	Chattanooga, Tenn.
Revere Copper and Brass Incorporated	Main Office, 230 Park Avenue, New York 17, N.Y.
Extrusion Billet	Baltimore, Md.
Sheet and Plate	Baltimore, Md., Chicago, Ill., Newport, Ark.
Foil	Newport, Ark.
Extruded Shapes	Baltimore, Md.
Drawn Tube	Baltimore, Md.
Welded Tube	Baltimore, Md.
Forgings	Rome, N.Y.

[fol. 6413]

Reynolds Metals Company

Main Office, 6601 West Broad St., Richmond 18, Va.
918–16th St., N.W., Wash. 6, D.C.

	Plants:	
Primary Ingot	Arkadelphia, Ark.	*Jones Mills, Ark.
	*Listerhill, Ala.	Longview, Wash.
	*Massena, N.Y.	San Patricio, Tex.
	Troutdale, Ore.	
Extrusion Billet	Arkadelphia, Ark.	Grand Rapids, Mich.
	Longview, Wash.	Massena, N.Y.
	Phoenix, Ariz.	Richmond, Va.
	Listerhill, Ala.	McCook, Ill.
Sheet and Plate	Louisville, Ky.	Richmond, Va.
Foil	Listerhill, Ala.	
Rolled Structural Shapes	Listerhill, Ala.	
Rolled Rod and Bar	Listerhill, Ala.	
Wire, bare, conductor and nonconductor	Listerhill, Ala.	
ACSR and Aluminum Cable, bare	Listerhill, Ala.	
Wire and Cable, insulated or covered	Grand Rapids, Mich.	Louisville, Ky.
Extruded Shapes	Phoenix, Ariz.,	Richmond, Va.
	Torrance, Cal.	
	Phoenix, Ariz.	Richmond, Va.
Drawn Tube	Listerhill, Ala.	
Welded Tube	Louisville, Ky.	
Powder and Paste		

* Reduction plants supplying aluminum in molten metal form.

[fol. 6414] Secondary Ingot

A. M. A. Corp., P. O. Box 63, Rockville Centre, N. Y.

Abasco, Inc., P. O. Box 13367, Dallas 20, Texas

Alan-Barr Aluminum Co., Inc., 118 East Front St., Palmyra, Pa.

Allied Metal Co., 1105-15 West Liberty St., Chicago 8, Ill.

Allied Smelting Co., 1740 East 12th St., Cleveland 14, Ohio

Alloys & Chemicals Mfg. Co., Inc., 4365 Bradley Rd., S.W. Cleveland 9, Ohio

Aluminum and Magnesium, Inc., P. O. Box 720, 1 Huron St., Sandusky, Ohio and Corona, Cal.

Aluminum Billets, Inc., 3786 Oakwood Ave., Youngstown 9, Ohio

Aluminum Industries, Inc., (Triplex Corp. of America) Box 606, Pueblo, Colo.

Aluminum Smelters, Inc., P. O. Box 1517, 31-33 Vine St., New Haven 6, Conn.

Aluminum Smelters of New Jersey, Inc. (Sub. of Belmont Aluminum Extrusion Co.), Delair, N. J.

Aluminum Smelting and Refining Co., 5463 Dunham Rd., Maple Heights, Ohio

American Alloys Corp., 4446 Belleview, Kansas City 11, Mo.

American Smelting & Refining Co., Federated Metals Division, 120 Broadway, New York, N. Y.—Plants: Alton, Ill., Detroit, Mich., Los Angeles, Cal., Perth Amboy, N. J.

Apex Smelting Co., 2537 West Taylor, Chicago 12, Ill. Plants: Cleveland 5, Ohio, Long Beach, Cal.

Arkansas Alloys & Castings, Inc., 700 N. Washington Street, Magnolia, Ark.

Armet Alloys, Inc., 4338 Bradley Rd., Cleveland 9, Ohio

Associated Metals Co. of California, 2730 Peralta St., Oakland 7, Cal.

Aurora Refining Co., P. O. Box 88, Aurora, Ill.

Batchelder (Charles) Co., Inc., Botsford, Conn.

Bay Billets, Inc., 1308 Olds St., Sandusky, Ohio

Bay State Aluminum Co., Inc., P. O. Box 89, Middleboro, Mass.

Belmont Smelting & Refining Works, Inc., 330 Belmont Ave., Brooklyn 7, N. Y.

Berman Bros. Iron & Metal Co., Inc., 2501 First Ave., North Birmingham, Ala.

Briel Industries, Inc., 2232 E. Market St., New Albany, Ind. and Industrial Park, Shelbyville, Ky.

Brunswick Salvage & Foundry, Inc., Southend Shipyard, Brunswick, Ga.

Bullock (W. J.), Inc., P. O. Box 539, Fairfield, Ala.

Capital Smelting & Refining Co., P. O. 571, 7 Southwest 10th St., Oklahoma City, Okla.

Cedergren Metals Co., 1901 West Commerce St., Box 5562, Dallas 8, Texas

Certified Metals Mfg. Co., 534 West 12th St., Newport, Ky.

Chersky (Jon) & Sons, 441 Florence Ave., West Inglewood, Cal.

Cleveland Electro Metals Co., 2391 West 38th St., Cleveland 13, Ohio

Cohn (H.) & Sons, Inc., 4528 W. Division St., Chicago 51, Ill.

Colonial Metals Co., 2nd & Linden, Columbia, Pa.

Continental Copper & Steel Industries, Inc., Niagara Falls Smelting & Refining Division, 2208 Elmwood Ave., Buffalo 23, N. Y.

Delta Smelting Corp., Box 722, Macon, Georgia

[fol. 6415] Elkins (J. R.) Inc., 518 Gardner Ave., Brooklyn 22, N. Y.

Excel Smelting Corp., 1300-1310 North Seventh St., Memphis 7, Tenn.

Extrusion Ingot Co., (Sub-Precision Extrs. Inc.)—190 East Green Ave., Bensenville, Ill.

Ferer (Aaron) and Sons, Inc., 2300 East 11th St., and 3248 Long Beach Ave., Los Angeles 21, Cal.

Garfield Company, 55—1st St., Berea, Ohio

General Aluminum Smelting Co., 1506 Eastern Ave., Kansas City 26, Mo.

General Smelting Co., 2901 Westmoreland, Philadelphia 34, Pa.

Gett-sburg Foundry Specialties Co., R. F. D. #2, Gettysburg, Pa.

Globe Metals Co., 1820—10th St., Oakland 20, Cal.

Goldberg Metal Refining Co., 14700 South Avalon Blvd., Gardena, Cal.

Greenfield (Samuel) Co., Inc., 31 Stone St., Buffalo 12, N. Y.

Hall Aluminum Co., P. O. Box 223, 17th & State Sts., Chicago Heights, Ill.

Hamden Smelting Co., Inc., P. O. Box 1528, Edmund St., New Haven 6, Conn.

Henning Brothers & Smith, Inc., 91-113 Scott Ave., Brooklyn 37, N. Y.

Hi-Duty Alloys Corp., 7201 East Marginal Way, Seattle 8, Wash.

Holtzman (M.) Metal Co., 5223 McKissick Ave., St. Louis 7, Mo.

Industrial Smelting Div. of Christiansen Corp., P. O. Box 205, 499 East 16th St., Chicago Heights, Ill.

Jobbins (William F.) Inc., Aurora, Ill.

Kimerling (M.) & Sons, Inc., P. O. Box 1108, 2020 Vanderbilt Rd., Birmingham 1, Ala.

Kirk (Morris P.) & Son, Inc., 2700 South Indiana St., Los Angeles 23, Cal.

Lavin (R.) & Sons, Inc., 3426 Kedzie Ave., Chicago 23, Ill.

Materials Reclamation Co., 6760 West Marginal Way, Seattle 6, Wash.

McGowan Co. Inc., 1205 South Boyle Ave., Los Angeles 23, Cal.

Milward Alloys, Inc., P.O. Box 336, North Transit & Mill Sts., Lockport, N.Y.

National Metal & Smelting Co., P.O. Box 586, 210 Northwest 4th St., Ft. Worth, Texas.

North American Smelting Co., Marine Terminal, Wilmington 99, Del.

Northwestern Metal Co., 900 "T" St., Lincoln 1, Nebr.

Paragon Smelting Corp., 36-08 Review Ave., Long Island City, New York.

Pioneer Aluminum, Inc. (Sub. of Morris P. Kirk & Sons, Inc.), P.O. Box 45367, 5251 West Imperial Highway, Los Angeles 45, Cal.

Progressive Metals Co., 16914 South Broadway, Gardena, Cal.

Renard of Connecticut, Inc., Barnum Smelting Co. Division, 1548 Barnum Ave., Bridgeport 8, Conn.

Republic Smelting & Refining Co., 19031 South Hamilton Ave., Gardena, Cal.

Rochester Smelting & Refining Co., Inc., P.O. Box 547, 26 Sherer St., Rochester 2, N. Y.

Roessing Bronze Co., Etna, 320 Barbour Street, Pittsburgh 23, Pa.

Roth Smelting Co., P.O. Box 83, Thompson Road, Syracuse 1, N. Y.

Russell (Robert) Metals, Inc., 5761 N.W. 37th Ave., Miami, Fla.

Sall (George), The, Metals Co., Inc., 2300 Butler St., Philadelphia 37, Pa.

Sonken-Galamba Corp., Riverview at Second St., Kansas City 18, Kans. Plants: Gardena, Cal., North Miami, Fla.

[fol. 6416] South Bend Smelting & Refining Co., 1610 Circle Ave., South Bend 21, Ind.

Tomke Aluminum Division, United Iron & Metals Co., Inc., 4201 East Monument St., Baltimore 5, Md.

Union Aluminum Co. Inc., Sheffield, Ala.

U. S. Aluminum Corp. of Pennsylvania, P.O. Box 8, Marietta, Pa.

U. S. Reduction Co., 4610 Melville Ave., East Chicago, Ind. Plant: Toledo, Ohio.

Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

Viener (Hyman) & Son, P.O. Box 573, 5309 Hatcher St., Richmond, Va.

Wabash Smelting Inc., Wabash, Ind.

Western Metal Co., 3201 South Kedzie Ave., Chicago 23, Ill.

Youngstown Manufacturing, Inc., Metalcast Division, 70 Prospect St., Youngstown, Ohio.

[fol. 6417] **Extrusion Billet**

ABC, Inc. (Affil. with Fentron Industries, Inc., Seattle, Wash.) 2653 Market St., Seattle 7, Wash.

Adams Engineering Co., Inc., P. O. Box 875, Ojus, Fla. Plant; 19300 Biscayne Blvd., Miami, Fla.

Adams & Westlake Co., The, 1025 No. Michigan St., Elkhart, Ind.

Almetco, Inc.,—See Olin Mathieson Chemical Corp.

Alsco, Inc., P. O. Box 270, 225 South Forge, Akron Ohio.

Plants: 310 Allwood Rd., Clifton, N.J. and Gnadenhutten, Ohio

Aluminum Billets, Inc., 3786 Oakwood Ave., Youngstown, 9, Ohio

Aluminum Company of America, 1501 Alcoa Bldg., 425 Sixth Ave., Pittsburgh, Pa. Plants: Cleveland, Ohio, Cressona, Pa., Detroit, Mich., Lafayette, Ind., Los Angeles, Cal., New Kensington, Pa., Rockdale, Tex., and Vancouver, Wash., Sub-Cupples Products Corp., St. Louis, Mo.

Aluminum Extrusion Co., 3042 Treadwell St., Los Angeles 65, Cal.

Aluminum Press Corp., 20th & Allegheny Ave., Philadelphia 32, Pa.

Aluminum Shapes, Inc., (Affil. with Belmont Aluminum Extrusions Co., Philadelphia, Pa.) 9000 River Rd., Delair, N.J.

American-International Aluminum Corp., 4851 N.W. 36th Ave., 3765 N.W. 74th St., Miami, Fla. and 495 Brokaw Rd., San Jose, Cal.

Anaconda Aluminum Co., Sub. of The Anaconda Co., 1430 South 13th St., Louisville 1, Ky. Plants: 449 North 9th St., Terre Haute, Ind., Columbia Falls, Mont.

Apex Smelting Co., 2537 West Taylor, Chicago 12, Ill.

Arkansas Alloys & Castings, Inc., Div. of Southern Extrusions, Inc., 700 N. Washington St., Magnolia, Ark.

Badger Aluminum Extrusions, 960 Georgia Ave., Brooklyn 7, N. Y.

Barberton Metal Products Co., Inc., Sub. of Weather Seal, Inc., 24 Huston St., Barberton, Ohio

Bauer Aluminum Co., P. O. Box 30218, Dallas 30, Tex. Plant: 100 W. Spring Valley Road, Richardson, Tex.

Bay Billets, Inc., 1308 Olds St., Sandusky, Ohio

Belmont Aluminum Extrusions Co.—See Aluminum Shapes, Inc.

Bohn Aluminum & Brass Corp., 1400 Lafayette Bldg., Detroit 26, Mich. Plant: Butler, Ind.

Bonnell (William L.) Co., Inc., The, 78 Fair St., Newman, Ga.

Briel Industries, Inc., 2232 E. Market St., New Albany, Ind., and Industrial Park, Shelbyville, Ky.

Bristol Aluminum Co., P. O. Box 11, Emilie Rd. and Green Lane, Bristol, Pa.

Capitol Door Co., Div. of Capitol Products Corp., P.O. Box 69, Mechanicsburg, Pa. Plant: Route 11, Carlisle Pyke, Mechanicsburg, Pa.

Ceco Steel Products Corp., 5601 W. 26th St., Chicago 50, Ill.

Channel Master Corp., Channel Master Road, Ellenville, N.Y.

Croft Aluminum Company, Inc., Magnolia St., McComb, Miss.

Cupples Products Corp.—See Aluminum Company of America

Detroit Gasket & Mfg. Co., Extruded Metals Division, P.O. Box 151, Belding, Mich.

Dixie Aluminum Corp., 102 North Hanks St., Rome, Ga., and Tube Div., 1200 S. Edwards St., Hattiesburg, Miss.

[fol. 6418] Extrusion Ingot Co. (Sub. of Precision Extrusions, Inc.), 190 East Green Ave., Bensenville, Ill.

Fenestra Inc., 11801 Mack Avenue, Detroit, Mich. Plant: 8501 Hegerman St., Philadelphia 36, Pa.

Flynn (Michael) Manufacturing Co., 700 East Godfrey Ave., Philadelphia 24, Pa.

Fruehauf Trailer Co., P.O. Box 202, Highway #20, Decatur, Ala.

General Motors Corp., GMC Truck & Coach Div., 660 South Blvd. East, Pontiac 11, Mich.

Harvey Aluminum (Inc.), 19200 South Western Ave., Torrance, Cal.

Hercules Aluminum Corp. (Affil. with Warrenville Window Co.), Joliet, Ill.

Himmel Brothers Co., The, 1409-15 Dixwell Ave., Hamden 14, Conn.

Hunter Engineering Co., P.O. Box 272, Riverside, Cal. Plant: 1495 Columbia Ave., Riverside, Cal.

Jarl Extrusions, Inc., Linden Ave., East Rochester, N.Y.

Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Oakland 12, Cal. Plants: Dolton, Ill., Halethorpe, Md., Chalmette, La., Newark, O.

Kawneer Co., 714 North Front St., Niles, Mich. Plant: Powis Road, St. Charles, Ill.

Keller Metal Products, Inc., 4120 N.W. 26th St., Miami, Fla.

Macklanburg-Duncan Co., P.O. Box 1197, Oklahoma City, Okla. Plant: 41st and Santa Fe Sts., Oklahoma City 1, Okla.

Magnode Products, Inc., P.O. Box 292, 400 E. State St., Trenton, Ohio.

May, Inc., P.O. Box 6597, Houston 5, Texas. Plant: 5803 Alief Rd., Houston, Texas.

Midwest Aluminum Corp., 7696 W. Michigan Ave., Kalamazoo, Mich.

National Extrusion & Mfg. Co., Orchard at Elm, Bellefontaine, Ohio.

Northeast Aluminum, Inc., 65 Manchester St., Lawrence, Mass.

Olin Mathieson Chemical Corp.; Metals Div., 400 Park Ave., New York 22, N.Y. Plants: 34th St., Gulfport, Miss., (Almetco, Inc.-Sub), Nesquehoning, Pa.

Ormet Corporation, Hannibal (Omal) Ohio, (Producers for Olin Mathieson Chemical Corp. and Revere Copper and Brass Inc.)

Pfister Aluminum Corp., 54 West Allendale Ave., Allendale, N.J. Plant: 35 Vreeland St., Lodi, N.J.

Pilgrim (F. A.) Co., 4449 Lake Parke Rd., Youngstown 12, Ohio

Precision Extrusions, Inc., 720 East Green Ave., Bensenville, Ill.

Quality Aluminum Products Co., 301 Industrial Ave., Coldwater, Mich.

Revere Copper and Brass Inc., 230 Park Ave., New York 17, N.Y. Plant: Baltimore, Md.

Reynolds Metals Co., 6601 West Broad St., Richmond 18, Va. Plants: Arkadelphia, Ark., Grand Rapids, Mich., Longview, Wash., Massena, N.Y., Phoenix, Ariz., Richmond, Va.

Rogers Industries Inc., 14575 Meyers Rd., Detroit, Mich.

Russell (Robert) Metals, Inc., 5761 N. W. 37th Ave., Miami, Fla.

Saramar Aluminum Co., 4021 Mohoning Ave., Youngstown 1, Ohio

Sonken-Galamba Corp., Riverview at Second St., Kansas City 18, Kans. Plants: Gardena, Cal., and North Miami, Fla.

Southern Extrusions Inc.—See Arkansas Alloys & Castings, Inc.

Superior Industries, Inc., 3786 Oakwood Ave., Youngstown 9, Ohio and So. Amboy, N.J.

[fol. 6419] Texas Aluminum Co., Inc., P. O. Box 417, Plant Rd., Rockwall, Texas, and (West) California City, Cal.

Trim Alloys, Inc., 40 West Third St., Boston 27, Mass.

Union Aluminum Co., 111 Raleigh Ave., Sheffield, Ala.

United Wire & Supply Corp., 1497 Elmwood Ave., Providence 7, R. I. Plant: Cranston, R.I.

Valley Metal Products Co. (Sub. of Mueller Brass Co.) 800 East Bridge St., Plainwell, Mich.

Warner Mfg. Corp., 265 Watsessing Ave., Bloomfield, N.J.

Warrenville Window Co., Inc.,—See Hercules Aluminum Corp.

Wells Aluminum Corp., Box 278, 205 So. Henry St., North Liberty, Ind.

Werner (R. D.) Co., Inc., P.O. Box 580, Osgood Rd., Greenville, Pa.

Wolverine Tube, Div. of Calumet & Hecla, Inc., 17200 Southfield Rd., Allen Park, Mich. Plant: Decatur, Alabama

[fol. 6420] Sheet And Plate

Alsco Inc., 225 South Forge Street, Akron 8, Ohio.

[1] American Screen Products Co., 20 N. Wacker Dr., Chicago, Ill. Plant: Chatsworth, Ill.

Aluminum Co. of America, 1501 Alcoa Bldg., 425 Sixth Ave., Pittsburgh, Pa. Plants: Alcoa, Tenn., Davenport, Iowa, Edgewater, N.J.

Aluminum Mills Inc., 1660 Deerfield Rd., Highland Park, Ill.

Anaconda Aluminum Co. (Sub. The Anaconda Co.), 1430 S. 13th St., Louisville, Ky. Plants: Louisville, Ky., Terre Haute, Ind.

Artcraft Venetian Blind Mfg. Co., 3958-72 Olive St., St. Louis 8, Mo.

Bridgeport Brass Company, 30 Grand Street, Bridgeport 2, Conn. Plants: Riverside, Cal., Griswald St., Warren, Ohio.

Carey-McFall Company, 2156 E. Dauphin St., Philadelphia 25, Pa.

Chase Brass & Copper Co., Inc., (Sub. of Kennecott Copper Corp.) 1914 Sidney Street, Waterbury, Conn.

Consolidated Aluminum Corp., P.O. Box 540, 1100 Richmond St., Jackson, Tenn.

Consolidated General Products Inc., P.O. Box 7425, Houston 8, Texas.

[1] Coors Company, Adolph, 600 Ninth St., Golden, Colo.

The Dow Metal Products Co. (Div. of The Dow Chemical Co.), Midland, Mich. Plants: College & Weaver Sts., Madison, Ill., 701 Liberty St., Jackson, Mich.

Eastern Products Company, 1601 Wicomico St., Baltimore, Mass.

Eastern Rolling Mills, 1122 East 180 St., New York 60, N.Y.

Fairmont Aluminum Co. (Sub. of Cerro Corp.), P.O. Box 912 Fairmont, W. Va.

General Aluminum Corp., 2221 West Jefferson St., Torrance, Cal.

[1] Hi-Ten Metal Products Corp., 21740 South Main Street, Matteson, Ill.

Hunter Engineering Co. (Mills Products Div. of), 1495 Columbia Ave., Riverside, Cal.

Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Oakland 12, Cal. Plants: Ravenswood, W. Va., Spokane, Wash.

[1] Lando Products Inc., Sausalito, Cal.

Levolor Lorentzen Inc., 720 Monroe St., Hoboken, N.J.

[1] Mirro Aluminum Company, 1512 Washington St., Manitowoc, Wis.

Nichols Wire & Aluminum Co., 1725 Rockingham Road, Davenport, Iowa.

Olin Mathieson Chemical Corp., 400 Park Avenue, New York 22, N.Y. Plant: Hannibal (Omal), Ohio.

Peerless of America, 5830 N. Pulaski Rd., Chicago 30, Ill.

Quaker State Metals Co. (Div. of Howe Sound Co.), P.O. Box 1138, Manheim Pike at 230 Bypass, Lancaster, Pa.

Revere Copper and Brass Inc., 230 Park Avenue, New York 17, N.Y. Plants: Baltimore, Md., Chicago, Ill., Newport, Ark.

Reynolds Metals Company, 6601 West Broad St., Richmond 18, Va. Plants: Listerhill, Ala., McCook, Ill.

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[1] Captive Plants

[1] Rodney Metals, Inc., 1357 Rodney French Blvd., New Bedford, Mass.

Scovill Manufacturing Co., 99 Mill St., Waterbury 20, Conn. and New Milford, Conn.

United Pacific Aluminum Corp., (Div. of Cerro Corp.) 5311 Avalon Blvd., Los Angeles 11, Cal.

United Smelting & Aluminum Co., Inc., 187 Commerce St., New Haven 11, Conn.

Western Aluminum Corporation, 2421 South Yates Ave., Los Angeles 22, Cal. and 7215 South Crider St., Pico Rivera, Cal.

[fol. 6421] Foil

Aluminum Co. of America, 1501 Alcoa Bldg., 425 Sixth Avenue, Pittsburgh 19, Pa. Plants: Alcoa, Tenn., Davenport, Iowa, Edgewater, N.J., New Kensington, Pa.

Anaconda Aluminum Co. (Sub of The Anaconda Co.), 1430 South 13th St., Louisville 1, Ky.

Consolidated Aluminum Corp., P.O. Box 540, 1100 Richmond St., Jackson, Tenn.

[1] Crown Cork & Seal Co., Inc., 9300 Ashton Rd., Philadelphia 36, Pa. Plant: Eastern Ave. & Kresson St., Baltimore, Md.

[1] Ekco-Alcoa Containers Inc., Hintz Road & Thomas St., Wheeling, Ill.

Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Oakland 12, Cal. Plants: Permanente, Cal., Ravenswood, W. Va.

[1] Mirro Aluminum Co., Rolling Mill, 1512 Washington St., Manitowoc, Wis.

Premium Foil Co., Inc., 4612 Scuff Lane, Louisville, Ky.

Republic Foil Inc., 55 Triangle St., Danbury, Conn.

Revere Copper and Brass Inc., 230 Park Avenue, New York 17, N.Y. Plant: Newport, Ark.

Reynolds Metals Company, 6601 West Broad St., Richmond 18, Va. Plants: Louisville, Ky., Richmond, Va.

Reynolds (R. J.) Tobacco Co., 4th & Main Sts., Winston-Salem, N.C.

Rodney Metals, Inc., 1357 Rodney French Blvd., New Bedford, Mass.

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[1] Captive Plants

Standard Packaging Corp. (Johnston Foil Div.) 6008-6298 South Broadway, St. Louis 11, Mo.

Stranahan Foil Co., Inc., 100 Wesley St., South Hackensack, N.J.

Western Aluminum Corporation, 2421 South Yates Ave., Los Angeles 22, Cal. and 7215 South Crider St., Pico Rivera, Cal.

[fol. 6422] Rolled Structural Shapes

Aluminum Company of America, 1501 Alcoa Bldg., 425 Sixth Ave., Pittsburgh, Pa. Plants: Massena, N.Y., Vancouver, Wash.

Reynolds Metals Co., 6601 West Broad St., Richmond 18, Va. Plant: Listerhill, Ala.

Rolled Rod And Bar

Aluminum Company of America, 1501 Alcoa Bldg., 425 Sixth Ave., Pittsburgh, Pa. Plants: Massena, N.Y.,[3] Vancouver, Wash.—Sub. Rome Cable Corp.,[3] 421 Ridge St., Rome, N.Y.

Anaconda Aluminum Company, Sub. of The Anaconda Co., 1430 South 13th St., Louisville 1, Ky. Plant: Terre Haute, Ind.

General Cable Corp., 420 Lexington Ave., New York 17, N.Y. Plants:[3] St. Louis, Mo.,[3] Tampa, Fla.

Harvey Aluminum (Inc.) 19200 South Western Ave., Torrance, Cal.

Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Oakland 12, Cal. Plant: Newark, Ohio.

Nichols Wire & Aluminum Co., 1725 Rockingham Rd.,[3] Davenport, Iowa.

Proof Company, The, Sub. of Essex Wire Corp.,[3] Goshen, Ind.

Reynolds Metals Company, 6601 West Broad Street, Richmond 18, Va. Plant: Listerville, Ala.

Southwire Co., Fertilla St.,[3] Carrollton, Ga.

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[1] Captive Plants

[3] Plants producing Continuous Cast Rod and Bar

[fol. 6423] Wire, Bare, Conductor And Nonconductor

Alabama Wire Co., Inc., Sub of Columbia Metal Products, Inc., Box 648, Florence, Ala.

Aluminum Company of America, 1501 Alcoa Bldg., 425 Sixth Ave., Pittsburgh, Pa. Plants: Massena, N.Y., Vancouver, Wash., Sub. Rome Cable Corp., 421 Ridge St., Rome, N.Y.

All-State Welding Alloys Co., Inc., 249-55 Ferris Ave., White Plains, N.Y. and South Gate, Cal.

[1] American Steel & Wire Div., U.S. Steel Corp., Rockefeller Bldg., Cleveland, Ohio. Plant: Worcester, Mass.

Anaconda Wire & Cable Co., Sub. of The Anaconda Co., 25 Broadway, New York, N.Y. Plants: Great Falls, Mont., Hastings-On-Hudson, N.Y., Orange, Cal., Sycamore, Ill., Watkinsville, Ga.

Arcola Wire Co., Beaver Rd., Branford, Conn.

Charter Wire Products, 300 Third Street, Sterling, Ill.

Durable Wire, Inc., Beaver Rd., Branford, Conn.

Essex Wire Corp., 1601 Wall St., Fort Wayne, Ind.

Florida Wire Fabrics, Hialeah, Fla.

General Cable Corp., 420 Lexington Ave., New York 17, N.Y. Plant: Perth Amboy, N.J.

General Electric Co., 1285 Boston Ave., Bridgeport 9, Conn.

General Motors Corp.—See Packard Electric Division

Kagan-Dixon Wire Corp., 400 Blair Rd., P.O. Box 346, Rahway, N.J.

Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Oakland 12, Cal. Plants: Bristol, R.I., Newark, Ohio.

Kennecott Wire & Cable Co., Bourne Ave., Phillipsdale (Rumford 16), R.I.

Nesor Alloy Products Co., 282-84 Halsey St., Newark 2, N.J.

New York Wire Cloth Co., Sub. of Durall Products Co., 437 E. Market St., York, Pa.

Nichols Wire & Aluminum Co., 1725 Rockingham Rd., Davenport, Iowa.

Olin Mathieson Chemical Corp., Metals Div., 400 Park Ave., Newark 22, N.Y. Plant: Chattanooga, Tenn.

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[1] Captive Plants.

[1] Packard Electric Division of General Motors Corp., Dana Ave., Warren, Ohio.

Reynolds Metals Company, 6601 West Broad St., Richmond 18, Va. Plant: Listerhill, Ala.

Scovill Manufacturing Co., 100 Mill Street, Waterbury 20, Conn.

Seneca Wire & Manufacturing Co., Vine St., Fostoria, Ohio.

Sharon Wire Corp., Foot of Plane St., Boonton, N.J.

Southwire Co., Fertilla St., Carrollton, Ga.

United Wire & Supply Corp., 1497 Elmwood Ave., Providence, R.I. Plant: Kilvert St. & Jefferson Blvd., Hillsgrove, Warwick, R.I.

[1] Welding Alloys Mfg. Co., 744 Broad St., Newark, N.J. and 406 W. Grand St., Elizabeth, N.J.

Western Electric Co., 195 Broadway, New York 7, N.Y.

[fol. 6424] ACSR And Aluminum Cable, Bare

Aluminum Co. of America, 1501 Alcoa Bldg., 425 Sixth Ave., Pittsburgh, Pa. Plants: Massena, N.Y., Vancouver, Wash., Sub—Rome Cable Corp., 421 Ridge St., Rome, N.Y.

Anaconda Wire & Cable Co., Sub. of The Anaconda Co., 25 Broadway, N.Y. 4, N.Y. Plants: Great Falls, Mont., Hastings-On-Hudson, N.Y., Orange, Calif., Sycamore, Ill., Watkinsville, Ga.

Central Cable Corp., 610 Washington Ave., Jersey Shore, Pa., and Freeport, Ill.

Essex Wire Corp., 1601 Wall St., Fort Wayne, Ind. Plants: Birmingham, Ala., Goshen, Ind., Marion, Ind., Tiffin, Ohio.

General Cable Corp., 420 Lexington Ave., New York 17, N.Y. Plants: Bonham, Tex., Los Angeles, Cal., Perth Amboy, N.J., Rome, N.Y., St. Louis, Mo., Tampa, Fla.

Kaiser Aluminum & Chemical Corporation, 300 Lakeside Dr., Oakland 12, Cal. Plant: Newark, Ohio.

Nehring Electrical Works, Ninth & Locust Sts., Dekalb, Ill.

Olin Mathieson Chemical Corp., Metals Div., 400 Park Ave., New York, N.Y. Plant: Chattanooga, Tenn.

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[1] Captive Plants.

Reynolds Metals Company, 6601 West Broad St., Richmond 18, Va. Plant: Listerhill, Ala.

Southwire Co., Fertilla St., Carrollton, Ga.

Texas Wire & Cable Co., Div. of Narragansett Wire Co., Plano, Tex.

[fol. 6425] Wire and Cable, Insulated or Covered

Aluminum Company of America, 1501 Alcoa Bldg., 425 Sixth Ave., Pittsburgh, Pa. Plants: Sub—Rea Magnet Wire Co., Inc., 3600 E. Pontiac St., Ft. Wayne, Ind. and Concord Rd., Lafayette, Ind. Sub.—Rome Cable Corp., 421 Ridge St., Rome, N.Y.

Anaconda Wire & Cable Co., Sub., of The Anaconda Co., 25 Broadway, New York, N.Y. Plants: Hastings-on-Hudson, N.Y., Marion, Ind., Orange, Cal., Sycamore, Ill., Watkinsville, Ga.

Belden Manufacturing Co., 4647 West Van Buren St., Chicago 44, Ill. Plant: Richmond, Ind.

Central Cable Corp., 610 Washington Ave., Jersey Shore, Pa. Plant: Freeport, Ill.

Circle Wire & Cable Corp., Sub. of Cerro Corp., Circle Bldg., Maspeth, L.I., N.Y. and Hicksville, L.I., N.Y.

Collyer Insulated Wire Co., 249 Roosevelt Ave., Pawtucket, R.I.

Crescent Insulated Wire & Cable Co., 319 North Olden Ave., Trenton 5, N.J.

Electric Auto-Lite Company, Box 931, Toledo 1, Ohio. Plants: Port Huron, Mich., Hazelton, Pa.

Essex Wire Corp., 1601 Wall St., Fort Wayne, Ind. Plants: Birmingham, Ala., Goshen, Ind. and Marion, Ind.

General Cable Corp., 420 Lexington Ave., New York 17, N.Y. Plants: Emeryville, Cal., Los Angeles, Cal., Perth Amboy, N.J., Rome, N.Y., St. Louis, Mo. and Tampa, Fla.

General Electric Co., 1285 Boston Ave., Bridgeport 9, Conn., and Fort Wayne 2, Ind.

Hatfield Wire & Cable Div. of Continental Copper & Steel Industries, Inc., Hillside, N.J. and Union, N.J.

Hendrix Wire & Cable Corp., 19 Watson St., Boston 18, Mass.

Hudson Wire Co., Upper Dock, Ossining, N.Y.

Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr.,

Oakland 12, Cal. Plants: Bristol, R.I., Newark, Ohio.

Kerite Company, 30 Church Street, New York 7, N.Y.

Narragansett Wire Co., 541 Pawtucket Ave., Pawtucket, R.I.

National Electric Products Corp., 140 Stanwix St., Pittsburgh, Pa.

Okonite Co., Sub. of Kennecott Copper Corp., Passaic, N.J. Plants: New Brunswick, N.J., Paterson, N.J.

Olin Mathieson Chemical Corp., Metals Div., 400 Park Ave., New York 22, N.Y. Plant: Chattanooga, Tenn.

Reynolds Metals Company, 6601 West Broad St., Richmond 18, Va. Plant: Listerhill, Ala.

Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass.

Southwire Co., Fertilla St., Carrollton, Ga.

Suprenant Mfg. Co., 199 Washington St., Boston 8, Mass.

Texas Wire & Cable Co., Div. of Narragansett Wire Co., Plano, Texas.

Triangle Conduit & Cable Co., Inc., Jersey & Triangle Aves., New Brunswick, N.J.

Walker Brothers, P.O. Box 33, Conshohocken, Pa.

Western Electric Co., 195 Broadway, New York 7, N.Y. Plants: Hawthorne Station, Chicago 23, Ill., Kearney, N.J., Point Breeze, Baltimore, Md.

Westinghouse Electric Corp., P.O. Box 8839, Pittsburgh 21, Pa. Plants: Buffalo, N.Y., Sharon, Pa.

[fol. 6426] Extruded Shapes

Adams Engineering Co., Inc., P.O. Box 875, Ojus, Fla. Plant: 19300 Biscayne Blvd., Miama, Fla.

[1] Adams & Westlake Co., The, 1025 No. Michigan St., Elkhart, Ind.

Aerolite Extrusion Co., The, 4605 Lake Park Rd., Youngstown 12, Ohio.

All-State Welding Alloys Co., Inc., 249-55 Ferris Ave., White Plains, N.Y. Plants: 9 Naubuc Ave., Glastonbury, Conn., 4954 Firestone Blvd., Los Angeles, Cal.

Almetco, Inc.—See Olin Mathieson Chemical Corp.

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[1] Captive Plants

[4] Alsco Inc., P.O. Box 270, 225 South Forge Street, Akron, Ohio. Plants: 310 Allwood Rd., Clifton, N.J. and Gnadenhutten, Ohio.

[4] Aluminum Air Seal Mfg. Co., 4021 Mahoning Ave., Youngstown, Ohio. Plant: 3400 West Federal, Youngstown, Ohio.

[4] Aluminum Company of America, 1501 Alcoa Bldg., 425 Sixth Ave., Pittsburgh, Pa. Plants: Cressona, Pa., Lafayette, Ind., Los Angeles, Cal., New Kensington, Pa., Vancouver, Wash., Sub.—Cupples Products Corp., 2650 Hanley Rd., St. Louis, Mo.

Aluminum Extrusion Co., 3042 Treadwell St., Los Angeles 65, Cal.

Aluminum Extrusions, Inc., 815 W. Shepherd St., Charlotte, Mich. Plant: 530 West Lovett St., Charlotte, Mich.

Aluminum Industries—See Alsco.

[1] Aluminum Press Corp., 20th & Allegheny Ave., Philadelphia 32, Pa.

Aluminum Shapes, Inc., Affil. with Belmont Aluminum Extrusions Co., Philadelphia, Pa., 9000 River Rd., Delair, N.J.

Aluminwall Corp.—See Alsco, Inc.

American Art Metals Company, 433 Highland Ave., N.E., Atlanta 12, Ga. Plant: 4785 Fulton Industrial Bldg., Atlanta, Ga.

American-International Aluminum Corp., 4851 N.W. 36th Ave., 3765 N.W. 74th St., Miami, Fla. and Brokaw Rd., San Jose, Cal.

[4] Anaconda Aluminum Company, Sub. of The Anaconda Co., 1430 South 13th St., Louisville 1, Ky. Plant: 449 North 9th St., Terre Haute, Ind.

[1] Anderson, (V.E.) Mfg. Co., Inc., P.O. Box 121, Rome, Ga. Plant: Anderson Road, Rome, Ga.

[1] Arvin Industries, Inc., 13th & Big Four, Columbus, Ind. Furniture & Household Plant: 17th & Central Sts., Columbus, Ind.

Aywon Wire and Metal Corp., 745-64th St., Brooklyn 20, N.Y.

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[1] Captive Plants.

[4] Produce alloys in 2000 and 7000 Series

B & T Metals Co., The, 425 West Town St., Columbus 16, Ohio and 2240 S. Garfield Ave., Los Angeles, Cal.

[4] Badger Aluminum Extrusions, 960 Georgia Ave., Brooklyn 7, N.Y.

[1] Balcrank, Inc., Disney St. near Marburg, Cincinnati 9, Ohio.

Barberton Metal Products Co., Inc.—Sub of Weather-Seal, Inc., 24 Houston St., Barberton, Ohio.

[4] Bauer Aluminum Company, P.O. Box 30218, Dallas 30, Texas. Plant: 100 W. Spring Valley Rd., Richardson, Texas.

[fol. 6427] Bayless Products Inc., P.O. Box 188, Damascus, Ohio.

Belmont Aluminum Extrusions Co.—See Aluminum Shapes, Inc.

[4] Benson Aluminum Co., Inc., R.R. 1, Connersville, Ind.

[4] Bohn Aluminum & Brass Corp., 1400 LaFayette Bldg., Detroit 26, Mich. Plants: E. Maumee St., Adrian, Mich., 2601 Clay Ave., Detroit, Mich., and 365-24th St., Holland, Mich.

Bonnell (William L.) Co., Inc., The, 78 Fair St., Newnan, Ga.

[4] Brazeway, Inc., 2711 East Maumee St., Adrian, Mich.

[4] Bristol Aluminum Co., P.O. Box 11, Emilie Rd. & Green Lane, Bristol, Pa.

Calex Corp., 2415 Wilson Avenue, Campbell, Ohio.

Calumet & Hecla, Inc.—See Wolverine Tube

Capitol Products Corp., P.O. Box 69, Carlisle Pike, Mechanicsburg, Pa.

Cardinal Extrusions Co. (Southern Extrusions Corp. d/b/a), 6910 Preston Hiway, Louisville 13, Ky.

[1] [4] Ceco Steel Products Corp., 5601 W. 26th St., Chicago 50, Ill.

[1] Channel Master Corp., Channel Master Road, Ellenville, N.Y.

Clark Aluminum Co., P.O. Box 43558, 13131 Almeda St., Houston, Texas.

Colotrym Co., The, 35 Hanford St., Seattle 4, Wash.

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[1] Captive Plants

[4] Productive alloys in 2000 and 7000 Series

Commonwealth Extrusion Corp., P.O. Box 914, Bayamon, Puerto Rico (Controlled by Texas Aluminum Co.)

Croft Aluminum Company, Inc., Magnolia St., McComb, Miss.

Cupples Products Corp.—See Aluminum Company of America.

Detroit Gasket & Mfg. Co., Extruded Metals Division, P.O. Box 151, Belding, Mich.

Dixie Aluminum Corp., 102 North Hanks St., Rome, Ga., and Tube Division, 1200 South Edwards St., Hattiesburg, Miss.

[4] Dow Metal Products Company, The, (Div. of The Dow Chemical Company), Midland, Mich. Plant: College and Weaver Sts., Madison, Ill.

Eagle Aluminum Products Company, (Div. of The Pollock Co.), P.O. Box 32, Richboynton Road, Dover, N.J.

[4] Empire Extrusions Corp., 120 Old Broadway St., Garden City Park, L.I., N.Y.

Extruded Alloys, Inc., 800-900 X Street, Bedford, Ind.

Extruded Aluminum Company, Inc., P.O. Box 470, Industrial Road, Summerville, S.C.

Extrusions, Inc., Standiford Lane, Louisville 13, Ky.

Faulkner Associated Industries, Inc., 158 Belmont Ave., Garfield, N.J.

Feather Lite Manufacturing Co., 11710 Cloverdale Ave., Detroit 4, Mich. Plant: 828 Bay St., E. Tawas, Mich.

[fol. 6428] [1] Fenestra Inc., Hugg Rd. and E. Grand Blvd., Detroit, Mich. Plant: 8501 Hegerman St., Philadelphia 36, Pa.

[1] [4] Fentron Industries, Inc., 2801 Market St., Seattle 7, Wash.

Ferguson Extrusions, Inc., 13639 Elmira Street, Detroit 27, Mich. Plant: 1320 Mt. Ellicott, Detroit 7, Mich.

Fetter Bros.—See Greater Louisville Industries, Inc.

Flynn Extrusion Corp. (Sub. of Perm-a-Trim Storm Window, Inc.), 900 South Marshall St., Marshall, Mich.

[4] Flynn (Michael) Manufacturing Co., 700 East Godfrey Ave., Philadelphia, Pa. and 18111 East Railroad St., City of Industry, Cal.

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[1] Captive Plants

[4] Produce Alloys in 2000 and 7000 Series

Fruehauf Trailer Co., P. O. Box 202, Highway #20, Decatur, Ala.

[1] Fullview Corp., 4640 Sperry, Los Angeles, Cal.

General Extrusions, Inc., 4040 Lake Park Rd., Youngstown, Ohio

General Motors Corp., GMC Truck & Coach Div., 660 South Blvd. East, Pontiac 11, Mich.

Greater Louisville Industries, Inc., P. O. Box 408, 835 Spring St., and 2nd and Ave. "D", Bldg. 243, Quartermaster Depot, Jeffersonville, Ind.

[4] Harvey Aluminum (Inc.), 19200 South Western Avenue, Torrance, Cal.

Hazelwood Engineering & Equipment, Inc., 6005 Lindbergh, Hazelwood, Mo.

Hillman Manufacturing, Anglus Aluminum Div., 2020 Chico Avenue, So. Elmonte, Cal.

Himmel Brothers Co., The, 1409-15 Dixwell Ave., Hamden 14, Conn.

[1 4] Hunter Engineering Co., P. O. Box 272, Riverside, Cal. Plant: 1495 Columbia Ave., Riverside, Cal.

[1] Industrial Lamp Corporation, 14th & Blaine Streets, Elkhart, Ind.

Jarl Extrusions, Inc., Linden Ave., East Rochester, N. Y.

Jasco Aluminum Products, Div. of The Irving Air Chute Co., 31 Nassau Terminal Rd., New Hyde Park, N. Y.

Jerex Corporation, 336 Bayview Ave., Amityville, N. Y.

[4] Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Oakland 12, Cal. Plants: Dolton, Ill., Halethorpe, Md.

Kawneer Co., 714 North Front St., Niles, Mich. Plants: Powis Rd., St. Charles, Ill., and [1] 1105 N. Frost St., Niles, Mich., and 600 Parr Blvd., Richmond, Cal.

Keystone Alloys Co., Route 982, Derry, Pennsylvania

Kinkead Industries, Inc., 5860 North Pulaski Rd., Chicago 46, Ill.

[4] Light Metals Corp., 1211 Monroe Ave., N. W., Grand Rapids 5, Mich.

Linderme Extrusions, Inc., 1365 East 219th St., Euclid 17, Ohio

Loxcreen Co., Inc., The, 4983 S. Peachtree Road, Chamblee, Georgia

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[1] Captive Plants

[4] Produce Alloys in 2000 and 7000 Series

[1] Macklanburg-Duncan Co., P. O. Box 1197, 41st and Sante Fe Sts., Oklahoma City, Okla.

Magnode Products, Inc., Extrusion Div., P. O. Box 292, 400 E. State St., Trenton, Ohio

Mainline Extrusions, Inc., 2605 South Main Street, South Bend, Ind.

Mala Extrusions, Inc., 610—37th Avenue, Rock Island, Ill.

[fol. 6429] May Inc., P. O. 6597, 5803 Alief Road, Houston, Texas

[1] Metalmasters, Inc. (Affil. with Arnold Altex Aluminum Co.), 125 Industrial Rd., Summerville, S. C.

Metal Trims, Inc., P. O. Box 632, Jackson, Miss.

Miami Extruders, Inc., 7575 Northwest 37th Ave., Miami, Fla., and 1123 E. 23rd St., Hialeah, Fla.

Miami Window Corp., Florida Extrusions Div., 1200 North Dixie Highway, Hollywood, Fla.

Mideast Aluminum Corp., U. S. Hwy. 130, Dayton, N. J. and 4 Charlton St., Princeton, N. J.

Midwest Aluminum Corp., 7696 West Michigan Ave., Kalamazoo, Mich.

Miller Industries, P. O. Box 157, Reed City, Mich.

[1] Moloney Company, The, 210 N. "A" St., Albia, Iowa

Mueller Brass Co.—See Valley Metal Products Co.

National Aluminum Co., 1133 Alum Creek Drive, Columbus 9, Ohio

[4] National Extrusion & Manufacturing Co., Orchard at Elm, Bellefontaine, Ohio

New Jersey Aluminum Extrusion Co., Inc., P. O. Box 73, North Brunswick, N. J. Plant: Jersey Ave., New Brunswick, N. J.

North American Extrusions Corp., 5569 North Riverview Dr., Kalamazoo, Mich.

Northeast Aluminum, Inc., 65 Manchester St., Lawrence, Mass.

[4] Olin Mathieson Chemical Corp., Metals Div., 400 Park Ave., N. Y. 22, N. Y. Plants: 34th Street, Gulfport, Miss. and 275 Winchester Ave., New Haven, Conn. (Almetco, Inc. —Sub.), 500 W. Catawissa St., Nesquehoning, Pa.

Pacific Extrusions, Inc., P. O. Box 1018, Judd & Beach Rd., Watsonville, Cal.

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[1] Captive Plants

[4] Produce alloys in 2000 and 7000 Series

Pax Metal Corp., 14533 Keswick St., Van Nuys, Cal.

Penn Extrusion Corp., 3837 West 20th St., Erie, Pa.

[1] [4] Pfister Aluminum Corp., 54 W. Allendale Ave., Allendale, N. J. Plant: 35 Vreeland St., Lodi, N. J.

Pilgrim (F. A.) Co., Inc., 4449 Lake Park Rd., Youngstown 12, Ohio

[4] Pittsburgh Aluminum Alloys, 2nd and Glenavy Streets, Murrysville, Pa.

Precision Extrusions, Inc., 720 East Green Ave., Bensenville, Ill.

[1] Prest-Wheel, Inc., 120 Main St., South Grafton, Mass.

Purpose Extruded Aluminum, Inc., 111 Mechanic Street, Hudson, Mich.

Quality Aluminum Products Co., 301 Industrial Ave., Coldwater, Mich.

[4] Revere Copper and Brass, Inc., 230 Park Avenue, New York 17, N. Y. Plant: 1301 Wicomico Street, Baltimore 3, Md.

Reynolds Metals Company, 6601 West Broad St., Richmond 18, Va. Plants: Grand Rapids, Mich., Louisville, Ky., Phoenix, Ariz., Richmond, Va., Torrance, Cal.

Rogers Industries, Inc., 14575 Meyers Rd., Detroit, Mich., 205 Watts Rd., Jackson, Mich., and Hutchinson, Kansas

[fol. 6430] Royal Aluminum, Inc. (Sub. of L.C.S. Corp.) P.O. Box 3023 Terminal Annex, Los Angeles 54, Cal. Plant: 3000 S. Tanager Ave., Los Angeles 22, Cal.

Royce Aluminum Corp., 704 W. Water St., Taunton, Mass.

Saramar Aluminum Co., 4021 Mahoning Ave., Youngstown 1, Ohio

[1] [4] Schumacher (F. E.) Co., Inc., 200 Mill Street, Hartville, Ohio

Scott (Alan) Aluminum Corp.—See Seasonmaster, Inc.

Seasonmaster Inc., 24 Kinkel St., Westbury, L.I., N.Y. Plant: 777 Main Street, Westbury, L.I., N.Y.

Southern Extrusions Corp.—See Cardinal Extrusions Co.

Southern Extrusions Inc., North Washington St., Magnolia, Ark.

[1] [4] Southern Metals Co., Inc. (Leased by Union Aluminum Co.), 111 Raleigh Ave., Sheffield, Ala.

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[1] Captive Plants

[4] Produce alloys in 2000 and 7000 Series

Stanley Building Specialities, Div. of The Stanley Works, 1890 N.E. 146th St., No. Miami, Fla.

[1] Stolle Corp., The, 1501 Michigan Street, Sidney Ohio

Storm Seal Industries, 22901 Aurora Rd., Bedford Hgts., Ohio

Superior Industries, Inc., 3786 Oakwood Ave., Youngstown 9, Ohio

[4] Texas Aluminum Co., Inc., P.O. Box 417, Plant Road, Rockwell Texas and Mojave, Cal.

Titus Metals Corp., P.O. Box 810, Hiway 20 West Waterloo, Iowa

[4] Trim Alloys Inc., 40 West Third St., Boston 27, Mass.

Unexcelled Chemical Corp.—See Jasco Aluminum Products

Union Aluminum Co.—See Southern Metals Co., Inc.

[1] United Wire & Supply Corp., 1497 Elmwood Ave., Providence 7, R.I. Plant: Cranston, R.I.

[4] Valley Metal Products Co. (Sub. of Mueller Brass Co.), 800 E. Bridge St., Plainwell, Mich.

[1] Ware Aluminum Windows, Inc., P.O. Box 35037 Riverside Sta., Miami, Fla. Plant: 3700 N.W. 25th St., Miami, Fla.

Warner Mfg. Corp., 265 Watsessing Ave., Bloomfield, N.J.

Warrenville Window Co., Inc., P.O. Box G, Mount & Manning Sts., Warrenville, Ill.

Weather-Seal, Inc.—See Barberton Metal Products Co.

Wells Aluminum Corp., Box 278, 205 S. Henry St., North Liberty, Ind.

[4] Werner (R. D.) Co., Inc., P.O. Box 580, Osgood Rd., Greenville, Pa.

White Metal Rolling & Stamping Corp., 80 Moultrie St., Brooklyn 22, N.Y.

Wolverine Tube, Div. of Calumet & Hecla, Inc., 17200 South Field Rd., Allen Park, Mich. Plant: Decatur, Ala.

Youngstown Manufacturing, Inc., 70 S. Prospect St., Youngstown 6, Ohio Plant: Kenmore Ave., Louisburg, N.C.

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[1] Captive Plants

[4] Produce alloys in 2000 and 7000 Series

[fol. 6431] Drawn Tube

Adams Engineering Co., Inc., P.O. Box 936, Little River Branch, Miami 38, Fla.

[4] Aluminum Co. of America, 1501 Alcoa Bldg., 425 Sixth Avenue, Pittsburgh 19, Pa. Plants: Lafayette, Ind., Los Angeles, Cal., New Kensington, Pa.

Anaconda Aluminum Co. (Sub. of The Anaconda Co.), 1430 South 13th St., Louisville 1, Ky. Plant: Terre Haute, Ind.

[1] Arvin Industries, Inc. (Furniture & Houseware Plant), Central Avenue, Columbus, Ind.

Calumet & Hecla Inc.—See Wolverine Tube Division

Channel Master Corp., Channel Master Road, Ellenville, N.Y.

Dixie Aluminum Corp., Tube Div., 1200 S. Edwards St., Hattiesburg, Miss.

[4] Harvey Aluminum (Inc.), 19200 South Western Ave., Torrance, Cal.

[4] Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Oakland 12, Cal. Plants: Dolton, Ill., Halethorpe, Md.

Linderme Tube Co., 1500 E. 219 St., Cleveland 17, Ohio

Penn Brass & Copper Co., 20th & Powell Ave., Erie, Pa.

Pfister Aluminum Corp., 475 Franklin Turnpike, Allendale, N.J.

Precision Tube Co., Inc., Church Rd. & Wissahickon Ave., North Wales, Pa.

[4] Revere Copper and Brass Inc., 230 Park Avenue, New York, 17, N.Y. Plant: Baltimore, Md.

[4] Reynolds Metals Company, 6601 West Broad St., Richmond 18, Va. Plants: Phoenix, Ariz., Richmond, Va.

Uniform Tubes, Inc., R.D. #2, Collegeville, Pa.

United Wire & Supply Corp., 1497 Elmwood Ave., Providence 7, R.I.

Wolverine Tube, Div. of Calumet & Hecla, Inc., 17200 Southfield Rd., Allen Park, Mich. and Decatur, Ala.

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[1] Captive Plants

[4] Produce alloys in 2000 and 7000 Series

[fol. 6432] Welded Tube

Aluminum Co. of America, 1501 Alcoa Bldg., 425 Sixth Avenue, Pittsburgh 19, Pa. Plant: Alcoa, Tenn.

Aluminum Supply Co., Tube Division, 800 N. Fancher Way, Spokane, Wash. and Grand Island, Nebr.

Channel Master Corp., Channel Master Road, Ellenville, Ohio

General Tube Co., Div. of General Aluminum Corp., 2221 Jefferson St., Torrance, Cal.

Habco Manufacturing Company, P. O. Box 464, Columbus, Nebr.

Harvey Aluminum (Inc.), 19200 South Western Ave., Torrance, Cal.

Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Oakland 12, Cal. Plant: Spokane, Wash.

Revere Copper and Brass Inc., 230 Park Avenue, New York 17, N. Y. Plant: Baltimore, Md.

Reynolds Metals Company, 6601 West Broad St., Richmond 18, Va. Plant; Listerhill, Ala.

Westube Co., Inc., 351 Embarcadero, Oakland 6, Cal.

Powder and Paste.

Allied Metals Corp., P. O. Box 13, Pompton Lakes, N. J. and Wanaque, N. J.

Alloys & Chemicals Corp., 4365 Bradley Rd., S. W., Cleveland 9, Ohio

Aluminum Co. of America, 1501 Alcoa Bldg., 425 Sixth Avenue, Pittsburgh 19, Pa. Plants: Alcoa, Tenn., New Kensington, Pa.

Magna Manufacturing Co., Inc., 4th Avenue, Haskell, N. J.

Metals Disintegrating Co., Inc., P. O. Box 290, Morris Ave., Elizabeth, N. J. Plants: Townley, Union Township, N. J., Albany, Cal.

Reade Manufacturing Co., Inc., 135 Hobokin Ave., Jersey City 2, N. J., and Lakewood, N. J.

Reynolds Metals Company, 6601 West Broad St., Richmond 18, Va. Plant: Louisville, Ky.

Silberline Manufacturing Co., Inc., 425 Fairfield Ave., Stamford, Conn.

Valley Metallurgical Process Co., Inc., 49 Main Street, Essex, Conn. Plant: Centerbrook, Conn.

[fol. 6433] Forgings

Accurate Brass Corp., The (Sub. of The Bristol Brass Corp.), 204 Pine St., Bristol, Conn.

Aluminum Co. of America, 1501 Alcoa Bldg., 425 Sixth Ave., Pittsburgh 19, Pa. Plants: Cleveland, O., Edgewater, N. J., and Los Angeles, Cal.

Auld Co., (D. L.) The, Fifth Ave. & Fifth St., Columbus 1, Ohio

Bergman Manufacturing Co., 27 Bay St., San Rafael, Cal.

Bessemer Forging Co., Route 9, Box 91 G, Hicks Field, Ft. Worth, Texas

Billings & Spencer Co., The, 1 Laurel St., Hartford 1, Conn.

Bohn Aluminum & Brass Corp., 1400 Lafayette Bldg., Detroit 26, Mich. Plants: 2619 Clay Ave., Detroit 11, Mich., 365 W. 24th St., Holland, Mich.

Brass Forgings Co., 1351 Jarvis Ave., Ferndale 20, Mich.

Brewer-Titchener Corp., The, Cortland Forging Div., 45 Cleveland Street, Cortland, N. Y.

Bridgeport Brass Co., Aluminum Division, 30 Grand St., Bridgeport 2, Conn. Plants: 3016 Kansas Ave., Riverside, Cal., and Cored Forging Div., Connecticut Ave., South Norwalk, Conn.

Bristol Brass Corp.—See Accurate Brass Corp.

Chemetron Corp.—See Tube Turns

Consolidated Industries, Inc., Mixville Rd., Cheshire, Conn.

Crow (W. "Pat") Inc., 200 Luxton St., Ft. Worth, Texas

Dirilyte Co. of America, Inc., 1142 South Main St., Kokomo, Ind.

General Metals Corp., Foundry and Forge Div., P. O. Box 2496 Terminal Annex, Los Angeles 54, Cal.—Plant: 5701 So. Boyle Ave., Los Angeles, Cal.

Harvey Aluminum (Inc.), 19200 South Western Avenue, Torrance, Cal.

Harvey Metal Corp., The,—Div. of Chicago Extruded Metals Co., 1605-1725 West 74th St., Chicago 36, Ill.

Hawley Forge & Mfg. Co., Inc., 2350 Jerrold Avenue, San Francisco 24, Cal.

Hunter Engineering Co., 1495 Columbia Ave., Riverside, Cal.

Imperial Brass Mfg. Co., The, 6300 West Howard St., Chicago 31, Ill. Plant: Niles 48, Ill.

Joost Manufacturing Co., 742 Bancroft Way, Berkeley 10, Cal.

Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Oakland 12, Cal. Plant: 1015 East Twelfth St., Erie, Pa.

Kohler Co., Kohler, Wisconsin

Ladish Pacific Div., Landish Co., 3321 S. Slauson Ave., Los Angeles 58, Cal.

McKaig-Hatch, Inc., 125 Skillen St., Buffalo 7, N. Y.

McWilliams Forge Company, Inc., 1948 Franklin Ave., Rockaway, N. J.

Mondie Forge Co., Inc., 10300 Berea Rd., Cleveland 2, Ohio

Mueller Brass Co., 1925 Lapeer Ave., and 3609—32nd St., Port Huron, Mich.

Parker-Hannifin Appliance Corp., 17325 Euclid Ave., Cleveland 12, Ohio

Precision Forgings, Inc., 6th & St. Louis Aves., Valley Park, Mo.

Reisner Forge Co., 5241 E. Firestone Place, South Gate, Cal.

Revere Copper and Brass Inc., 230 Park Avenue, New York 17, N. Y. Plant: Rome Mfg. Co. Div., 201-203 Mill Street, Rome, N. Y.

Schick Products, Inc., P. O. 867, Belmont, Cal. Plant: 591 Quarry Road, Belmont, Cal.

[fol. 6434] Scovill Mfg. Co., 99 Mill St., Waterbury 20, Conn.

Standard Forgings Corp., 80 E. Jackson Blvd., Chicago 4, Ill. Plant: 3444 Dickey Rd., East Chicago, Ind.

Storms Drop Forging Co., 70 Storms Court, Springfield, Mass.

Taylor Forge & Pipe Works, P. O. Box 485, Chicago 90, Ill. Plant: 2500 East Dunes Highway, Gary, Ind.

Titan Metal Manufacturing Co., Div. of Cerro Corp., Bellefonte, Pa. and Newark, Cal.

Tube Turns,—Div. of Chemetron Corp., 224 East Broadway, Louisville, Ky. Plant: 718 S. 28th St., Louisville, Ky.

Weatherhead Co., The, Special Products Div., 300 East 131st St., Cleveland 8, Ohio, and Fort Wayne Div., 128 W. Washington Blvd., Fort Wayne, Ind. Plants: Antwerp, Ohio and Cleveland, Ohio

Williams (J. H.) & Co., 400 Vulcan St., Buffalo 7, N. Y.

Wyman-Gordon Co., General Offices and Worcester Plant —105 Madison St., Worcester, Mass., Grafton Plant—North Grafton, Mass.

[fol. 6435] Captive Plants

(Captive plants are plants which produce mill products for their own use only in further fabrication and not for sale)

Adams & Westlake Co., The, 1025 No. Michigan St., Elkhart, Ind. Extruded Shapes

Aluminum Press Corp., 20th & Allegheny Ave., Philadelphia, 32 Pa. Extruded Shapes

American Screen Products Co., 20 N. Wacger Dr., Chicago, Ill. Sheet

American Steel & Wire Div., U.S. Steel Corp., Rockefeller Bldg., Cleveland 13, Ohio. Plant: Worcester, Mass. Wire, bare

Anderson, (V. E.) Mfg. Co., P.O. Box 121, Rome, Ga. Plant: Anderson Road, Rome, Ga. Extruded Shapes

Arvin Industries, Inc., 13th & Big Four, Columbus, Ind. Furniture & Household Plant, 117th & Central, Columbus, Ind. Extruded Shapes

Balcrank, Inc., Disney St., near Marburg, Cincinnati 9, Ohio. Extruded Shapes

Ceco Steel Products Corp., 5601 W. 26 St., Chicago 50, Ill. Extruded Shapes

Channel Master Corp., Channel Master Road, Ellenville, N.Y. Extruded Shapes

Coors Company, Adolph, 600 Ninth St., Goldon, Colo. Sheet

Crown Cork & Seal Co., Inc., 9300 Ashton Road, Philadelphia 36, Pa. Plant: Eastern Ave. & Kresson St., Baltimore, Md. Sheet; foil

Ekco-Alcoa Containers, Inc., Hintz & Thomas St., Wheeling, Ill. Foil

Fenestra, Inc., 11801 Mack Avenue, Detroit, Mich. Plant: 8501 Hegerman St., Philadelphia 36, Pa. Extruded Shapes

Fentron Industries, Inc., 2801 Market St., Seattle 7, Wash. Extruded Shapes

Fullview Corp., 4640 Sperry, Los Angeles, 39, Cal. Extruded Shapes

Hi-Ten Metal Products Corp., 21740 South Main St., Matteson, Ill. Sheet

Hunter Engineering Co., P.O. Box 272, Riverside, Cal. Plant: 1495 Columbia Ave., Riverside Cal. Extruded Shapes

Industrial Lamp Corp., 14th & Blaine Sts., Elkhart, Ind. Extruded Shapes

Lando Products, Inc., Sausalito, Cal. Sheet

Macklanburg-Duncan Co., Box 1197, 41st & Santa Fe Sts., Oklahoma City, Okla. Extruded Shapes

Metalmasters, Inc., (Affil. with Arnold Altex Aluminum Co.), 125 Industrial Rd., Summerville, S.C. Extruded Shapes

Mirro Aluminum Co., 1512 Washington St., Manitowoc, Wis. Sheet; foil

Moloney Company, The, 210 N. "A" St., Albia, Iowa Extruded Shapes

Packard Electric Div., General Motors Corp., Dana Ave., Warren, Ohio. Wire, bare

Pfister Aluminum Corp., 54 Allendale Ave., Allendale, N.J. Plant: 35 Vreeland St., Lodi, N.J. Extruded Shapes

[fol. 6436] Prest-Wheel, Inc., 120 Main St., South Grafton, Mass. Extruded Shapes

Rodney Metals, Inc., 1357 Rodney French Blvd., New Bedford, Mass. Sheet

Schumacher (F. E.) Co., Inc., 200 Mill Street, Hartville, Ohio. Extruded Shapes

Southern Metals Co., Inc., (leased by Union Aluminum Co.) 111 Raleigh Ave., Sheffield, Ala. Extruded Shapes

Stolle Corp., The, 1501 Michigan St., Sidney, Ohio Extruded Shapes

United Wire & Supply Corp., 1497 Elmwood Ave., Providence 7, R.I. Plant: Cranston, R.I. Extruded Shapes

Ware Aluminum Windows, Inc., P. O. Box 35037, Riverside Station, Miami, Fla. Plant: 3700 N.W. 25th St., Miami, Fla. Extruded Shapes

Welding Alloys Mfg., Co., 744 Broad St., Newark, N.J. and 406 W. Grand St., Elizabeth, N.J. Wire, bare

DEFENDANTS' EXHIBIT 7

PRIMARY ALUMINUM CAPACITY, PRODUCTION AND SUPPLY

Year	Primary Aluminum Capacity				Primary Aluminum Production				United States Primary Aluminum Supply			
	Canada	United States	Alcoa	Alcoa Percent of U.S. %	Canada	United States	Alcoa	Alcoa Percent of U.S. %	U.S. Primary Production	U.S. Imports Crude Aluminum	Total	Alcoa Production As Percent of Total Supply %
1948	"	"	1,298,000	650,000	50	734,158	1,246,912	652,309	52	1,246,912	166,328	1,413,240	46
1949	"	"	1,454,150	588,000	40	738,932	1,206,924	582,783	48	1,206,924	154,686	1,361,610	43
1950	"	"	1,710,000	739,500	43	793,764	1,437,244	707,954	49	1,437,244	353,556	1,790,800	40
1951	"	"	1,691,500	742,500	44	894,190	1,673,762	851,080	51	1,673,762	244,844	1,918,606	44
1952	"	"	2,283,900	968,500	42	999,516	1,874,660	935,136	50	1,874,660	256,466	2,131,126	44
1953	"	"	2,621,400	1,096,000	42	1,096,890	2,504,026	1,222,614	49	2,504,026	601,856	3,105,882	39
1954	1,215,000	2,776,400	1,141,000	41	1,115,794	2,921,130	1,331,874	46	2,921,130	430,500	3,351,630	40
1955	1,300,000	3,218,400	1,413,000	44	1,225,086	3,131,442	1,404,461	45	3,131,442	355,305	3,486,747	40
1956	1,524,000	3,551,000	1,585,000	45	1,240,642	3,357,908	1,512,278	45	3,357,908	432,803	3,790,711	40
1957	1,639,400	3,683,500	1,585,000	43	1,113,430	3,295,418	1,424,095	43	3,295,418	444,316	3,739,734	38
1958	1,642,000	4,388,500	1,596,500	36	1,268,204	3,131,114	1,041,724	33	3,131,114	510,645	3,641,759	29
1959	1,732,000	4,805,500	1,596,500	33	1,187,260	3,906,360	1,253,585	32	3,906,350	479,141	4,385,491	29
1960	1,756,000	4,937,500	1,706,500	35	1,522,714	4,028,994	1,453,970	36	4,028,994	309,413	4,338,407	34

Quantities as thousands of pounds.

Source of Data

Canadian Primary Aluminum Capacity
American Metal Market "Metal Statistics" Handbook
Year 1954 - Edition of 1955 page 633
Year 1955 - Edition of 1956 page 608
Year 1956 - Edition of 1957 page 617
Year 1957 - Edition of 1958 page 614
Year 1958 - Edition of 1959 page 595
Year 1959 - Edition of 1960 page 600
Year 1960 - Edition of 1961 page 596

United States Primary Aluminum Capacity
U.S. Bureau of Mines Minerals Yearbook, or "Aluminum" Preprints

Year 1948 - Edition of 1948 Preprint, text page 3
Year 1949 - Edition of 1951 Yearbook, table 3, page 133
Year 1950 - Edition of 1951 Yearbook, table 3, page 133
Year 1955 - Edition of 1955 Preprint, text page 1
Year 1956 - Edition of 1956 Preprint, table 3, page 4
Year 1957 - Edition of 1957 Preprint, table 2, page 4
Year 1958 - Edition of 1958 Preprint, table 3, page 4
Year 1959 - Edition of 1959 Preprint, table 4, page 3

U.S. Bureau of Mines, Mineral Industry Surveys, Mineral Market Report
Year 1960 - Survey No. 3258, "Aluminum in 1960", table 4, page 4

American Bureau of Metal Statistics Yearbook
Year 1951 - page 96
Year 1952 - page 96
Year 1953 - page 97
Year 1954 - page 98

Source of Data (Continued)

Canadian Primary Aluminum Production
American Bureau of Metal Statistics Yearbook

Year 1948 - Edition of 1955 page 97
Year 1949 - Edition of 1956 page 87
Year 1950 - Edition of 1957 page 89
Year 1951 - Edition of 1959 page 89
Years 1952 to 1960 Edition of 1960 page 89

United States Primary Aluminum Production
U.S. Bureau of Mines Minerals Yearbook ("Aluminum" Preprints)
Years 1948 to 1949 - Edition of 1951, table 1, page 1
Years 1950 to 1954 - Edition of 1954, table 1, page 1
Years 1955 to 1959 - Edition of 1959, table 1, page 1

U.S. Bureau of Mines, Mineral Industry Surveys, Mineral Market Report
Year 1960 - Survey No. 3258, "Aluminum in 1960", table 4, page 4

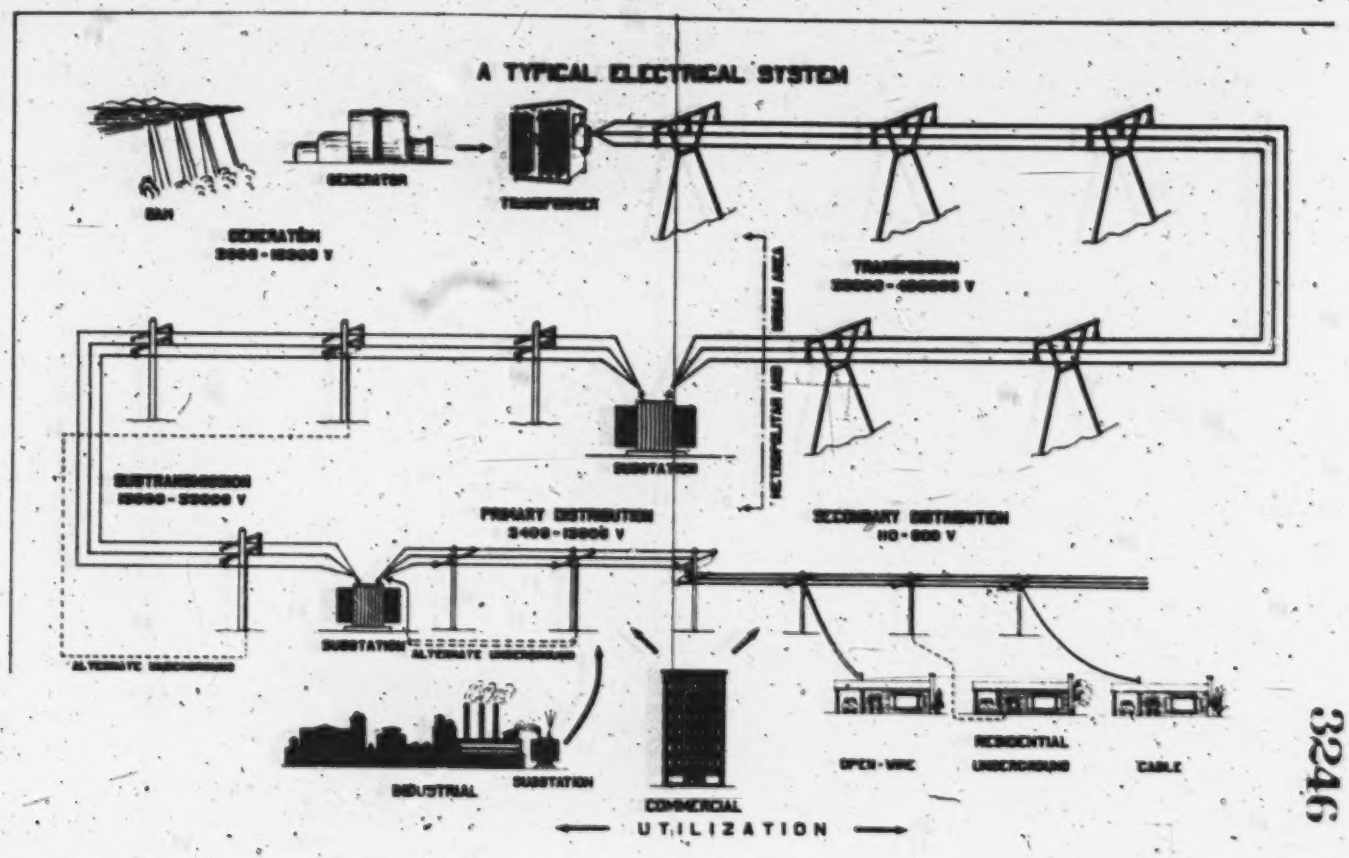
United States Imports Crude Aluminum
American Metal Market "Metal Statistics" Handbook
Years 1948 to 1960 - Edition of 1961, page 583

Alcoa Primary Aluminum Capacity
American Metal Market Newspaper, issue dated 8/29/61

Alcoa Primary Aluminum Production
Compiled from Aluminum Stock Reports (company records)

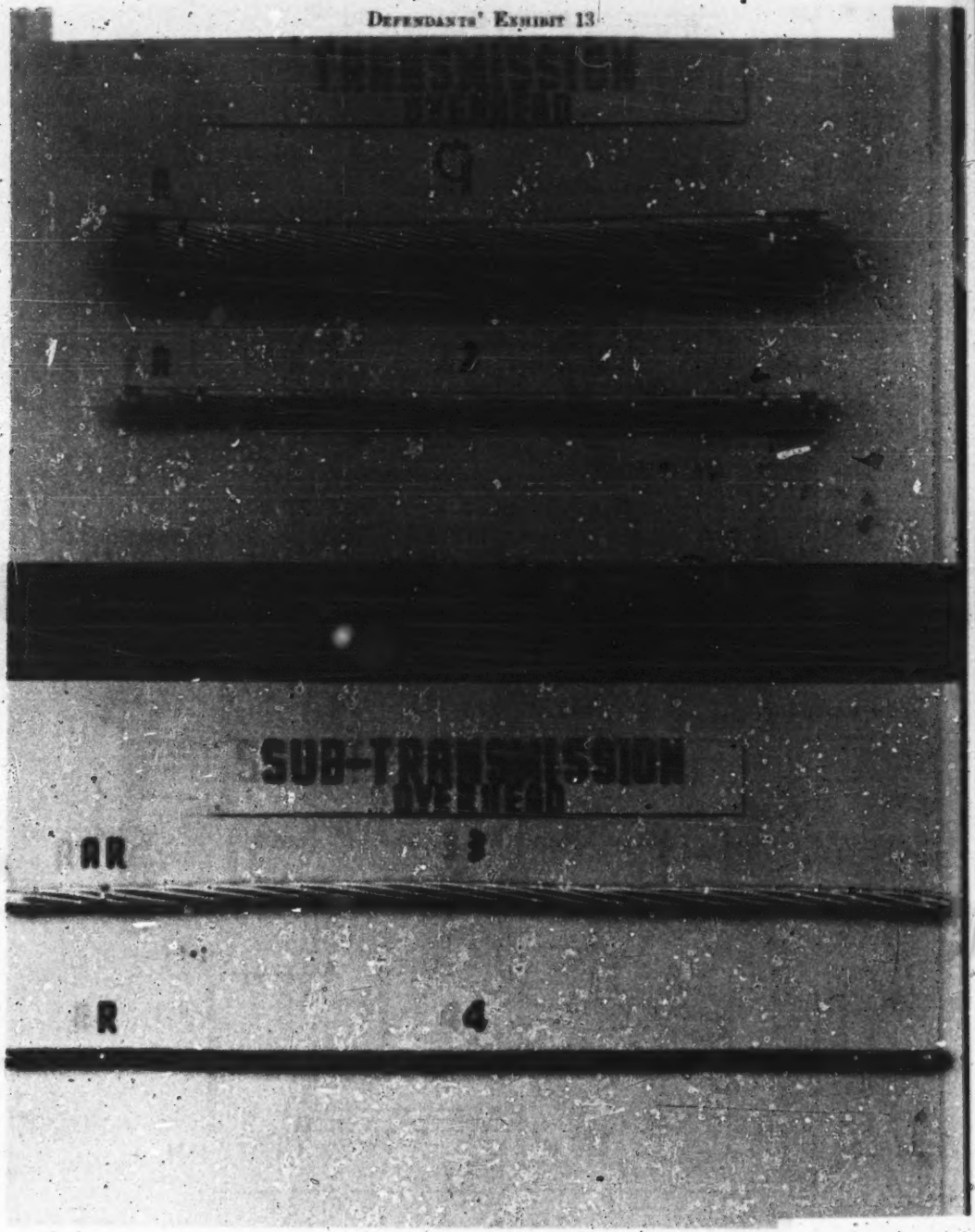
[fol. 6438] In United States District Court

Defendants' Exhibit 12



3246

Defendants' Exhibit 13



[fol. 6440] In United States District Court

Defendants' Exhibit 13a

TRANSMISSION OVERHEAD

A 1

1,275,000 CM Expanded ACSR Bare

A 2

336,400 CM 26/7 ACSR Bare

SUB-TRANSMISSION OVERHEAD

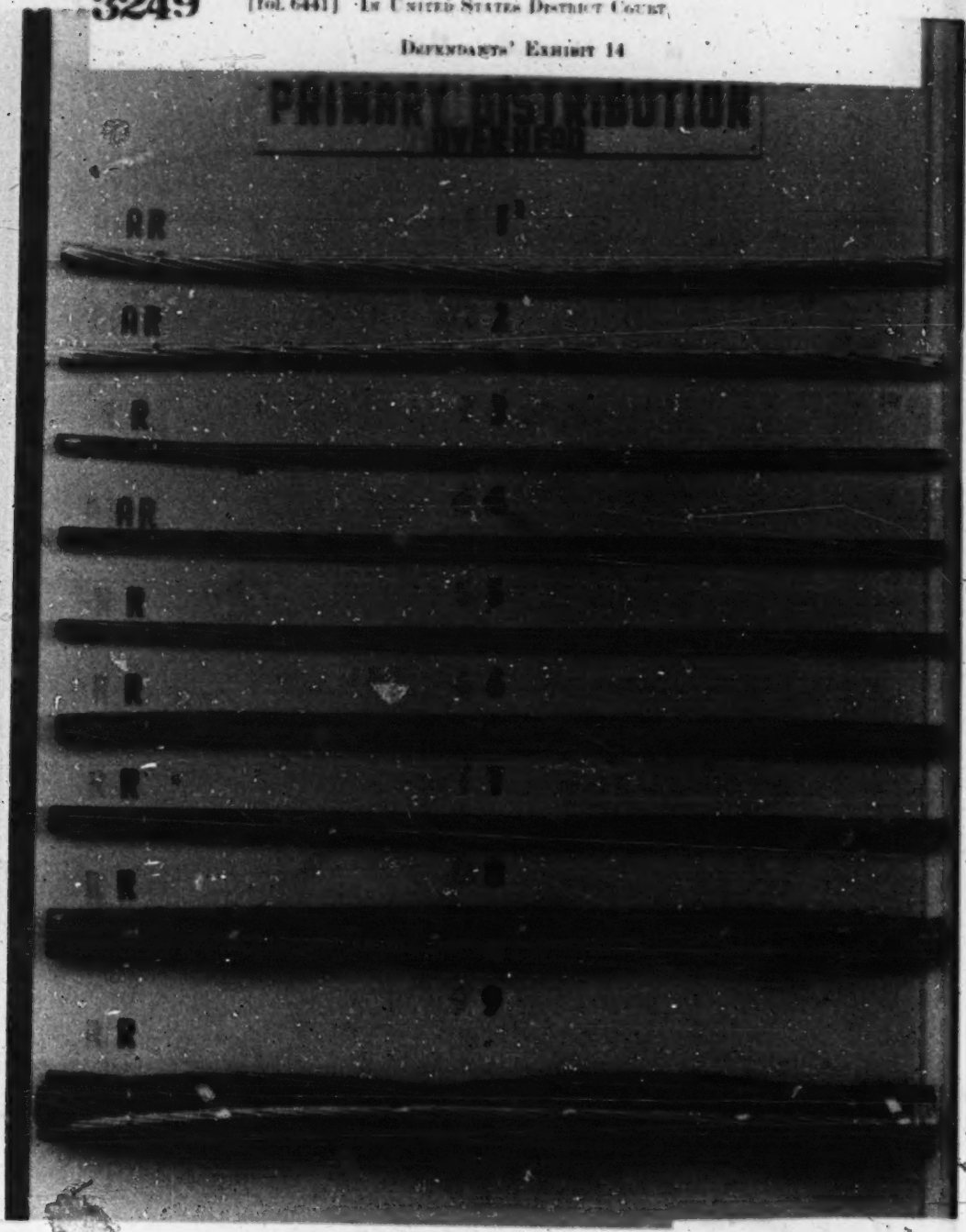
AR 3

4/0 AWG ACSR Bare

R 4

2/0 AWG Copper Hard Drawn Bare

Defendants' Exhibit 14



[illegible] In United States District Court

Defendants' Exhibit 14a

PRIMARY DISTRIBUTION
OVERHEAD

AR 1

4/0 AWG ACSR Bare Conductor

AR 2

4/0 AWG All Aluminum Bare Conductor

R 3

2/0 AWG Copper, Hard Drawn, Bare Conductor

AR 4

2/0 AWG ACSR, Polyethylene or Neoprene Covered Weatherproof (Line Wire)

R 5

2 AWG Copper H.D., Polyethylene Covered, Weatherproof (Line Wire)

R 6

2/0 AWG All Aluminum, Polyethylene Ins., Tree Wire

R 7

1 AWG Copper H.D., Polyethylene Ins., Tree Wire

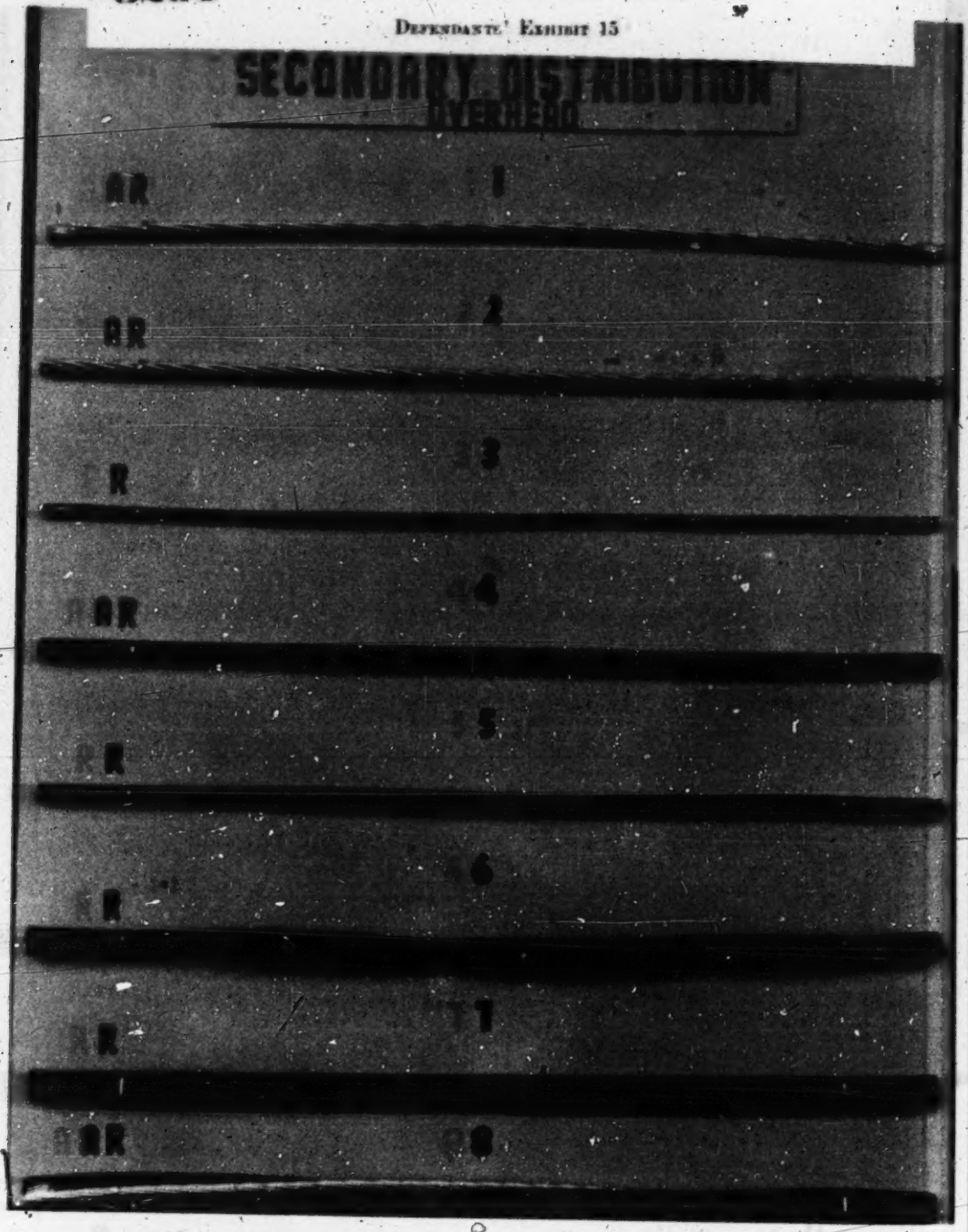
R 8

1 AWG Copper Self-Supporting Aerial Cable, 5 KV Rated

R 9

2/0 AWG Aluminum Self-Supporting Aerial Cable, 5 KV Rated

Defendants' Exhibit 15



[fol. 6444] In United States District Court

Defendants' Exhibit 15a

SECONDARY DISTRIBUTION
OVERHEAD

AR 1

1/0 AWG ACSR Bare Conductor

AR 2

1/0 AWG All-Aluminum Bare Conductor

R 3

2 AWG Hard Drawn Copper Bare Conductor

AR 4

1/0 AWG Aluminum-Polyethylene Covered Weatherproof (Line Wire)

R 5

2 AWG Copper-Polyethylene Covered Weatherproof (Line Wire)

R 6

2 AWG Copper-Neoprene Triplex Service Drop Cable

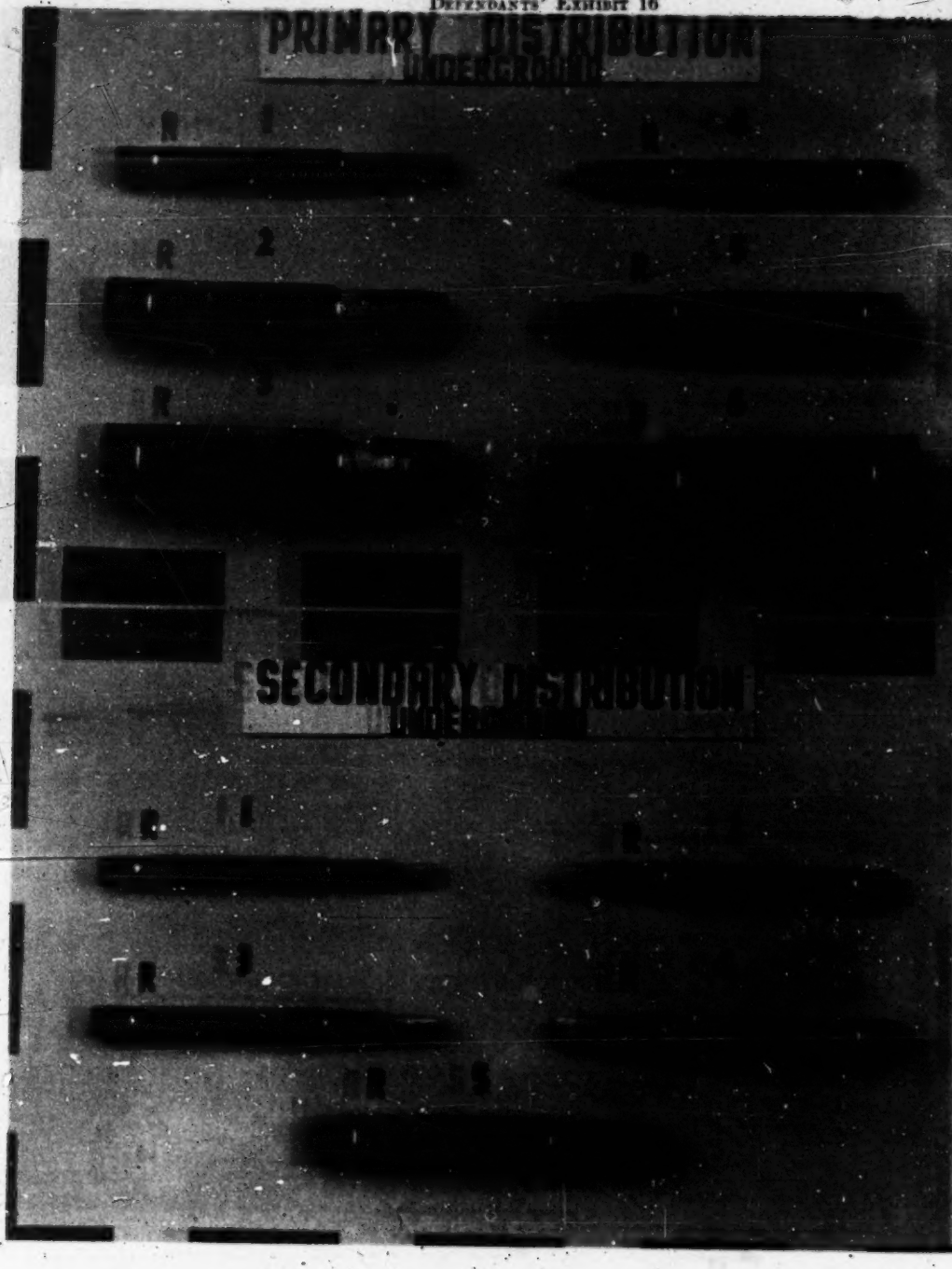
R 7

3/C #6 AWG Copper Service Drop Cable

AR 8

#2 AWG Aluminum-Polyethylene or Neoprene Triplex Service Drop Cable

Defendants' Exhibit 16



[fol. 6446] In United States District Court

Defendants' Exhibit 16a

PRIMARY DISTRIBUTION
UNDERGROUND

R 1

#2 AWG Copper, Polyethylene Ins.
Lead Sheath (15 KV Rated)

R 2

500 MCM Copper, Polyethylene Ins.
Shielded, PVC Jacket, (15 KV Rated)

R 3

400 MCM Copper Butyl Rubber Ins.
Shielded, Neoprene Jacket, (15 KV Rated)

R 4

#2 AWG Copper, Butyl Ins.
Concentric Servo (15 KV Rated)

R 5

500 MCM Copper, RoZone Ins. Neoprene Jacket
Unshielded, (15 KV Rated)

R 6

4/0 AWG Copper "RoZone" Ins.
Neoprene Sheath, 3/C Twisted
Neoprene Jacket, (15 KV Rated)

SECONDARY DISTRIBUTION
UNDERGROUND

R *1

2/0 AWG Copper
Style "RR" 600 V Rated

R *2

4/0 AWG Aluminum
Style RR 600 V. Rated

R *3

4/0 AWG Copper
Style RRD, 600 V. Rated

R *4

350 MCM Aluminum
Style RRD 600 V. Rated

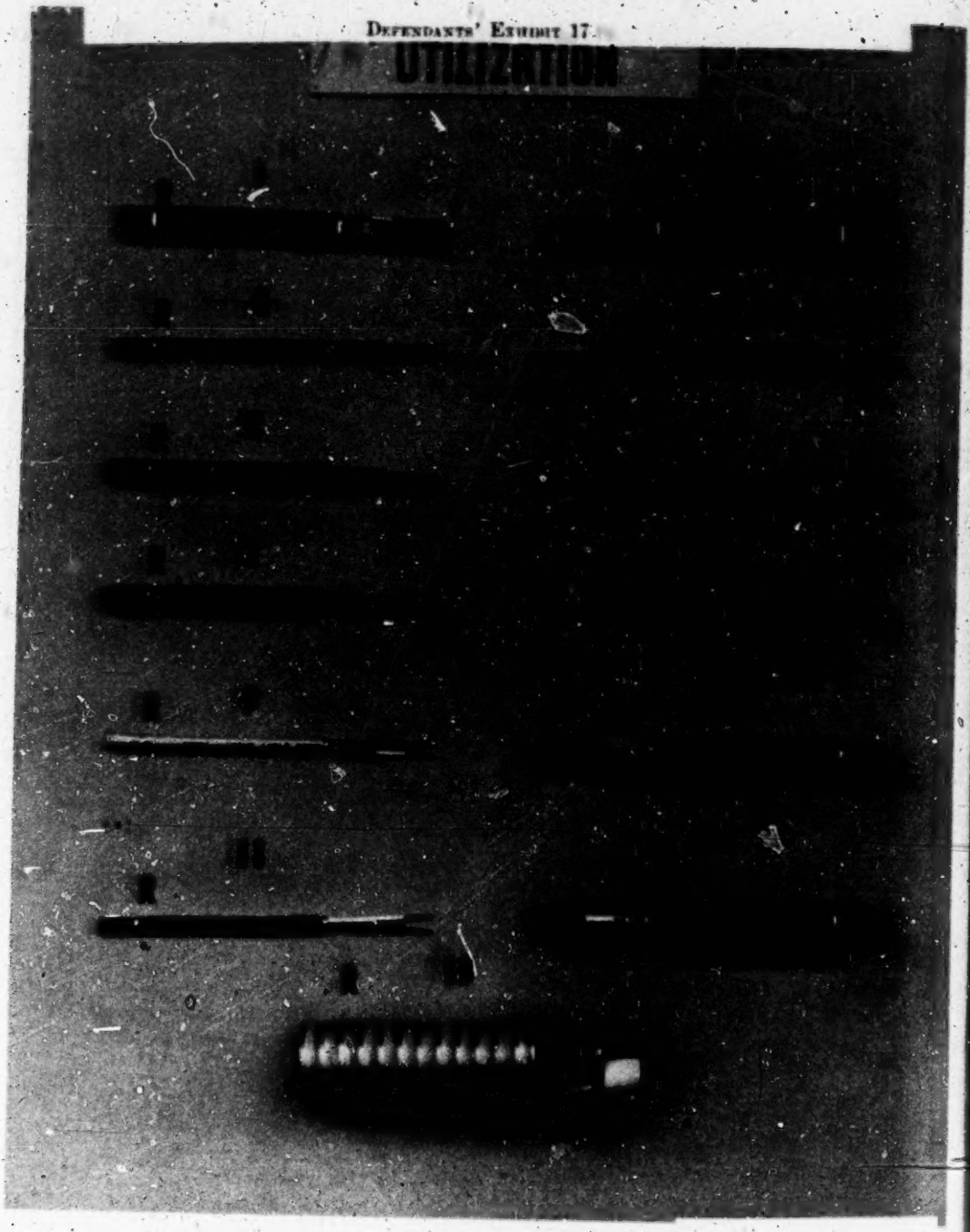
R *5

#2 AWG Copper
3/C Style RR 600 V. Rated

*NOTE: Above samples rubber insulated, Neoprene Jacketed.

[fol. 6447] In United States District Court

Defendants' Exhibit 17



[fol. 6448] In United States District Court

Defendants' Exhibit 17a

UTILIZATION

R 1

#4 AWG Copper 3/C Service Entrance Cable
Type S.E. Style U

R 2

#2 AWG Aluminum 3/C Service Entrance Cable
Type S.E. Style U

R 3

2 AWG Copper, Type TW
Thermoplastic Insulated,
Building Wire 600V. Rated

R 4

1/0 AWG Aluminum Type TW
(Thermoplastic Insulated)
Building Wire 600V Rated

R 5

2 AWG Copper, Type USE
(Underground Service Entrance Cable)
600V. Rated

R 6

1/0 AWG Aluminum, Type USE
(Underground Service Entrance Cable)
600V. Rated

R 7

#14 AWG Copper, [illegible] Cable Cord
3/C Type "SO" Rome "50"

R 8

#2 AWG Copper Thermoplastic
Insulated Synthanol 902
Type TW Building Wire

R 9

12 AWG Copper, 2/C "RoFlex"
Non-Metallic Sheathed House Wiring Cable

R 10

#4/0 AWG Copper 600V.
Rated, Rubber and Lead Power Cable

R 11

12 AWG Copper, 2/C "Flexall"
Type UF Underground Feeder Cable

R 12

1/0 AWG Copper, 5 KV, Rated, Shielded
"RoZone-RoPrene" Power Cable

R 13

4/0 AWG Copper, 5KV Rated.
Interlocked Armored Power Cable

Defendants' Exhibit 18

Defendants' Exhibit 18a

OTHER REPRESENTATIVE ROME PRODUCTS

1

Rectangular Copper, Formvar Coated Magnet Wire

2

Rectangular Copper, Glass-Dacron Covered Magnet Wire

3

12 AWG Copper, 12/C Thermoplastic Insulated Control Cable

4

12 AWG Copper, Rubber Insulated Control Cable

5

10 AWG Copper, 10/C Special Missile Cable

6

1/0 AWG Copper, "Synthinol 981" (Thermoplastic) Transformer Lead Wire

7

Spiral 4 Communication Cable (U.S. Signal Corps)

8

NSCA-19 Shipboard Control Cable (Navy)

9

3/0 AWG Copper, "Rome-60" Welding Cable

10

Special Instrumentation Cable with Molded Connector

11

Rectangular Aluminum, Formvar Coated Magnet Wire

12

Rectangular Copper, Glass Covered Magnet Wire

13

22 AWG Copper, Thermoplastic Ins., Nylon Sheathed, Shielded, Thermoplastic Jacketed Instrumentation Cable

14

14 AWG Copper, "Rome-50" Portable Cord-Type SO

15

24 AWG Copper, 15 Quads, Thermoplastic Ins., Shielded, Thermoplastic Sheath Jacketed Instrumentation Cable

16

6 AWG Copper, Pole & Bracket Cable for Ornamental Street Lighting

17

8 AWG Copper, Series Street Lighting Cable

18

8 AWG Copper, "Figure-8" Multiple Street Lighting Cable

19

2 AWG Copper, "Rome-60" Mining Machine Cable

20

4 AWG Copper, 7/C Railway Signal Cable

21

4/0 AWG Copper, "Rome-60" Type SHD Dredge Cable

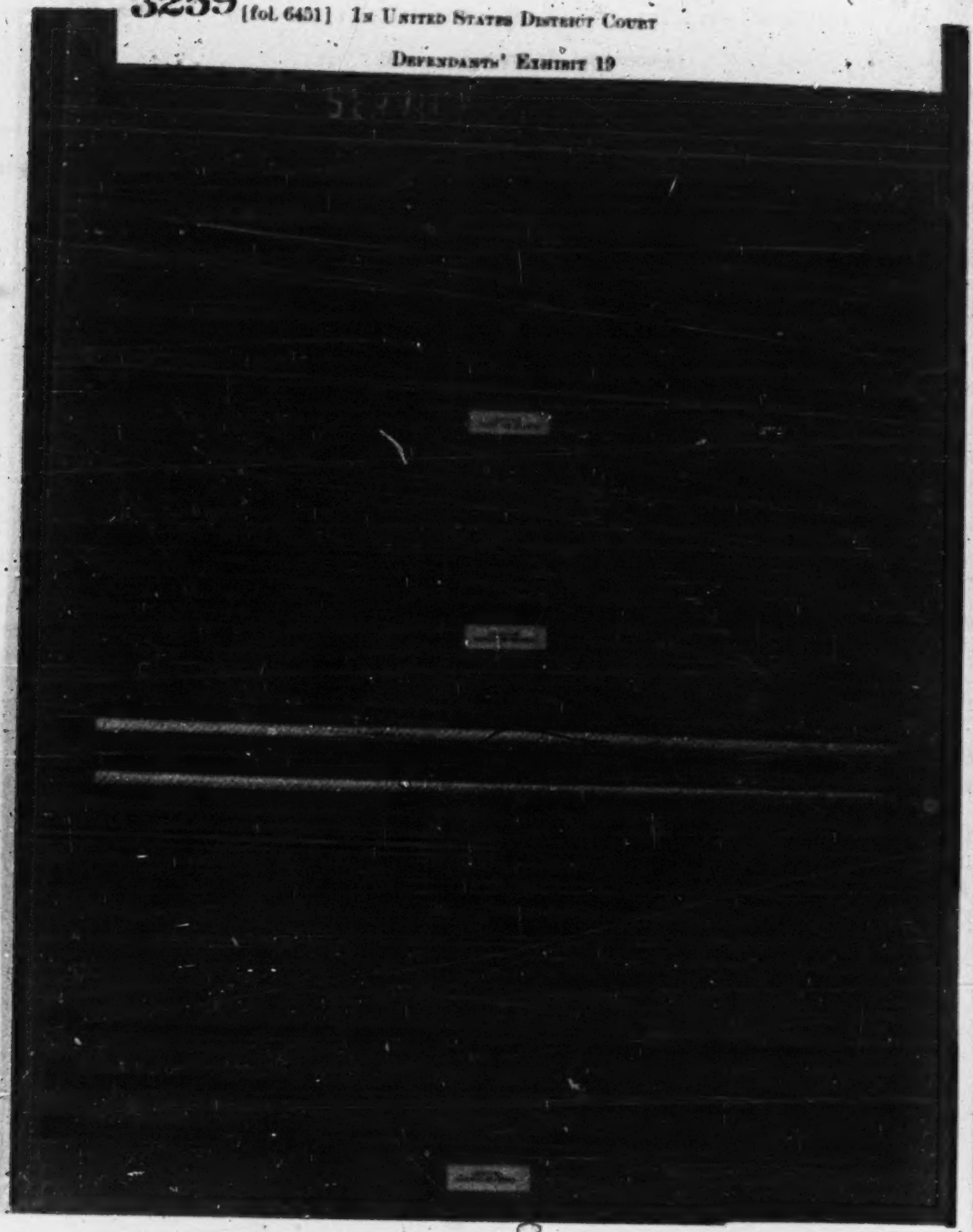
22

Radio Hookup Wire

23

Radio Hookup Wire

Defendants' Exhibit 19



DEFENDANTS' EXHIBIT 19a

SERVICE DROP CABLES

1. #4 AWG Std. Aluminum Triplex #6 ACSR Neutral
2. #4 AWG Std. Aluminum Triplex #4 Sol. Alumiweld Neutral
3. #4 AWG Std. Aluminum Triplex #4 Std. All Aluminum Neutral
4. #4 AWG Std. Aluminum Triplex #6 Std. Copperweld Neutral
5. #4 AWG Std. Aluminum Triplex #6 Sol. H.D. Copper Neutral

INSULATION
PLASTIC OR NEOPRENE

6. #6 AWG Std. Copper Triplex 8° Copperweld Neutral
7. #6 AWG Std. Copper Triplex 6 Sol. H.D. Bare Copper Neutral

INSULATION
PLASTIC OR NEOPRENE

8. #4 AWG Aluminum Style K (Ribbon Type)
9. #4 AWG Aluminum Style DD (Ribbon Type)
10. #4 AWG Aluminum Type S.D.
11. #6 AWG Copper Type S.D.
12. #4 AWG Sol. Copper Polyethylene Covered Weatherproof
13. #4 AWG Sol. Aluminum Neoprene Covered Weatherproof
14. #4 AWG Sol. Copper Fibrous Covered Weatherproof

CONDUCTOR
ALUMINUM OR COPPER

Defendants' Exhibit 20

[redacted]

[fol. 6454] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 20a

ALCOA-ROME

OVERLAP PRODUCTS

ACSR No. 6 to 4/0

AAC No. 8 to 1000 MCM

AL. Line Wire No. 6 to 1000 MCM

AL. Multiplex No. 6 to 4/0

Defendants' Exhibit 21

INSULATING MATERIALS

- PAPER — IMPREGNATING COMPOUNDS
  - MINERAL OIL
  - SYNTHETIC OILS
  - ROSIN-SYNTHETIC RESINS
- FIBROUS YARNS
  - COTTON, GLASS, SILK
  - RAYON, NYLON, ASBESTOS
- VARNISHED MATERIALS
  - VARNISHED CAMBRIC
  - VARNISHED GLASS
  - VARNISHED PAPER
  - SYNTHETIC ENAMEL
- RUBBER
- PLASTICS

Defendants' Exhibit 22

INSULATING MATERIALS
THERMOPLASTIC

RESIN	TYPES	COMPOUNDING INGREDIENTS
POLYETHYLENE	HIGH MOLECULAR HIGH DENSITY IRRADIATED FLAME RETARDANT CELLULAR	CHLORINATED ORGANIC COMPOUNDS MINERAL OXIDES ANTIOXIDANTS U V ABSORBERS CARBON BLACK BLOWING AGENTS COLORS, RUBBER
POLYPROPYLENE	HIGH TEMPERATURE HIGH IMPACT CELLULAR	STABILIZERS, ANTI-OXIDANTS COLORS, FILLERS BLOWING AGENTS
POLYVINYL CHLORIDE POLYVINYL CHLORIDE-ACETATE COPOLYMERS	RIGID, SEMI-RIGID SEMI-CONDUCTING CELLULAR	PLASTICIZERS, STABILIZERS LUBRICANTS, FILLERS, FLAME RETARDANTS, COLORS
NYLON		HEAT & LIGHT STABILIZERS
CELLULOSE PLASTICS	ETHYL CELLULOSE CELLULOSE ACETATE CELLULOSE ACETATE-BUTYRATE	PLASTICIZERS, OTHER COMPOUNDING INGREDIENTS

TEFLON
KEL-F

Defendants' Exhibit 23

INSULATING MATERIALS THERMOSETTING

RUBBER

NATURAL
POLYSULFIDE RUBBER
NEOPRENE RUBBER-TYPES GN-W, WD, WRT
GRS-SYNTHETIC RUBBER-TYPES 1018, 1019, 1023, 1801
BUTYL-SYNTHETIC RUBBER-TYPES 035, R100
SILICONE RUBBER
NITRILE-STYRENE RUBBER
HYPALON

ETHYLENE-PROPYLENE COPOLYMERS (EPR)
ETHYLENE PROPYLENE-DIENE TERPOLYMERS
STEREOSPECIFIC POLYMERS-CIS-4-POLYBUTADIENE

CROSS-LINKED POLYETHYLENE
POLYURETHANES

COMPOUNDING INGREDIENTS

ORGANIC ACCELERATORS

ORGANIC ANTIOXIDANTS

MINERAL OXIDES

CARBON BLACKS

WAXES

U V ABSORBERS

MINERAL INORGANIC EXTENDERS

ORGANIC EXTENDERS

MINERAL REINFORCING AGENTS

SULFUR & SULFUR COMPOUNDS

METALLIC VULCANIZING AGENTS

ORGANIC PEROXIDES

[fol. 6458] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 24

PROTECTIVE COVERINGS

METALLIC:

SHEATHING	LEAD, LEAD ALLOYS, ALUMINUM
ARMORING	STEEL OR BRONZE TAPE & WIRE, COPPER OR ALUMINUM TAPE & BRAIDED WIRE
COATINGS	ZINC, TIN, & LEAD ALLOYS

TREATED FIBERS:

BRAID	RAYON, COTTON, GLASS, ASBESTOS, JUTE, SISAL; NYLON, OTHER SYNTHETIC YARNS
TAPES OR WRAPS	COTTON, GLASS, JUTE, ASBESTOS
SATURATING-FINISHING COMPOUNDS	NATURAL & BY-PRODUCT ASPHALTS, ANIMAL & VEGETABLE PITCHES, MINERAL & VEGETABLE WAXES, OLEO-RESINOUS PAINTS & VARNISHES, SYNTHETIC RESIN BASE LACQUER

NON-METALLIC EXTRUDED

NATURAL & SYNTHETIC RUBBER

PLASTICIZED POLYVINYL CHLORIDE (PVC)

NYLON

POLYETHYLENE

POLYVINYL CHLORIDE-NITRILE RUBBER BLENDS

[fol. 6459] IN UNITED STATES DISTRICT COURT

DEFENDANT'S EXHIBIT 25

American Standard Specification for Weather-Resistant Wire and Cable, Neoprene Type

Sponsor Electrical Standards Board

Approved January 15, 1954

American Standards Association
Incorporated

[fol. 6460] American Standard

Registered United States Patent Office

An American Standard implies a consensus of those substantially concerned with its scope and provisions. The consensus principle extends to the initiation of work under the procedure of the Association, to the method of work to be followed, and to the final approval of the standard.

An American Standard is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an American Standard does not in any respect preclude any party who has approved of the standard from manufacturing, selling, or using products, processes, or procedures not conforming to the standard.

An American Standard defines a product, process, or procedure with reference to one or more of the following: nomenclature, composition, construction, dimensions, tolerances, safety, operating characteristics, performance, quality, rating, certification, testing, and the service for which designed.

American Standards are subject to periodic review. They are reaffirmed or revised to meet changing economic conditions and technological progress. Users of American Standards are cautioned to secure the latest editions.

Producers of goods made in conformity with an American Standard are encouraged to state on their own responsibility, in advertising, promotion material, or on tags or labels, that the goods are produced in conformity with particular American Standards. The inclusion in such advertising and promotion media, or on tags or labels, of information concerning the characteristics covered by the standard to define its scope is also encouraged.

Published by American Standards Association,
Incorporated
70 East Forty-fifth Street
New York 17, N. Y.
Price, Fifty Cents

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Incorporated
Universal Decimal Classification 621.315.336.7

[fol. 6461] Foreword

(This Foreword is not a part of the American Standard Specification for Weather-Resistant Wire and Cable, Neoprene Type, C8.34-1954.)

This American Standard is one of a series of standards on insulated wire and cable developed by ASA Sectional Committee, C8. The work of the technical subcommittee, in preparing this standard, extended over a period of three years. It was recognized that after a year or two of experience in production and usage there undoubtedly would be additional suggestions as to changes which should be made; however, it was felt that the specification could only be developed by bringing it into commercial usage by issuing it as an American Standard.

Suggestions for improvement gained in the use of this standard will be welcomed. They should be sent to the American Standards Association, Incorporated, 70 East Forty-fifth Street, New York 17, N. Y.

The organizations which participated in this work and the names of their representatives, as listed at the time this standard was submitted to the Sectional Committee for approval, are as follows:

W. F. DAVIDSON, *Chairman* S. D. HOFFMAN, *Secretary*

Organization Represented	Name of Representative
American Institute of Electrical Engineers	W. F. Davidson
	W. A. Del Mar
	L. C. Peterman
	W. N. Zippler
American Society for Testing Materials	Carl E. Ambelang
	R. W. Chadbourn
	A. A. Jones
	Gordon Thompson
Anaconda Wire and Cable Company	L. L. Carter
Armed Services Electro Standards Agency (Liaison)	David Raskin
Association of American Railroads	
Engineering Division, Signal Section	W. W. Beard
Engineering Division, Electrical Section	C. R. Troop
Mechanical Division, Electrical Section	C. R. Troop
Association of Iron and Steel Engineers	F. W. Cramer
Electric Light and Power Group	G. E. Dean
	J. H. Foote
	H. Halperin
	C. T. Sinclair
	C. K. Poarch (Alt)
Insulated Power Cable Engineers Association	E. W. Davis
	W. J. Richard
	R. J. Wiseman

Organization Represented	Name of Representative
International Municipal Signal Association	F. Leewe W. S. Anderson (Alt)
National Board of Fire Underwriters	E. N. Davis
National Bureau of Standards, U. S. Department of Commerce	L. E. Barbrow
National Electrical Manufacturers Association	C. A. Finkel C. O. Hull K. M. MacKay R. A. Schatzel H. H. Weber
National Fire Protection Association	C. W. Zimmerer
Telephone Group	C. C. Lawson
U. S. Department of the Army (Liaison)	Nathan Tunison
U. S. Department of the Navy, Bureau of Ships	Code 350 Laboratory Officer, Material Laboratory, New York Navy Yard (Alt)

Technical Committee No. 12 on Weatherproof Wire and Cable, which was responsbile for the development of this standard, has the following personnel:

C. T. Sinclair, Chairman

C. E. Ambelang	G. E. Dean	R. A. Schatzel
B. J. Barmack	E. P. Hall	E. G. Sturdevant
W. W. Beard	B. R. Hubbard	J. A. Ten Brock
H. N. Bockus	T. S. Johnson	C. E. Topping
L. L. Carter	C. A. Jordan	G. W. Zink
Glen A. Coan	J. J. Morrison	

[fol. 6462] Contents

Section	Page
1. Scope	5
2. Conductors	5
2.1 Copper Conductors	5
2.2 Copper-Alloy Conductors	5
2.3 Copper-Covered Steel Conductors	5
2.4 Aluminum Conductors	5
2.5. ACSR	6
3. Neoprene Covering	6
3.1 Physical Requirements	6
4. Acceptance Requirements	6
4.1 Conductor Tests	6
4.2 Thickness of Covering	6
4.3 Weights and Tolerances	6
5. Samples for Tests	8
5.1 Cutting	8
5.2 Number	8
6. Identification	9
7. Packing and Marking	9
8. Inspection	9
9. Acceptance or Rejection	9
Table 1 Nominal Weights of Weather-Resistant Wire and Cable, Neoprene Type	7
Table 2 Nominal Weights of Weather-Resistant Wire and Cable, Neoprene Type (ACSR Conductors)	8

[fol. 6463] American Standard Specification for Weather-Resistant Wire and Cable, *Neoprene Type* *

1. Scope

1.1 These specifications cover neoprene-type weather-resistant wire and cable, the conductors, the materials used for the neoprene coverings, and the acceptance requirements.

2. Conductors

2.1 Copper Conductors. The copper conductors of finished wire and cable shall be in accordance with the following American Standards, or the latest revisions thereof approved by the American Standards Association, Incorporated, except as modified herein.

American Standard Specifications for Soft or Annealed Copper Wire, C7.1-1953, 2nd ed. (ASTM B 3-53T)
American Standard Specifications for Hard-Drawn Copper Wire, C7.2-1953, 2nd ed. (ASTM B 1-53T)
American Standard Specifications for Medium-Hard-Drawn Copper Wire, C7.3-1953 (ASTM B 2-52)
American Standard Specifications for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft, C7.8-1953, 2nd ed. (ASTM B 8-53)

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* Note: These specifications are the result of cooperative effort among members of ASA Technical Committee 12, the producer of the neoprene polymer, and the several wire and cable manufacturers who are producers of neoprene weather-resistant wire. These specifications are regarded as tentative, since the work of the Committee and those cooperating with it is continuing with a view toward (1) the further development of test methods and specification requirements that will assure furnishing the most desirable type of neoprene compound from the standpoint of service characteristics, and (2) the development of reasonable and desirable methods for assuring the continuity of covering of the finished weather-resistant wire.

Field and manufacturing experience is expected to provide further guidance as to optimum thickness of covering and the most suitable limits for the physical properties of the conductor after weatherproofing.

2.1.1 For completed copper conductors after covering, minimum tensile or breaking-strength limits shall be 5 percent less, and maximum tensile or breaking-strength limits shall be 5 percent greater than the limits specified in the applicable referenced specifications. The minimum elongation limits for annealed solid wires or annealed wires removed from stranded conductors after covering shall be numerically 5 percentage points less than the minimum elongation required for bare conductors (for example, 30 percent reduced to 25 percent). The minimum elongation limits for hard-drawn and medium-hard-drawn solid wires after covering likewise shall be reduced 0.10 percent in numerical value for sizes No. 4 AWG and smaller, and 0.20 percent for sizes larger than No. 4 AWG. No elongation test shall be required on component wires of stranded hard-drawn and medium-hard-drawn copper conductors after covering.

2.2 Copper-Alloy Conductors. The copper-alloy (bronze) conductors of finished wire shall be of Grade-30 alloy, and shall be in accordance with American Standard Specifications for Hard-Drawn Copper Alloy Wires for Electrical Conductors C7.10-1953, 2nd ed. (ASTM B 105-53), or the latest revision thereof approved by the American Standards Association, Incorporated, except as modified herein.

2.2.1 For completed Grade-30 alloy wires after covering, minimum tensile-strength limits shall be 5 percent less, and minimum elongation limits shall be numerically 0.10 percentage points less than the respective limits specified in the above-referenced bare-wire specifications.

2.2.2 These specifications are not intended to cover solid copper-alloy conductors larger than No. 4 AWG or stranded copper-alloy conductors.

2.3 Copper-Covered Steel Conductors. The copper-covered steel conductors of finished wire shall be either Grade-30 high strength or Grade-40 high strength, as specified by the purchaser, and shall be in accordance with American Standard Specifications for Hard-Drawn Copper Covered Steel Wire, C7.17-1953 (ASTM B 227-52), or the latest revision thereof approved by the American Standards Association, Incorporated.

2.4 Aluminum Conductors. The aluminum conductors of finished wire and cable shall be in accordance with the following specifications, or the latest revisions thereof approved by the American Standards Association, Incorporated, except as modified herein:

[fol. 6464] American Standard Specifications for Hard-Drawn Aluminum Wire for Electrical Purposes, C7.20-1953, 2nd ed. (ASTM B 230-53T)

American Standard Specifications for Concentric-Lay-Stranded Aluminum Conductors, Hard-Drawn, C 7.21-1953, 2nd ed. (ASTM B 231-53)

2.4.1 For completed aluminum conductors after covering, minimum tensile or breaking-strength limits shall be 10 percent less than the limits specified in the applicable referenced bare-conductor specifications. The minimum elongation limits for solid hard-drawn aluminum wires after covering shall be numerically 0.5 percentage points less than the minimum elongation required by the applicable bare-wire specification. No elongation test shall be required on component wires of stranded hard-drawn aluminum conductors after covering.

2.5 ACSR. Prior to covering, aluminum conductors, steel-reinforced, shall be in accordance with American Standard Specifications for Concentric-Lay-Stranded Aluminum Conductors, Steel-Reinforced (ACSR), C7.22-1953, 2nd ed. (ASTM B 232-53T), or the latest revision thereof approved by the American Standards Association, Incorporated.

2.5.1 Tensile or elongation tests shall not normally be required on completed ACSR or its component wires after covering; however, upon advance agreement between manufacturer and purchaser, breaking-strength tests may be made upon completed ACSR with covering removed. For such tests, compression or other suitable fittings shall be employed.

2.5.2 For purposes of rating, the breaking strength of finished ACSR after covering shall be taken as 95 percent of the bare-conductor breaking strength specified in 8(a) of American Standard Specifications for Concentric-Lay-Stranded Aluminum Conductors, Steel-Reinforced (ACSR),

C7.22-1953, 2nd ed. (ASTM B 232-53T). If ACSR is tested in accordance with advance mutual agreement between manufacturer and purchaser, its breaking strength after covering shall be not less than 95 percent of the bare-conductor breaking strength specified in 8(b) of the same specification.

3. Neoprene Covering

The covering shall be neoprene (polychloroprene) so compounded and vulcanized as to meet the following requirements. The compound shall contain suitable amounts of well-dispersed channel black and anti-oxidants to insure long life as a line-wire covering in direct contact with metallic conductors.

3.1 Physical Requirements. The covering shall conform to the following requirements when tested in accordance with American Society for Testing Materials Tentative Methods of Testing Rubber Insulated Wire and Cable (ASTM D 470-52T).

Initial tensile strength, minimum, psi	1400
Initial elongation at rupture, minimum, percent	250
Set in 2-inch gage length, maximum, inch	3/8
Oxygen-pressure aging test (96 hrs at 70C and 300 psi)	
Tensile strength, minimum, percent of original	75
Elongation, minimum, percent of original	65
Oil-Immersion test (18 hrs at 121C)	
Tensile strength, minimum, percent of original	60
Elongation, minimum, percent of original	60

4. Acceptance Requirements

The finished wire or cable shall meet the following acceptance requirements. The frequency of sampling to determine compliance with these requirements shall be in accordance with 5, Samples for Test, and conformance with these requirements shall be in accordance with 9, Acceptance or Rejection.

4.1 Conductor Tests. Tests on conductors of other than ACSR construction shall be made upon finished wire or

cable after removing the covering. Tests and properties shall conform to the requirements of 2, Conductors.

4.2 Thickness of Covering. The average thickness of the covering, considered as one-half the difference between the average over-all diameter measured over the covering, and the diameter of the bare conductor, shall be not less than that shown in Tables 1 or 2. The minimum thickness at any point shall be not more than 5 mils below the specified average for thickness 3/64 inch and under, and not more than 10 percent below the specified average for 4/64 inch and over.

4.3 Weights and Tolerances

4.3.1 The diameters of the conductors of finished wire or the individual strands of stranded conductors in finished cable supplied under these specifications shall meet the requirements and limits of 2, Con-

[fol. 6465]

Table 1

Nominal Weights of Weather-Resistant Wire and Cable Neoprene Type

(Pounds per 1000 Feet)

Size AWG or Mcm	Conductors Weights			Coverings		Finished Wire and Cable		
	Copper & Copper Alloy	Aluminum	Copper-Covered Steel	Thickness 64ths in.	Weight	Copper & Copper Alloy	Aluminum	Copper-Covered Steel
	Stranded Conductors							
500	1544	460.4	——	6	215	1759	684	——
477	——	447.8	——	6	211	——	659	——
450	1389	422.4	——	6	204	1593	626	——
400	1235	375.5	——	6	203	1438	579	——
397.5	——	373.0	——	6	202.4	——	575	——
350	1081	328.6	——	5	159	1240	488	——
336.4	——	315.7	——	5	156.0	——	472	——
300	926.3	281.6	——	5	146.7	1073	428	——
266.8	——	250.4	——	5	137.5	——	388	——
250	771.9	234.7	——	5	133.1	905	368	——
4/0	653.3	198.6	——	4	107.7	761	306	——
3/0	518.1	157.5	——	4	93.9	612	251	——
2/0	410.9	124.9	——	4	83.1	494	208	——
1/0	325.8	99.1	——	4	72.2	398	171	——
1	258.4	78.6	——	4	64.6	323	143	——
2	204.9	62.3	——	3	43.0	248	105	——
4	128.9	39.2	——	3	34.1	163	73.3	——
6	81.1	24.6	——	3	26.9	108	51.5	——
	Solid Conductors							
1	253.3	——	——	4	47.7	301	——	——
2	200.9	61.1	——	3	31.1	232	92.2	——
3	159.3	——	——	3	28.7	188	——	——
4	126.4	38.4	115.8	3	25.6	152	64.0	141
6	79.5	24.2	72.8	3	21.5	101	45.7	94.3
8	50.0	15.2	45.8	3	18.0	68	33.2	63.8
9	39.6	——	36.3	3	16.4	56	——	52.7
10	31.4	——	28.8	2	9.2	40.6	——	38.0
12	19.8	——	18.1	2	7.7	27.5	——	25.8

Table 2

Nominal Weights of Weather-Resistant Wire and Cable, Neoprene Type

ACSR Conductors
(Pounds per 1000 Feet)

Conductors				Covering		
Size*	Hard-Drawn Copper Equivalent†	Stranding Aluminum/Steel	Weight	Thickness	Weight	Finished Wire and Cable
AWG	AWG			64ths in.		
4/0	2/0	6/1	291.1	4	117.9	409
3/0	1/0	6/1	230.8	4	103.2	334
2/0	1	6/1	183.1	4	89.9	273
1/0	2	6/1	145.2	4	78.8	224
1	3	6/1	115.2	4	69.8	185
2	4	7/1	106.7	3	48.3	155
2	4	6/1	91.3	3	47.7	139
3	5	6/1	72.4	3	41.6	114
4	6	7/1	67.0	3	38.0	105
4	6	6/1	57.4	3	37.1	94.5
5	7	6/1	45.5	3	33.0	78.5
6	8	6/1	36.1	3	28.9	65.0

* Aluminum wires only.

† Area of hard-drawn copper cable (conductivity = 97 percent IACS) having the same d-c resistance as that of the ACSR (aluminum conductivity = 61 percent IACS).

ductors, and the variation in weights from Tables 1 and 2 shall be determined by the dimensional tolerances of 2, Conductors.

4.3.2 The average weight of the covering of wire or cable in any lot or shipment of any one size or type manufactured or supplied under these specifications shall vary not more than 15 percent over or 15 percent under the nominal weights given in Tables 1 and 2. This average applies to the entire lot or shipment and is not cause for rejection of an individual coil or reel exceeding the 15-percent variation. Each sample used for this test shall be not less than 2 feet in length for sizes 4/0 AWG and smaller, and not less than 1 foot in length for 250,000 cm and larger.

4.3.3 The weights of finished wire and cable in Tables 1 and 2 are presented merely as a matter of information for the convenience of the user of these specifications, and are subject to the tolerances resulting from the application of 4.3.1 and 4.3.2.

5. Samples for Test

Samples to determine conformance with Acceptance Requirements, 4, shall be taken as prescribed in the following paragraphs:

5.1 Cutting. Fair samples shall be cut from the ends of coils or reels, after first cutting back these ends at least 2 feet. These samples shall be cut in half and tagged—one-half to be used for the tests, the other half to be held in reserve for check tests. The samples shall not be distorted or sharply bent.

5.2 Number. The number of samples of each size of wire or cable taken for test shall be as follows:

[fol. 6467] *5.2.1 Wire or Cable Supplied in Coils*

(*a*) For coils of standard size exceeding 1000 feet of wire or cable, samples shall be taken from three coils of the first lot of 25 coils or fraction thereof, and samples from one coil of each additional 25 coils or fraction thereof.

(*b*) For small coils of less than 1000 feet of wire or cable, samples shall be taken from three coils of the first lot of 2500 pounds or fraction thereof and samples from one coil of each additional 2500-pound lot or fraction thereof.

(*c*) If less than three coils are submitted, one sample shall be taken from each coil.

5.2.2 Wire or Cable Supplied on Reels

(*a*) For reels of standard size containing 2000 feet or more of wire or cable, samples shall be taken from three of the first lot of 30 reels or fraction thereof, and samples from one of each additional lot of ten reels or fraction thereof.

(*b*) For small reels of less than 2000 feet of wire or cable, samples shall be taken from three reels of the first lot of 6000 pounds or fraction thereof, and samples from one reel of each additional 2000 pound lot or fraction thereof.

(*c*) If less than three reels are submitted, one sample shall be taken from each reel.

6. Identification

6.1 The wire shall be so identified that the manufacturer can be determined readily.

7. Packing and Marking

7.1 Packing and marking shall be in accordance with the purchaser's specification.

8. Inspection

8.1 Inspection and acceptance shall be made at the point of manufacture. The manufacturer shall give the purchaser, or his representative, such access to his works during working hours as is reasonable and necessary to determine the suitability of the material to be supplied and shall furnish the necessary apparatus, labor, and other facilities for making the inspection and acceptance tests herein called for, without cost to the purchaser. Neither inspection, waiving of inspection, nor the purchaser's acceptance shall relieve the manufacturer from obligation to furnish weather-resistant wire in accordance with these specifications.

9. Acceptance or Rejection

9.1 Conformance with these specifications shall be determined as follows:

(*a*) If 20 percent or more of the samples fail to meet these specifications, an entirely new lot of samples shall be selected at random from the shipment and tested. If the second group of samples fails to meet these specifications, as outlined in the preceding sentence, the entire shipment shall be rejected.

(*b*) The 15-percent variation in the average weight of the complete covering shown in 4.3 establishes a manufacturing tolerance. Should any shipment of wire or cable exceed this manufacturing tolerance by weight, but be satisfactory in all other respects, the purchaser may accept the shipment, but he shall not be required to pay for weather-resistant covering in excess of the allowable variation, and he shall receive credit from the manufacturer for such excess over the maximum permissible

weight of covering, at the price charged for the finished wire or cable.

(*c*) In all cases, even if the shipment of wire or cable is accepted, the coils or reels that fail to meet these specifications shall be rejected, except that individual coils or reels shall not be rejected because covering weights exceed the allowable variation, when the average weight of the entire lot is within the allowable variation or when the customer elects to accept an entire lot or shipment in which the average weight exceeds the allowable variation.

[fol. 6468] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 26

American Standard Specifications for Weather-Resistant Wire and Cable, Polyethylene Type

Sponsor Electrical Standards Board

Approved August 13, 1957
American Standards Association
Incorporated

[fol. 6469] American Standard

Registered United States Patent Office

An American Standard implies a consensus of those substantially concerned with its scope and provisions. The consensus principle extends to the initiation of work under the procedure of the Association, to the method of work to be followed, and to the final approval of the standard.

An American Standard is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an American Standard does not in any respect preclude any party who has approved of the standard from manufacturing, selling, or using products, processes, or procedures not conforming to the standard.

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[fol. 6470] Foreword

(This Foreword is not a part of American Standard Specifications for Weather-Resistant Wire and Cable, Polyethylene Type, C8.35-1957.)

This American Standard is one of a series of standards on insulated wire and cable developed by ASA Sectional Committee C8. The work of technical subcommittee 12, in preparing this standard, extended over a period of many years. This standard is the result of the cooperative effort between the producers of polyethylene and the several wire and cable manufacturers who are producers of polyethylene weather-resistant wire.

The committee is continuing its efforts with a view towards (1) the further development of test methods and specification requirements that will assure furnishing the most desirable type of polyethylene compound from the standpoint of service characteristics, and (2) the development of reasonable and desirable methods for assuring the continuity of covering of the finished weather-resistant wire.

Field and manufacturing experience is expected to provide further guidance as to optimum thicknesses of covering and the most suitable limits for the physical properties of the conductor after covering.

Suggestions for improvement gained in the use of this standard will be welcomed. They should be sent to the American Standards Association, Incorporated, 70 East Forty-fifth Street, New York 17, N. Y.

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[fol. 6471]

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[fol. 6472] Contents

Section	Page
1. Scope	6
2. Conductors	6
2.1 Copper Conductors	6
2.2 Copper-Alloy Conductors	6
2.3 Copper-Covered Steel Conductors	6
2.4 Aluminum Conductors	6
2.5 ACSR	7
3. Polyethylene Covering	7
3.1 Carbon Black	7
3.2 Heat Stabilizer	7
3.3 Specific Gravity	7
3.4 Flow Rate	7
3.5 Tensile Properties	7
3.6 Weights and Covering Thicknesses	7
4. Acceptance Requirements	7
4.1 Conductor Tests	7
4.2 Thickness of Covering	7
4.3 Weights and Tolerances	9
5. Samples for Test	9
5.1 Cutting	9
5.2 Number	10
6. Identification	10
7. Packing and Marking	10
8. Inspection	10
9. Acceptance or Rejection	10
Appendix A—Method of Determining Dispersion of Carbon Black in Polyethylene Compounds	11
A1. Scope	11
A2. Significance	11
A3. Apparatus	11
A4. Test Specimens	11
A5. Procedure	11
A6. Report	14
A7. References	14

Appendix B—Method of Determining Carbon Black Content of Ethylene Plastics 14
B1. Scope 14
B2. Significance 14
B3. Apparatus 14
B4. Reagents 14
B5. Procedure 14
B6. Calculation 15
B7. Report 15
Tables
Table 1 Nominal Weights of Weather-Resistant Wire and Cable, Polyethylene Type 8
Table 2 Nominal Weights of Weather-Resistant Wire and Cable, Polyethylene Type (ACSR Conductors) 9
Figures
Fig. A1 12
Fig. A2 13
Fig. B1 15

[fol. 6473] American Standard Specifications for Weather-Resistant Wire and Cable, Polyethylene Type

1. Scope

1.1 These specifications cover polyethylene-type weather-resistant wire and cable, the conductors, the materials used for the polyethylene coverings, and the acceptance requirements.

2. Conductors

2.1 Copper Conductors. The copper conductors of finished wire and cable shall be in accordance with the following American Standards, or the latest revisions thereof approved by the American Standards Association, Incorporated, except as modified herein.

American Standard Specifications for Soft or Annealed Copper Wire, C7.1-1955 (ASTM B 3-54T)

American Standard Specifications for Hard-Drawn Copper Wire, C7.2-1953, R1957 (ASTM B 1-56T)

American Standard Specifications for Medium-Hard-Drawn Copper Wire, C7.3-1953 (ASTM B 2-52)

American Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft, C7.8-1953 (ASTM B 8-53)

2.1.1 For completed copper conductors after covering, minimum tensile or breaking-strength limits shall be 5 percent less, and maximum tensile or breaking-strength limits shall be 5 percent greater than the limits specified in the applicable referenced specifications. The minimum elongation limits for annealed solid wires or annealed wires removed from stranded conductors after covering shall be numerically 5 per cent less than the minimum elongation required for bare conductors (for example, 30 percent reduced to 25 percent). The minimum elongation limits for hard-drawn and medium-hard-drawn solid wires after covering likewise shall be reduced in numerical value 0.10 percent for sizes No. 4 AWG and smaller, and 0.20

percent for sizes larger than No. 4. No elongation test shall be required on component wires of stranded hard-drawn and medium-hard-drawn copper conductors after covering.

2.2 Copper-Alloy Conductors. The copper-alloy (bronze) conductors of finished wire shall be Alloy No. 30 and shall be in accordance with American Standard Specifications for Hard-Drawn Copper Alloy Wires for Electrical Conductors, C7.10-1956 (ASTM B 105-55), or the latest revision thereof approved by the American Standards Association, Incorporated, except as modified herein.

2.2.1 For completed Alloy No. 30 wires after covering, minimum tensile-strength limits shall be numerically 5 percent less, and minimum elongation limits shall be numerically 0.10 percent less, than the respective limits specified in the above-reference bare-wire specification.

2.2.2 These specifications are not intended to cover solid copper-alloy conductors larger than No. 4 AWG or stranded copper-alloy conductors.

2.3 Copper-Covered Steel Conductors. The copper-covered steel conductors of finished wire shall be either Grade-30 high strength, or Grade-40 high strength as specified by the purchaser, and shall be in accordance with American Standard Specifications for Hard-Drawn Copper Covered Steel Wire, C7.17-1953 (ASTM B 227-52), or the latest revision thereof approved by the American Standards Association, Incorporated:

2.4 Aluminum Conductors. The aluminum conductors of finished wire and cable shall be in accordance with the following American Standards, or the latest revisions thereof approved by the American Standards Association, Incorporated, except as modified herein.

American Standard Specifications for Hard-Drawn Aluminum Wire for Electrical Purposes, C7.20-1956 (ASTM B 230-55T).

American Standard Specifications for Concentric-Lay-Stranded Aluminum Conductors, Hard-Drawn and Three-Quarter Hard-Drawn, C7.21-1956 (ASTM B 231-55)

2.4.1 For completed aluminum conductors after covering, minimum tensile or breaking-strength limits shall be 10 percent less than the limits specified in the applicable [fol. 6474] referenced bare-conductor specifications. The minimum elongation limits for solid hard-drawn aluminum wires after covering shall be numerically 0.5 percent less than the minimum elongation required by the applicable bare-wire specification. No elongation test shall be required on component wires of stranded hard-drawn aluminum conductors after covering.

2.5 ACSR. Prior to covering, aluminum conductors, steel-reinforced, shall be in accordance with American Standard Specifications for Concentric-Lay-Stranded Aluminum Conductors, Steel-Reinforced (ACSR), C7.22-1956 (ASTM B 232-55T), or the latest revision thereof approved by the American Standards Association, Incorporated.

2.5.1 Tensile or elongation tests shall not normally be required on completed ACSR or its component wires after covering. However, upon advance agreement between manufacturer and purchaser, breaking-strength tests may be made on completed ACSR with covering removed. For such tests, compression or other suitable fittings shall be employed.

2.5.2 For purposes of rating, the breaking strength of finished ACSR after covering shall be taken as 95 percent of the bare-conductor breaking strength specified in Section 8(a) of American Standard C.722-1956 (ASTM B 232-55T). If ACSR is tested in accordance with advance mutual agreement between manufacturer and purchaser, the breaking strength of ACSR after covering shall be not less than 95 percent of the bare-conductor breaking strength specified in Section 8(b) of that same specification.

3. Polyethylene Covering

The covering shall be extruded polyethylene compound containing only properly dispersed suitable carbon black and heat-stabilizer and meeting the following physical and chemical requirements:

3.1 Carbon Black. The polyethylene compound on the finished wire or cable shall contain 3.0 percent ± 0.5 per-

cent by weight of medium-color channel black having a maximum particle size of 20 millimicrons (mμ). The absorptivity as determined by the method prescribed in Appendix A shall not be less than 24,000 when measured using light of wave-length 560 mμ, except that for an integrating sphere photometer "white light" (color temperature = 2850 K) shall be used.

3.2 Heat Stabilizer. To insure thermal stability during processing, the polyethylene compound shall contain a suitable antioxidant.

3.3 Specific Gravity. The polyethylene compound on the finished wire or cable shall have a specific gravity of 0.91 to 0.94 as determined by ASTM D 792-50, Standard Methods of Test for Specific Gravity of Plastics.

3.4 Flow Rate. The flow rate of the polyethylene compound on the finished wire or cable shall be such that the melt index shall not exceed 2.1 grams per 10 minutes as determined by ASTM D 1238-52T, Tentative Method of Test for Measuring Flow Rates of Thermoplastics by Extrusion Plastometer.

3.5 Tensile Properties. The polyethylene compound removed from the finished wire or cable shall have a tensile strength of not less than 1200 pounds per square inch (psi) and an ultimate elongation at rupture, including cold drawing, of not less than 300 percent when tested in accordance with ASTM D 470-54T, Tentative Methods of Testing Rubber and Thermoplastic Insulated Wire and Cable, except that the gage marks shall be 1 inch apart.

3.6 Weights and Covering Thicknesses. The weights and covering thicknesses shall be those prescribed in Section 4, Acceptance Requirements.

4. Acceptance Requirements

The finished wire or cable shall meet the following acceptance requirements. The frequency of sampling to determine compliance with these requirements shall be in accordance with Section 5, Samples for Test, and conformance with these requirements shall be in accordance with Section 9, Acceptance or Rejection.

4.1 Conductor Tests. Tests on conductors of other than ACSR construction shall be made upon finished wire or cable after removing the covering. Tests and properties shall conform to the requirements of Section 2, Conductors.

4.2 Thickness of Covering. The average thickness of the covering, considered as one-half the difference between the average over-all diameter measured over the covering and the diameter of the bare conductor, shall be not less than that shown in Tables 1 or 2. The minimum thickness at any point shall not be more than 5 mils below the specified average for thicknesses 64ths inch and under, and not more than 10 percent below the specified average for thicknesses greater than 64ths inch.

[fol. 6475]

Table 1

Nominal Weights of Weather-Resistant Wire and Cable Polyethylene Type
(Pounds per 1000 Feet)

Size	Conductors Weight			Covering		Finished Wire and Cable Weight		
AWG or Mcm	Copper and Copper Alloy	Aluminum	Copper-Covered Steel	Thickness	Weight	Copper and Copper Alloy	Aluminum	Copper-Covered Steel
	Stranded Conductors			64ths in.				
750				5	104	1648	573	
500	1544	469.4		5	102		550	
477		447.8		5	98	1487	520	
450	1389	422.4		5	99	1334	475	
400	1235	375.5		5	98.4		471	
397.5		373.0		4	76	1157	405	
350	1081	328.6		4	74.0		390	
336.4		315.7		4	69.7	996	351	
300	926.3	281.6		4	64.8		315	
266.8		250.4		4	62.1	834	297	
250	771.9	234.7		4	61.7	715	260	
4/0	653.3	198.6		4	53.9	572	211	
3/0	518.1	157.5		4	47.1	458	172	
2/0	410.9	124.9		4	41.2	367	140	
1/0	325.8	99.1		3	28.6	287	107	
1	258.4	78.6		3	25.1	230	87.4	
2	204.9	62.3		2	14.1	143	53.3	
4	128.9	39.2		2	10.4	91.5	35.0	
6	81.1	24.6						
	Solid Conductors							
1	253.3			3	19.7	273		
2	200.9	61.1		3	18.1	219	79.2	
3	159.3			3	16.7	176		
4	126.4	38.4	115.8	2	9.6	136	48.0	125
6	79.5	24.2	72.8	2	7.5	87	31.7	80.3
8	50.0	15.2	45.8	2	6.0	56	21.2	51.8
9	39.6		36.3	2	5.4	45		41.7
10	31.4		28.8	2	5.1	36.5		33.9
12	19.8		18.1	2	4.2	24		22.3

[fol. 6476]

Table 2

Nominal Weights of Weather-Resistant Wire and Cable, Polyethylene Type

ACSR Conductors
(Pounds per 1000 Feet)

Conductors				Covering		Finished Wire and Cable Weight
Size* AWG	Hard-Drawn Copper Equivalent† AWG	Stranding Aluminum/Steel	Weight	Thickness 64ths in.	Weight	
4/0	2/0	6/1	291.1	4	67.9	359
3/0	1/0	6/1	230.8	4	59.2	290
2/0	1	6/1	183.1	4	51.9	235
1/0	2	6/1	145.2	4	45.8	191
1	3	6/1	115.2	3	30.8	146
2	4	7/1	106.7	3	28.3	135
2	4	6/1	91.3	3	27.7	119
3	5	6/1	72.4	3	24.1	96.5
4	6	7/1	67.0	2	15.0	82.0
4	6	6/1	57.4	2	14.6	72.0
5	7	6/1	45.5	2	13.0	58.5
6	8	6/1	36.1	2	11.4	47.5

* Aluminum wires only.

† Area of hard-drawn copper cable [conductivity = 97 percent International Annealed Copper Standard (IACS)] having practically the same d-c resistance as that of the ACSR (aluminum conductivity = 61 percent IACS).

4.3 Weights and Tolerances

4.3.1 The diameters of the conductors of finished wire or the individual strands of stranded conductors in finished cable supplied under these specifications shall meet the requirements and limits of Section 2, Conductors, and the variation in weights from Tables 1 and 2 shall be determined by the dimensional tolerances of Section 2, Conductors.

4.3.2 The average weight of the covering of wire or cable in any lot or shipment of any one size or type manufactured or supplied under these specifications shall be not more than 20 percent over or 10 percent under the nominal weights given in Tables 1 and 2. This average applies to the entire lot or shipment and is not cause for rejection of an individual coil or reel exceeding the allowable variation. Each sample used for this test shall be not less than 2 feet in length for sizes 4/0 AWG and smaller and not less than 1 foot in length for 250,000 circular mils and larger.

4.3.3 The weights of finished wire and cable in Tables 1 and 2 are presented merely as a matter of information for

the convenience of the user of these specifications and are subject to the tolerances resulting from the application of 4.3.1 and 4.3.2.

5. Samples for Test

Samples to determine conformance with Section 4, Acceptance Requirements, shall be taken as prescribed in the following paragraphs:

5.1 Cutting. Fair samples shall be cut from the ends of [fol. 6477] coils or reels, after first cutting back these ends at least 2 feet. These samples shall be cut in half and tagged, one-half to be used for the tests, the other half to be held in reserve for check tests. The samples shall not be distorted or sharply bent.

5.2 Number. The number of samples of each size of wire or cable taken for test shall be as follows:

5.2.1 *Wire or Cable Supplied in Coils*

(1) For coils of standard size exceeding 1000 feet of wire or cable, samples shall be taken from 3 coils of the first lot of 25 coils or fraction thereof, and samples from 1 coil of each additional 25 coils or fraction thereof.

(2) For small coils of less than 1000 feet of wire or cable, samples shall be taken from 3 coils of the first lot of 2500 pounds or fraction thereof, and samples from 1 coil of each additional 2500-pound lot or fraction thereof.

(3) If less than 3 coils are submitted, 1 sample shall be taken from each coil.

5.2.2 *Wire or Cable Supplied on Reels*

(1) For reels of standard size containing 2000 feet or more of wire or cable, samples shall be taken from 3 of the first lot of 30 reels or fraction thereof, and samples from 1 of each additional lot of 10 reels or fraction thereof.

(2) For small reels of less than 2000 feet of wire or cable, samples shall be taken from 3 reels of the first lot 6000 pounds or fraction thereof, and samples from 1 reel of each additional 2000-pound lot or fraction thereof.

(3) If less than 3 reels are submitted, 1 sample shall be taken from each reel.

6. Identification

6.1 The wire shall be so identified that the manufacturer can be determined readily.

7. Packing and Marking

7.1 Packing and marking shall be done in accordance with the purchaser's specification.

8. Inspection

8.1 Inspection and acceptance shall be made at the point of manufacture. The manufacturer shall give the purchaser, or his representative, such access to his works during working hours as is reasonable and necessary to determine the suitability of the material to be supplied and shall furnish the necessary apparatus, labor, and other facilities for making the inspection and acceptance tests herein called for, without cost to the purchaser. Neither inspection, waiving of inspection, nor the purchaser's acceptance shall relieve the manufacturer from obligation to furnish weather-resistant wire in accordance with these specifications.

9. Acceptance or Rejection

9.1 Conformance with these specifications shall be determined as follows:

(1) If 20 percent or more of the samples fail to meet these specifications, an entirely new lot of samples shall be selected at random from the shipment and tested. If the second group of samples fails to meet these specifications as outlined in the preceding sentence, the entire shipment shall be rejected.

(2) The allowable variation in the average weight of the complete covering shown in 4.3 establishes a manufacturing tolerance. Should any shipment of wire or cable exceed this manufacturing tolerance by weight, but be satisfactory in all other respects, the purchaser may accept the shipment but he shall not be required to pay for weather-resistant covering in excess of the allowable variation, and he shall receive credit from the manufacturer for such excess over the maximum permissible

weight of overing at the price charged for the finished wire or cable.

(3) In all cases, even if the shipment of wire or cable is accepted, the coils or reels that fail to meet these specifications shall be rejected, except that individual coils or reels shall not be rejected because covering weights exceed the allowable variation, when the average weight of the entire lot is within the allowable variation, or when the customer elects to accept an entire lot or shipment in which the average weight exceeds the allowable variation.

[fol. 6478] Appendices

(These Appendices are not a part of American Standard Specifications for Weather-Resistant Wire and Cable, Polyethylene Type, C8.35-1957, but are included to facilitate its use.)

Appendix A

Method of Determining Dispersion of Carbon Black in Polyethylene Compounds

A1. Scope

A1.1 This method describes the apparatus and the procedure for determining the degree of dispersion of carbon black in ethylene plastics. The amount of light transmitted through a film of the material under test is measured under specified conditions. From data so obtained the absorptivity of the sample can be calculated when the thickness of the film is known. This absorptivity can be related empirically to degree of dispersion when carbon black concentration and type are also known.

Note: The method of test for determining the carbon black content in ethylene plastics is contained in Appendix B.

A2. Significance

A2.1 The information provided by this method can be used to determine when optimum dispersion of a carbon black has been achieved in ethylene plastics, or for control purposes, to show that a given minimum level of dispersion has been obtained. The degree of dispersion has been

shown to be related to the resistance of black ethylene plastics to degradation on direct exposure to sunlight.

A3. Apparatus

A3.1 The apparatus shall consist of the following:

(1) An integrating sphere spectrophotometer or photometer which conforms to the apparatus requirements of Standard Method of Test for Haze and Luminous Transmittance of Transparent Plastics, ASTM D 1003-52

(2) A specimen holder suitable for the spectrophotometer to be used.

This may be a sheet of rigid material of dimensions dictated by the device into which it is to be inserted, having at its center an opening which does not restrict the light-beam of the spectrophotometer with which it is to be used. Single- or double-surfaced pressure-sensitive tape may be used to hold the test specimen in place over the opening.

Alternately, a pair of standard thickness (0.05 inch) glass or quartz microscope slides held together at their ends by pressure-sensitive tape may be used. A thin film of glycerine (USP or better grade) shall be used to eliminate air interfaces between the specimen and the slides.

(3) Clean forceps for handling test specimens

(4) A die of dimensions suitable for cutting the test specimen

(5) An analytical balance with a precision of ± 0.0001 gram

(6) A set of Class S weights for use with (5)

(7) A suitable ionizing-type static eliminator to facilitate handling the test specimen

(8) A means for determining the density of the sample to ± 1 per cent

(9) As alternative to (5), (6), and (8), a micrometer capable of measuring the thickness of the film with an accuracy of ± 5 percent or better

A4. Test Specimens

A4.1 The test specimen shall be uniform film of such length and width, or diameter, as required by the apparatus with

which its light transmission is to be measured. The thickness of the film shall be such that its transmittance is no less than 0.003 at the wavelength or wavelengths specified for transmission measurement if a spectrophotometer is to be used.

Note: Suitable films may be prepared by pressing out 2-3 milligrams of sample between polished platens of the design shown in Figs. A1 and A2, using temperatures of 140-185 C and a force of 30 tons.

No special preconditioning of test specimens is required, but care must be taken to prevent their injury or contamination. Specimens shall be handled only with clean, smooth forceps.

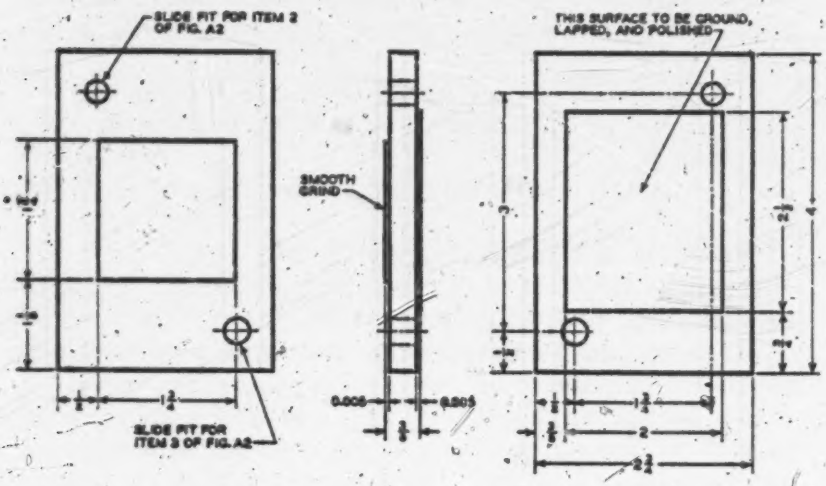
A5. Procedure

A5.1 The average thickness of the test specimen shall be determined from:

(1) Measurement of its weight and density prior to step A5.2, or

(2) Micrometer measurement following step A5.3

[fol. 6479]



Finish: Chromium plate 403A, 0.0002
Material: Kitco Steel, harden to 45 Rockwell "C"
Dimensions expressed in inches.

FIG. A1

A5.2 The specimen shall be mounted in the holder, being handled only with clear forceps. The mounted specimen shall be free of folds or wrinkles.

A5.3 The transmittance of the specimen shall be measured using a procedure approved for the spectrophotometer or integrating sphere photometer being employed and the wavelength or wavelengths called for by the specification covering the material under test. This procedure shall be repeated for three specimens and the results of the three determinations averaged.

Note: Care shall be taken that only the specimen and no portion of the holder or of the pressure-sensitive tape enters the beam of the photometer.

When microscope slides are used to support the test specimen in the holder, a duplicate pair of slides with a film of glycerine between them shall be used as a reference standard.

A5.4 When the thickness of the test specimen is to be measured directly, it shall be determined in accordance with Standard Methods of Test for Thickness of Solid Electrical Insulation, ASTM D 374-42, Method A or C. If glycerine has been used, it shall be removed by careful blotting with clean, lintless, absorbent paper.

A5.5 The absorptivity of the sample, a, shall be calculated as follows:

$$a = \frac{A}{bc} \qquad \text{(Eq A5.5)}$$

where

A = absorbency = $\log \frac{1}{T}$

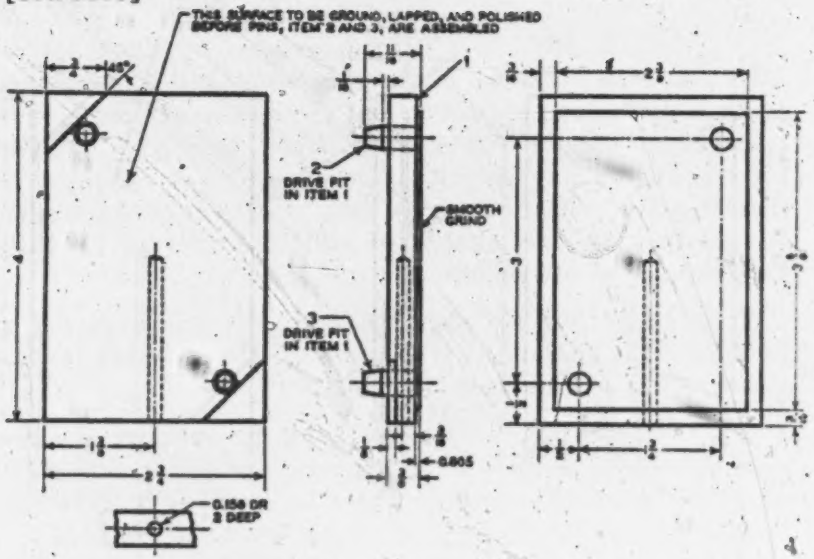
T = transmittance

b = thickness of the specimen (centimeters)

c = concentration of carbon black (grams/cubic centimeter)

log = $\log_{10}$

[fol. 6480]



Finish for Items 1, 2, and 3: Chromium plate 403A, 0.0002
Material for Item 1: Kotos Steel, harden to 46 Rockwell "C"
Material for Item 2: Drill rod, steel 0.221 dia
Material for Item 3: Drill rod, steel 0.312 dia
Dimensions expressed in inches.

Item	Piece	Name	Req
6			
5			
4			
3		Pin	1
2		Pin	1
1		Plate	1

Stock List

FIG. A2

[fol. 6481] A6. Report

A6.1 The report shall include the following:

(1) Absorptivity

(2) Wavelength at which determined

(3) Identification of instrument used

(4) Concentration of carbon black determined according to Appendix B

A7. References

Brode, W. R. *Journal of the Optical Society of America*, 39 (1949), 1024-1031.

Hughes, H. K., et al. *Analytical Chemistry*, 24 (1952), 1349-1354.

Appendix B

Method of Determining Carbon Black Content of Ethylene Plastics

B1. Scope

B1.1 This method describes the apparatus and procedure for determining the carbon black content of ethylene plastics.

B2. Significance

B2.1 The information provided by this method is useful for control purposes and is required for calculation of absorptivity.

B3. Apparatus

B3.1 The apparatus shall consist of the following:

(1) An electric furnace suitable for use with the tubing of (2)

(2) Pyrex or Vicor tubing 1⅛-inch diameter, approximately 4 inches longer than the furnace of (1)

(3) Two rubber or neoprene stoppers to fit tube of (2)

(4) Supplies of 10-millimeter glass tubing and matching rubber or plastic tubing for connections

(5) A combustion boat approximately 3½ inches x ¾ inch x ½ inch. Porcelain or platinum is suitable

(6) A thermometer covering at least the range 300-550 C

(7) A flow meter suitable for measuring gas flow at rates of 1-10 liters per minute.

(8) Three cold traps with removable ground-glass connected heads and 10-mm diameter inner and connecting tubes

(9) A "U"-shaped drying tube, inside diameter 20 mm or larger, fitted with ground glass or neoprene stoppers

(10) A supply of glass wool

(11) A metal desiccator
(12) A Bunsen burner
(13) An analytical balance with a precision of ± 0.0001 gram
(14) A set of Class S weights for use with (13)

B4. Reagents

(1) Purified nitrogen with an oxygen content not greater than 0.01 percent
(2) Pyrogallol, technical grade or better
(3) Potassium hydroxide, technical grade or better
(4) Trichloroethylene, technical grade
(5) Solid carbon dioxide (dry ice)
(6) Anhydrous $CaCl_2$ or other desiccant

B5. Procedure

B5.1 The procedure shall be as follows:

(1) The apparatus shall be set up as shown in Fig. B1. Both cold traps following the combustion tube shall contain trichloroethylene, but only the first need be cooled with dry ice.

(2) A solution of 5 grams pyrogallol and 50 grams potassium hydroxide in 100 milliliters water shall be prepared and enough added to the trap ahead of the drying tube to fill it approximately one-third full.

(3) Anhydrous $CaCl_2$ or other suitable desiccant shall be added to the drying tube and held between loose plugs of glass wool.

(4) A clean combustion boat shall be heated to red heat in a Bunsen flame, then transferred to the metal desiccator and allowed to cool over fresh desiccant for not less than 30 minutes.

(5) The boat shall then be removed from the

[fol. 6482]

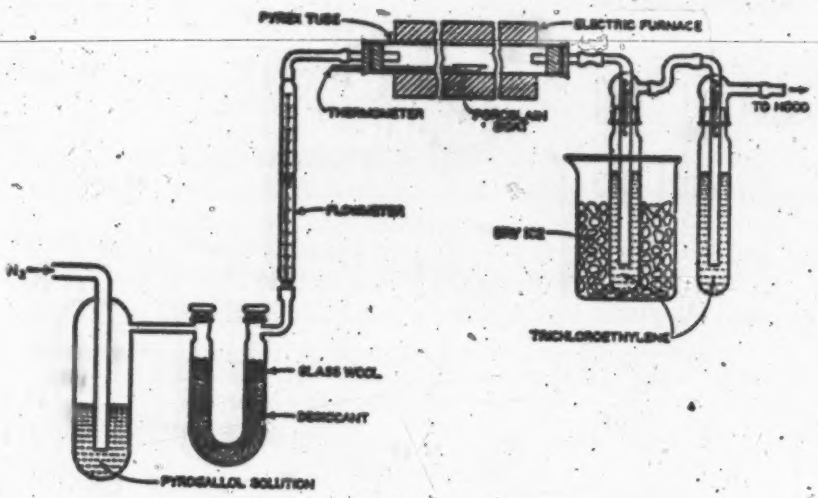


FIG. B1

dessiccator and weighed to nearest 0.0001 gram as quickly as possible.

(6) 1.0 ± 0.1 gram of the ethylene plastic under test shall immediately be placed in the boat and the combination weighed quickly to the nearest 0.0001 gram.

(7) The rate of nitrogen flow shall be adjusted to 1.7 ± 0.3 liters per minute, and the combustion boat with the sample then placed in the Pyrex tube at the center of the furnace with the themometer adjusted so that the bulb is touching the boat. The furnace shall be heated at a rate such that a temperature of 350 C is reached in about 10 minutes, 450 C in another ten minutes, and 500 C after a total of 30 minutes. Heating shall be continued at 500 ± 5 C for an additional 10 minutes.

(8) The tube shall be removed from the furnace with the boat in place and allowed to cool for 5 minutes, the flow of nitrogen being maintained. The boat shall then be removed through the inlet end of the tube and allowed to cool in the desiccator for at least 30 minutes after which the boat and its contents shall be reweighed quickly to the nearest 0.0001 gram.

(9) All determinations shall be made in duplicate. When successive runs are made, the temperature of the

furnace shall be allowed to fall to at least 300 C between determinations.

B6. Calculation

B6.1 The carbon black content shall be calculated as follows:

$$\text{Percent carbon black} = \frac{\text{weight of residue (grams)}}{\text{weight of sample (grams)}} \times 100$$

C = concentration of carbon black (grams/cubic centimeter)

$$= \frac{\text{weight of residue (grams)} \times \text{density of sample}}{\text{weight of sample (grams)}} \qquad \text{(Eq B6.1)}$$

B7. Report

B7.1 The report shall include the following:

(1) Identity of the sample
(2) The individual values calculated as in Section 6
(3) The average of the values in B7.1 (2) above

[fol. 6483] IN UNITED STATES DISTRICT COURT

DEFENDANT'S EXHIBIT 27

IPCEA-NEMA Standards Publication

Thermoplastic-insulated Wire and Cable for the Transmission and Distribution of Electrical Energy

This publication includes and supersedes the following Interim Standards which were previously published for inclusion in IPCEA Pub. No. S-61-402, NEMA Pub. No. WC 5:

#1, November 1960 Shielding of Thermoplastic-insulated Cables
#2, September 1959 Polyethylene Insulation for Wires and Cables
#3, September 1959 Thermoplastic Protective Coverings for Lead-sheathed Cables
#4, November 1959 Thermoplastic-insulated Pole and Bracket Cable
#5, November 1959 Black Polyethylene (Thermoplastic) Jacket and Wire Cable
#6, November 1960 Polyvinyl Chloride Insulation, 60 C, for Wires and Cables
#7, November 1960 Polyvinyl - chloride - insulated Cotton-braided Switchboard Wire and Cable

It also supersedes the thermoplastic portion of the IPCEA General Specifications for Wire and Cable with Rubber, Rubber-like and Thermoplastic Insulations, Second Edition, S-19-81.

Approved by Insulated Power Cable Engineers Association
January 12, 1961

Approved as a NEMA Standard May 15, 1961

National Electrical Manufacturers Association

[fol. 6484] **Foreword**

This Standards Publication for Thermoplastic-insulated Wire and Cable for the Transmission and Distribution of Electrical Energy (IPCEA S-61-402; NEMA WC 5-1961) was developed by the Insulated Power Cable Engineers Association and approved by the National Electrical Manufacturers Association.

Suggestions for improvements gained in the use of this standard will be welcomed. They should be sent to the Insulated Power Cable Engineers Association, 283 Valley Road, Montclair, N. J.

Table of Contents—Condensed

	Part	Page
General	1	1
Conductors	2	1-14
Insulation	3	1-6
Shielding and Coverings	4	1-15
Cabling, Fillers, Binders and Circuit Identification	5	1-4
Testing and Test Methods	6	1-20
Constructions of Specific Types	7	1-6
Pole and Bracket Cable	7	1-2
Polyvinyl-chloride-insulated Cotton-braided Switchboard Wire and Cable	7	3
Neutral-supported Secondary and Service Drop Cables	7	5-6
Appendices	8	1-5

For a detailed Table of Contents, see page ii.
For a detailed listing of the appendices, see page v.
For a detailed listing of the tables contained in this publication, see page vi.

[fol. 6485]

Part 1

General

1.1 Scope. These standards apply to materials, constructions and testing of thermoplastic-insulated wires and cables which are used for the transmission and distribution of electrical energy for normal conditions of installation and service, either indoors, aerial, underground or submarine.

The thermoplastic insulations and jackets covered in this publication are compounds made from polyvinyl chloride, or the copolymer of vinyl chloride and vinyl acetate, or polyethylene.

In classifying jackets and sheaths in these standards, the term "jacket" refers to nonmetallic coverings and "sheath" to continuous metallic coverings.

1.2 General Information. These standards cover the requirements for conductors, the various grades of insulations and protective coverings, and general constructional and dimensional details common to most standard types of wires and cables. Constructions of specific types are covered in Part 7. Where a conflict exists between the requirements of Part 7 and those of Parts 1 to 6, inclusive, the requirements of Part 7 shall apply.

1.3 Information to be Supplied by Purchaser.* When requesting proposals from cable manufacturers, the prospective purchaser should furnish the following information:

1.3.1 Characteristics of System on which Cable is to be Used.

(*a*) Current—alternating or direct.

(*b*) Frequency—cycles per second.

(*c*) Normal operating voltage phases or, if direct current, between conductors.

(*d*) Number of phases and conductors. If series lighting, give open-circuit voltage and state whether system is operated with or without protectors.

(*e*) Operated with neutral solidly grounded, grounded

* This paragraph has been approved by NEMA as Authorized Engineering Information.

through resistance or reactance, or ungrounded. If grounded through resistance or reactance state amount.

(*f*) Minimum temperature at which cable will be installed.

(*g*) Description of installation.

(*1*) In buildings.

(*2*) In underground ducts.

(*3*) Aerial.

a. On messenger in metal rings.

b. On messenger with marlin ties.

c. Preassembled.

d. Field spun.

(*4*) Direct burial in ground.

(*5*) Submarine.

(*6*) Descriptions other than the foregoing.

(*h*) Conditions of installations.

(*1*) Ambient temperature.

(*2*) Number of loaded cables in duct bank or conduit. If in conduit, give type of conduit (metallic or nonmetallic), number of loaded conduits, enclosed or exposed, and spacing between conduits.

(*3*) Load factor.

(*4*) Method of bonding and grounding of lead sheaths.

(*5*) Wet or dry location.

1.3.2 Quantities and Description of Cable

(*a*) Total number of feet, including test lengths, and lengths if specific lengths are required.

(*b*) Type of cable. Describe as single conductor, 2-conductor flat, 2-conductor round, etc.

(*c*) Rated circuit voltage, phase to phase.

(*d*) Type of conductor—copper or aluminum.

(*e*) Size of conductors—Awg or circular mils. If conditions require other than standard stranding, a complete description should be given.

(*f*) Type and grade of insulation.

(*g*) Thickness of insulation in 64ths of an inch or in mils.

(*h*) Type of outer covering.

(i) Maximum allowable overall diameter in inches. When duct space is not limited, it is desirable not to restrict the overall diameter.
(j) Method of conductor identification.

[fol. 6486]

Part 2

Conductors

2.1 Material. Conductors shall be annealed uncoated copper, or annealed coated copper, or aluminum.

2.1.1 Copper Conductors. Uncoated conductors shall be of annealed copper wire in accordance with ASTM B 3.

Coated conductors shall be of annealed copper wire in accordance with ASTM B 33 for tin-coated conductors or ASTM B 189 for lead- or lead-alloy-coated conductors.

The continuity of tin coating shall be determined in accordance with ASTM B 33 before the conductors are insulated or stranded.

The continuity of lead and lead-alloy coatings shall be determined in accordance with ASTM B 189 before the conductors are insulated or stranded.

2.1.2 Aluminum Conductors. Solid conductors 8 Awg and smaller shall be "EC" grade aluminum three-quarter hard in accordance with ASTM B 262. Solid conductors larger than 8 Awg and all sizes of stranded conductors shall be "EC" grade aluminum either hard-drawn in accordance with ASTM B 230 or three-quarter hard in accordance with ASTM B 262. Stranded conductors shall conform to ASTM B 231.

2.2 Solid Conductors. Conductors 8 Awg and smaller shall be solid or, when required for a particular application, stranded. Conductors 6 Awg and larger may be solid as indicated in Table 1 when required. Nominal diameters shall be in accordance with Table 1, subject to the tolerances given in 2.5.

2.3 Stranded Conductors

2.3.1 Conductors 6 Awg and larger shall be stranded in accordance with 2.3.3. For series lighting cable conductors 6 and 4 Awg may be solid.

Stranded conductors shall be composed of the number of wires given in Tables 1 through 6 and subject to the tolerances on cross-sectional areas given in 2.5. Intermediate sizes take the stranding of the next larger conductor size given in the tables.

2.3.2 Strand shielding shall be used on stranded conductors of power cables having rated circuit voltages above 2000 volts. This requirement does not apply to series lighting cables.

Strand shielding in thermoplastic-insulated cables is a conducting material at least 0.0025 inch thick applied over the surface of the conductor. It may be conducting nonmetallic tape, conducting compound, or conducting cement.

2.3.3 Uses of Classes of Stranding

2.3.3.1 *Concentric-lay Conductors.* A concentric-lay conductor is a conductor composed of a central core surrounded by one or more layers of helically laid wires.

Class of Stranding *	Use
B	Power cables rated 0–2000 volts for normal use and, where strand shielding is employed (see 2.3.2.), for use above 2000 volts.
C	Power cables where more flexible stranding than Class B is desired.
D	Power cables where extra flexible stranding is desired.

* See Table 1.

See Appendix E for complete titles and dates of ASTM standards to which reference is made in this publication.

[fol. 6487] 2.3.3.2 *Rope-lay Conductors.* A rope-lay conductor is a conductor composed of concentric-lay stranded members or bunch-stranded members.

Classes G and H shall have concentric-lay-stranded members, and Classes I, K and M shall have bunch-stranded members.

Class of Stranding	Use
G (see Table 2)	All cables for portable use.
H (see Table 3)	All cables where extreme flexibility is required, such as for use on take-up sheaves, etc.
I (see Table 4)	Apparatus cable and motor-leads.
K (see Table 5)	Cords and cables composed of No. 30 Awg copper wires.
M (see Table 6)	Cords and cables composed of No. 34 Awg copper wires.

Other strandings are given in Part 7.

2.3.4 The individual wires used in the construction of the stranded conductor shall, before stranding, meet the requirements of 2.1.

2.3.5 The lay of concentric stranded conductors shall be in accordance with ASTM B 8 for copper conductors and ASTM B 231 for aluminum conductors (see Appendix E). The lay of a layer of wires shall be not less than eight nor more than sixteen times the outside diameter of that layer, except that for conductors composed of 37 wires or more, this requirement shall apply only to the two outer layers.

The direction of lay of the outer layer shall be left-hand.

The direction of lay for conductors having a nominal cross-sectional area larger than 8 Awg shall be reversed in successive layers.

2.4 Individual Wire Splices in Solid and Stranded Conductors. A splice in a solid conductor in one of the individual wires of a stranded conductor shall be made in a workmanlike manner and shall be such that the joint will not increase the diameter of the individual wire or of the conductor nor lessen its mechanical strength. A joint or splice in a stranded conductor as a whole shall be made by separately joining each individual wire in such a manner that the overall diameter of the entire stranded conductor will not be increased. In rope-stranded conductors, the primary groups used in forming the rope shall be considered the equivalent of a solid wire in a concentric stranded conductor.

2.5 Tolerances in Diameters and Cross-sectional Areas. The following tolerances apply to determinations made on conductors of the completed cable.

	Diameter, Inches	Maximum Variation in Diameter
Solid copper conductors		
Coated	0.010 and larger	−1%, +3%
	Smaller than 0.010	−0.1 mil, +0.3 mil
Uncoated	0.010 and larger	−1%, +1%
	Smaller than 0.010	−0.1 mi., +0.1 mil
Solid aluminum conductors	0.100 and larger	−1%, +1%
	0.036 up to 0.100	−1 mil, +1 mil
	Smaller than 0.036	−0.5 mil, +0.5 mil

[fol. 6488] 2.5.2 Cross-sectional Areas

2.5.2.1 In stranded conductors, the area of cross-section of the completed conductor shall be not less than 98 percent of the area given in Table 1 and not less than 97 percent of the area given in Table 1 for 18 and 20 Awg conductors made with 30 Awg strands when measured in accordance with 6.3.4.

2.5.2.2 In rope-lay-stranded conductors having bunch-stranded members (Classes I, K and M), the number of individual wires may vary from that given in Tables 4, 5 or 6, provided the cross-sectional area of the conductor is in accordance with 2.5.2.1.

2.5.2.3 The cross-sectional area of a stranded conductor shall be the sum of its component wires at any point, when measured in accordance with 6.3.4.

2.6 Resistance of Conductors

2.6.1 The direct-current resistance of solid or Class B stranded coated conductors at 20 C or 25 C shall not exceed the values given in Table 7.

The direct-current resistance of solid or Class B stranded uncoated conductors at 20 C or 25 C shall not exceed by more than 2 percent the values given in Table 7.

2.6.2 For flexible stranded conductors and for sizes not listed in Table 7, the direct-current resistance at 20 C or 25 C shall be not greater than that calculated from the factors given in Table 8.

2.6.3 In completed multiple-conductor cables the increase in resistance due to conductor cabling lay shall not exceed the values given in Tables 7 and 8 by more than the following percentages:

(*a*) One layer of conductors	2
(*b*) More than one layer of conductors	3
(*c*) Pairs or other pre-cabled units	4

2.6.4 When the direct-current resistance is measured at other than 20 C or 25 C, it shall be corrected by using the multiplying factors given in Tables 9 and 10.

Factors for temperatures other than those given in the tables shall be obtained by interpolation or shall be calculated from the formulae given in the footnotes to Tables 9 and 10.

2.5.1 Diameters

[fol. 6489]

Part 7

Construction of Specific Types

The requirements of Parts 1 through 6 shall be met except as otherwise modified in Part 7.

7.1 Pole and Bracket Table

7.1.1 *Scope.* This section applies to flat-twin pole and bracket cable insulated with polyvinyl chloride and belted with polyethylene. This cable is intended for use in series street lighting circuits in both interior and exterior installations for operation at temperatures not exceeding 75 C. The conductor sizes covered are 10, 8 and 6 Awg. The insulation and belt thicknesses are based on a maximum of 600 volts between conductors and on open-circuit voltages from 4000 to 10000 volts.

7.1.2 *Conductors*

7.1.2.1 The conductors shall be of annealed uncoated copper or annealed coated copper and shall meet the requirements of 2.1.1 and 2.3.

7.1.2.2 The sizes, minimum number of strands, average cross-sectional areas and approximate diameters of the conductors shall be as follows:

Size Awg	Minimum Number of Strands/Conductor	Average Cross-sectional Area, Circular Mils	Approximate Diameter, Inches
10	19	10,380	0.117
8	19	16,510	0.148
6	19	26,240	0.186

The area of cross-section of any conductor shall be not less than 98 percent of the area given in the above table.

7.1.3 *Insulation*

7.1.3.1 The polyvinyl chloride insulation shall meet the requirements given in 3.7, except that both the tensile strength and elongation after 168 hours at 100 ± 1 C shall be not less than 85 percent of the unaged values, and the cold bend test shall be conducted at minus 30, plus or minus 1 C.

7.1.3.2 The average thickness of the insulation shall be not less than that given in Table 45. The minimum thickness shall be not less than 90 percent of the values given in the table. The thickness shall be measured in accordance with 6.4.3.

7.1.3.3 One conductor shall be colored black and the other white or natural.

7.1.4 *Conductor Assembly.* The two insulated conductors shall be laid flat and parallel.

7.1.5 *Belt*

7.1.5.1 The belt shall be a heat- and light-stabilized black polyethylene insulation and shall meet the physical and aging requirements for polyethylene insulation as given in 3.9.1. It shall be applied in a flat configuration. Fillers shall not be used. The belt insulation shall fill the interstices of the cable.

7.1.5.2 The average thickness of the belt shall be not less than that given in Table 45.

7.1.6 *Electrical Tests*

7.1.6.1 The completed cable shall withstand the following voltage tests after being immersed in water for at least 6 hours.

7.1.6.2 An alternating-current test voltage of 3000 volts shall be applied between conductors for 5 minutes.

7.1.6.3 The conductors shall be connected together, and the alternating-current and direct-current test voltages given in Table 45 shall be applied between the conductor and water.

7.1.7 *Cold Bend Test.* The polyethylene belt shall not show any cracks when conditioned and tested in accordance with 6.4.15.1. The cable shall be bent around its minor axis. The insulated conductor diameter given in 6.4.15.1 shall be taken as the minor axis of the cable. Cracking of the polyvinyl chloride insulation on the individual conductors under this test shall not constitute failure.

7.1.8 *Outside Diameters.* The outside diameters of the completed cable shall be not less than that given in Table 45, with a tolerance of plus 10 percent.

[fol. 6490]

Table 45

Construction and Test Requirements for Pole and Bracket Cable

Open-circuit Voltage, Volts	Conductor Size, Awg	Thickness, Mils		Minimum Outside Diameter, Inches		Test Voltages, Kv	
		Insulation	Belt	Major	Minor	A-C 5 Min	D-C 15 Min
4001–6000	10	47	94	0.610	0.400	13.0	39.0
	8	47	94	0.670	0.430	13.0	39.0
	6	62	94	0.810	0.500	13.0	39.0
6001–10000	10	47	109	0.640	0.430	17.0	51.0
	8	47	109	0.700	0.460	17.0	51.0
	6	62	109	0.840	0.530	17.0	51.0

7.1.9 *Bending Radius**. The minimum radius to which these cables may be bent around their minor axis in service is 2 inches, with a maximum of ½ turn (180-degree U bend).

7.1.10 *Terminations**. Suitable high-temperature terminations are recommended where the cable will be exposed to temperatures, in close proximity to the luminaire, in excess of 75 C.

[fol. 6491] 7.2 Polyvinyl-chloride-insulated Cotton-braided Switchboard Wire and Cable

7.2.1 *Scope.* This section covers single-conductor switchboard wire and cable insulated with polyvinyl chloride and covered with a cotton braid, in sizes 14 through 4/0 Awg with copper conductors and 12 Awg through 350 MCM with aluminum conductors. The wire or cable is suitable for operation at conductor temperatures of 90 C (194 F) and less, in dry locations, at a maximum voltage rating of 600 volts.

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* These paragraphs have been approved by NEMA as Authorized Engineering Information.

It is similar to but may differ from Underwriters' Laboratories, Inc., Type TBS.

7.2.2 *Conductors*

7.2.2.1 *Copper.* Copper conductors shall be annealed coated or uncoated copper and shall meet the requirements of 2.1.1 and 2.3. Sizes 14 though 4 Awg shall be either solid or Class B stranded in accordance with Table 1. Sizes 3 Awg through 4/0 Awg shall be Class B stranded.

7.2.2.2 *Aluminum.* Aluminum conductors shall be "EC" grade and shall meet the requirements of 2.1.2 and 2.3. Sizes 12 through 4 Awg shall be either solid or Class B stranded in accordance with Table 1. Sizes 3 Awg through 350 MCM shall be Class B stranded.

7.2.3 *Separator.* A separator, when used, shall consist of a helical or longitudinal wrapping of paper or other suitable material.

7.2.4 *Insulation*

7.2.4.1 The insulation shall consist of an extruded polyvinyl chloride (or its copolymer with vinyl acetate) compound. When tested in accordance with Part 6, the insulation shall meet the following requirements:

Physical Requirements	
Tensile strength, minimum, psi	1500
Elongation at rupture, minimum, percent	100
Aging Requirements—after air oven test at 121 ± 1 C for 168 hours	
Tensile strength, minimum, percentage of unaged value	70
Elongation at rupture, minimum, percentage of unaged value	65

7.2.4.2 *Insulation Thickness.* The average thickness of the insulation shall be not less than that given in Table 46. The minimum thickness shall be not less than 90 percent of the values given in the table.

Table 46

Insulation Thickness

Conductor Size, Awg or MCM *	Insulation Thickness, Mils
14–10	31
8	47
6–2	62
1–4/0	78
225–350†	94

* MCM—thousands of circular mils.
† Aluminum conductors only.

7.2.5 *Covering and Finish*

7.2.5.1 *Braid.* A closely woven soft cotton braid meeting the requirements for Class B braids given in 4.5 of the *IPCEA-NEMA Standards Publication for Rubber-insulated Wire and Cable for the Transmission and Distribution of Electrical Energy,* IPCEA S-19-81 (Third Edition), NEMA WC 3-1959, shall be applied over the insulation.

7.2.5.2 *Finish.* The braid shall be impregnated with a flame-retarding compound.

7.2.6 *Tests.* The completed wire shall meet the following requirements.

7.2.6.1 *Dripping Test* After the following dripping test, the saturating compound shall not have dripped.

A 7-inch specimen of the wire or cable shall be suspended vertically in an electrically heated oven which is equipped with a suitable automatic temperature control and which has been heated to 97 ± 1 C (204.8 to 208.4 F). The specimen shall be maintained at this temperature for one hour. A piece of white paper shall be placed beneath the specimen to catch any of the compound which drips.

7.2.6.2 *Flame-retarding Requirement.* A 22-inch specimen of the wire shall meet the vertical flame test described in 6.5.

7.2.6.3 *Voltage Test.* The insulation on a 12-inch specimen of the wire shall withstand for one minute the alternating-current voltage indicated in the following table. The central 6-inch portion of the 12-inch specimen shall be wrapped in metal foil, and the voltage shall be applied between the conductor and the metal foil.

Conductor Size, Awg or MCM *	A-C Test Voltage, Volts
14–10	1500
8–2	2000
1–4/0	2500
225–350†	3000

* MCM—thousands of circular mils.
† Aluminum conductors only.

[fol. 6492] 7.3 Neutral-supported Secondary and Service Drop Cables

7.3.1 *Scope.* This section covers secondary and service drop cables composed of one or more polyethylene-insulated conductors and one neutral conductor for use as the supporting member. These cables are for use on circuits not exceeding 300 volts to ground.

7.3.2 *Conductors*

7.3.2.1 *Insulated Conductors*

7.3.2.1.1 Copper. Copper conductors shall be annealed uncoated copper and shall meet the requirements given in Part 2. Size 8 Awg shall be solid. Sizes 6 Awg and larger shall be Class B stranded in accordance with Table 1.

7.3.2.1.2 Aluminum. Aluminum conductors shall be "EC" grade, with a minimum tensile strength of 17,000 psi. Size 6 Awg shall be solid. Size 4 Awg and larger shall be Class B stranded in accordance with Table 1, except that the outer layer shall have a right-hand lay.

7.3.2.2 *Neutral Conductors.* Neutral conductors shall be uncovered or covered and the sizes and composition shall be in accordance with Table 47.

7.3.2.2.1 Copper. Copper conductors shall be hard-drawn bare copper and shall be Class B stranded in accordance with Table 1, except that sizes 6 Awg and smaller may be solid.

7.3.2.2.2 Aluminum. Aluminum conductors shall be "EC" grade, hard-drawn aluminum, stranded in accordance with

Class A, Table II, ASTM B 231*, except sizes 3/0 and 4/0 shall be 19-wire stranded.

7.3.2.2.3 Copper and Copper-covered-steel Composite. Conductors shall be concentric-lay stranded copper and copper-covered-steel composite conductors and shall meet the requirements given in the applicable sections of ASTM B 229.*

7.3.2.2.4 Aluminum Conductors—Steel Reinforced. Aluminum conductors steel reinforced, (ACSR), shall be 7-wire strand (6 aluminum around 1 steel) and shall meet the requirements of ASTM B 232.*

7.3.3 *Insulation*

7.3.3.1 *Physical and Aging Requirements.* The polyethylene insulation shall be black and, when tested in accordance with Part 6, shall meet the following requirements:

Physical Requirements	
Tensile strength, minimum, psi	1400
Elongation at rupture, minimum, percent	350
Aging Requirements—after air oven test at 100 ± 1 C for 48 hours	
Tensile strength, minimum, percentage of unaged value	75
Elongation at rupture, minimum, percentage of unaged value	75

7.3.3.2 *Thickness of Insulation.* The average thickness of the insulation shall be not less than the following:

Conductor Size, Awg	Thickness, Inches
8–2	0.045
1–4/0	0.060

The minimum thickness shall be not less than 90 percent of the foregoing values.

7.3.4 *Assembly.* One or more insulated conductors shall be twisted around the neutral conductor without fillers with a lay of 25 to 60 times the diameter of one of the insulated conductors. The direction of lay of the insulated conductors shall be the same as that of the outer layer of wires of the neutral conductor.

The size of the neutral conductor shall be in accordance with Table 47.

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* See Appendix E.

7.3.5 *Tests.* Each length of completed cable shall successfully withstand, after one hour's immersion in water, an alternating-current voltage of 1500 volts applied for one minute between each insulated power conductor and ground.

[fol. 6493]

Table 47

Power and Neutral Conductors

Insulated Power Sizes, Awg		Neutral Conductor Sizes, Awg			
		For Use with Copper or Aluminum Insulated Power Conductors		For Use with Aluminum Insulated Power Conductors Only	
Copper	Aluminum	Copper	Copper Covered Steel *	All Aluminum	(ACSR)
8	6	8	8 C	6	6
6	4	6	6 C	4	4
6	4	8	8 C	...	6
4	2	4	4 A	2	2
4	2	6	6 C	...	4
2	1/1	2	2 F	1/0	1/0
2	1/1	4	4 A	...	2
1	2/0	1	1 F	2/0	2/0
1	2/0	3	3 A	...	1
1/0	3/0	1/0	1/0 F	3/0	3/0
1/0	3/0	2	2 F	...	1/0
2/0	4/0	2/0	2/0 F	4/0	4/0
2/0	4/0	1	1 F	...	2/0

* See ASTM B 229 (see Appendix E) for letter designations and construction.

[fol. 6494] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 28

March 1959.

IPCEA-NEMA Standards Publication

Rubber-insulated Wire and Cable for the Transmission and Distribution of Electrical Energy

This publication supersedes the following:

IPCEA General Specifications for Wire and Cable with Rubber, Rubber-like and Thermoplastic Insulations, Second Edition, S-19-81

NEMA Standards for Rubber-insulated Power and Control Cable, 49-141

Approved by Insulated Power Cable Engineers Association July 15, 1958

Approved as a NEMA Standard November 13, 1958, National Electrical Manufacturers Association

[fol. 6495]

Foreword

This Standards Publication for Rubber-insulated Wires and Cables for the Transmission and Distribution of Electrical Energy (IPCEA S-19-81 Third Edition; NEMA WC 3-1959) was developed by the Insulated Power Cable Engineers Association and approved by the National Electrical Manufacturers Association.

Suggestions for improvements gained in the use of this standard will be welcomed. They should be sent to the Insulated Power Cable Engineers Association, 283 Valley Road, Montclair, N. J.

Table of Contents—Condensed

	Part	Page
General	1	1
Conductors	2	1-14
Insulation	3	1-14
Shielding and Coverings	4	1-29
Cabling, Fillers, Binders and Circuit Identification	5	1-4
Testing and Test Methods	6	1-30
Construction of Specific Types	7	1-8
Pole and Bracket Cable	7	1-2
Nonmetallic Neoprene-jacketed Mine Power Cables	7	3-4
Preassembled Aerial Cable Using Copper Conductors	7	5-6
Neutral-supported Secondary and Service Drop Cables	7	7-8
Appendices	8	1-9

For a detailed Table of Contents, see page ii.
For a detailed listing of the appendices, see page ix.
For a detailed listing of the tables contained in this publication, see page x.

[fol. 6496]

Part 1

General

1.1 Scope. These standards apply to materials, constructions and testing of rubber-insulated wires and cables which are used for the transmission and distribution of electrical energy for normal conditions of installation and service, either indoors, aerial, underground or submarine.

In classifying vulcanized insulations and jackets in these standards, the term "rubber" when used alone without further description shall mean either natural rubber or synthetic rubber, or a combination of these materials.

In classifying jackets and sheaths in these standards, the term "jacket" refers to nonmetallic coverings and "sheath" to continuous metallic coverings.

1.2 General Information. These standards cover the requirements for conductors, the various grades of insulations and protective coverings, and general constructional and dimensional details common to most standard types of wires and cables. Constructions of specific types are covered in Part 7. Where a conflict exists between the requirements of Part 7 and those of Parts 1 to 6, inclusive, the requirements of Part 7 shall apply.

1.3 Information to be Supplied by Purchaser.* When requesting proposals from cable manufacturers, the prospective purchaser should furnish the following information:

1.3.1 Characteristics of System on which Cable is to be Used

(*a*) Current—alternating or direct.
(*b*) Frequency—cycles per second.
(*c*) Normal operating voltage between phases or, if direct current, between conductors.
(*d*) Number of phases and conductors. If series lighting, give open-circuit voltage and state whether system is operated with or without protectors.
(*e*) Operated with neutral solidly grounded, grounded through resistance or reactance, or ungrounded.

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* For the purposes of NEMA, this paragraph is approved as Authorized Engineering Information.

If grounded through resistance or reactance, state amount.

(*f*) Minimum temperature at which cable will be installed.

(*g*) Description of installation.

(*1*) In buildings.

(*2*) In underground ducts.

(*3*) Aerial.

a. On messenger in metal rings.
b. On messenger with marlin ties.
c. Preassembled.
d. Field spun.

(*4*) Direct burial in ground.

(*5*) Submarine.

(*6*) Descriptions other than the foregoing.

(*h*) Conditions of installations.

(*1*) Ambient temperature.

(*2*) Number of loaded cables in duct bank or conduit. If in conduit, give type of conduit (metallic or nonmetallic), number of loaded conduits, enclosed or exposed, and spacing between conduits.

(*3*) Load factor.

(*4*) Method of bonding and grounding of lead sheaths.

(*5*) Wet or dry location.

1.3.2 *Quantities and Description of Cable*

(*a*) Total number of feet, including test lengths, and lengths if specific lengths are required.

(*b*) Type of cable. Describe as single conductor, 2-conductor flat, 2-conductor round, etc.

(*c*) Rated circuit voltage, phase to phase.

(*d*) Type of conductor—copper or aluminum.

(*e*) Size of conductors—Awg or circular mils. If conditions require other than standard stranding, a complete description should be given.

(*f*) Grade of insulation.

(*g*) Thickness of insulation in 64ths of an inch or in mils.
(*h*) Type of outer covering.
(*i*) Maximum allowable overall diameter in inches. When duct space is not limited, it is desirable not to restrict the overall diameter.
(*f*) Method of conductor identification.

[fol. 6497]

Part 2

Conductors

2.1 Material. Part 2 covers copper conductors and aluminum conductors.

2.1.1 *Copper Conductors.* Uncoated conductors shall be of annealed copper wire in accordance with ASTM B 3, latest revision.

Coated conductors shall be of annealed copper wire in accordance with the latest revision of ASTM B 33 for tin-coated conductors or ASTM B 189 for lead- or lead-alloy-coated conductors.

The conductors, unless otherwise specified herein, shall be protected by tin, lead, or lead-alloy coating.

The continuity of tin coating shall be determined in accordance with ASTM B 33, latest revision, before the conductors are insulated or stranded.

The continuity of lead and lead-alloy coatings shall be determined in accordance with ASTM B 189, latest revision, before the conductors are insulated or stranded.

2.1.2 *Aluminum Conductors.* Solid conductors 8 Awg and smaller shall be "EC" grade aluminum three-quarter hard in accordance with ASTM B 262, latest revision. Solid conductors larger than 8 Awg and all sizes of stranded conductors shall be "EC" grade aluminum either hard-drawn in accordance with ASTM B 230 or three-quarter hard in accordance with ASTM B 262, latest revisions. Stranded conductors shall conform to ASTM B 231, latest revision.

2.2 Solid Conductors. Conductors 8 Awg and smaller shall be solid or, when required for a particular application, stranded. Conductors 6 Awg and larger may be solid as indicated in Table 1 when required. Nominal diameters

shall be in accordance with Table 1, subject to the tolerances given in 2.5.

2.3 Stranded Conductors.

2.3.1. Conductors 6 Awg and larger shall be stranded in accordance with 2.3.3. For series lighting cable and tree wire, conductors 6 and 4 Awg may be solid.

Stranded conductors shall be composed of the number of wires given in Tables 1 through 6 and subject to the tolerances on cross-sectional areas given in 2.5. Intermediate sizes take the stranding of the next larger conductor size given in the tables.

2.3.2 Strand shielding shall be used on stranded conductors of power cables having rated circuit voltages above 2000 volts. This requirement does not apply to series lighting cables.

Strand shielding in rubber-insulated cables is a conducting material at least 0.0025 inch thick applied over the surface of the conductor and vulcanized or firmly bonded to the inner surface of the insulation. It may be conducting nonmetallic tape, conducting compound, or conducting cement.

2.3.3 *Uses of Classes of Stranding*

2.3.3.1 *Concentric-lay Conductors.* A concentric-lay conductor is a conductor composed of a central core surrounded by one or more layers of helically laid wires.

Class of Stranding *	Use
B	Power cables rated 0–2000 volts for normal use and, where strand shielding is employed (see 2.3.2), for use above 2000 volts.
C	Power cables where more flexible stranding than Class B is desired.
D	Power cables where extra flexible stranding is desired.

* See Table 1.

[fol. 6498] 2.3.3.2 *Rope-lay Conductors.* A rope-lay conductor is a conductor composed of concentric-lay stranded members or bunch-stranded members.

Classes G and H shall have concentric-lay-stranded members, and Classes I, K and M shall have bunch-stranded members.

Class of Stranding	Use
G (see Table 2)	All cables for portable use.
H (see Table 3)	All cables where extreme flexibility is required, such as for use on take-up sheaves, etc.
I (see Table 4)	Apparatus cable and motor-leads.
K (see Table 5)	Cords and cables composed of No. 30 Awg copper wires.
M (see Table 6)	Cords and cables composed of No. 34 Awg copper wires.

Other strandings are given in Part 7.

2.3.4 The individual wires used in the construction of the stranded conductor shall, before stranding, meet the requirements of 2.1.

2.3.5 The lay of concentric stranded conductors shall be in accordance with the latest revision of ASTM B 8 for copper conductors and ASTM B 231 for aluminum conductors. The lay of a layer of wires shall be not less than eight nor more than sixteen times the outside diameter of that layer, except that for conductors composed of 37 wires or more, this requirement shall apply only to the two outer layers.

The direction of lay of the outer layer shall be left-hand. The direction of lay for conductors having a nominal cross-sectional area larger than 8 Awg shall be reversed in successive layers.

2.4 Individual Wire Splices in Solid and Stranded Conductors. A splice in a solid conductor or in one of the individual wires of a stranded conductor shall be made in a workman-like manner and shall be such that the joint will not increase the diameter of the individual wire or of the conductor nor lessen its mechanical strength. A joint or splice in a stranded conductor as a whole shall be made by separately joining each individual wire in such a manner that the overall diameter of the entire stranded conductor will not be increased. In rope-stranded conductors, the primary groups used in forming the rope shall be considered the equivalent of a solid wire in a concentric stranded conductor.

2.5 Tolerances in Diameters and Cross-sectional Areas. The following tolerances apply to determinations made on conductors of the completed cable.

2.5.1 *Diameters*

	Diameter, Inches	Maximum Variation in Diameter
Solid copper conductors		
Coated	0.010 and larger	−1%, +3%
	Smaller than 0.010	−0.1 mil, +0.3 mil
Uncoated	0.010 and larger	−1%, +1%
	Smaller than 0.010	−0.1 mil, +0.1 mil
Solid aluminum conductors	0.100 and larger	−1%, +1%
	0.036 up to 0.100	−1 mil, +1 mil
	Smaller than 0.036	−0.5 mil, +0.5 mil

[fol. 6499] 2.5.2 *Cross-sectional Areas*

2.5.2.1 In stranded conductors, the area of cross-section of the completed conductor shall be not less than 98 per cent of the area given in Table 1 for 18 and 20 Awg conductors made with 30 Awg strands when measured in accordance with 6.3.4.

2.5.2.2 In rope-lay-stranded conductors having bunch-stranded members (Classes I, K and M), the number of individual wires may vary from that given in Tables 4, 5 or 6, provided the cross-sectional area of the conductor is in accordance with 2.5.2.1.

2.5.2.3 The cross-sectional area of a stranded conductor shall be the sum of its component wires at any point, when measured in accordance with 6.3.4.

2.6 Resistance of Conductors

2.6.1 The direct-current resistance of solid or Class B stranded conductors at 20 C or 25 C shall not exceed the values given in Table 7.

2.6.2 For flexible stranded conductors and for sizes not listed in Table 7, the direct-current resistance at 20 C or 25 C shall be not greater than that calculated from the factors given in Table 8.

2.6.3. In completed multiple-conductor cables the increase in resistance due to conductor cabling lay shall not exceed the values give- in Tables 7 and 8 by more than the following percentages:

(*a*) Non-portable cables:
- (*1*) One layer of conductors 2
- (*2*) More than one layer of conductors 3
- (*3*) Pairs or other pre-cabled units 4

(*b*) Portable cords and cables 5

2.6.4 When the direct-current resistance is measured at other than 20 C or 25 C, it shall be corrected by using the multiplying factors given in Tables 9 and 10.

Factors for temperatures other than those given in the tables shall be obtained by interpolation or shall be calculated from the formulae given in the footnotes to Tables 9 and 10.

[fol. 6500]

Part 7

Constructions of Specific Types

The requirements of Parts 1 through 6 shall be met except as otherwise modified in Part 7

7.1 Pole and Bracket Cable

7.1.1 *Scope.* This section covers the following types of rubber-insulated two-conductor pole and bracket cables for use in series lighting circuits:

Type A—Belted cable having a belt of insulation and a fibrous covering over the insulated conductors.

Type B—Flat twin cable having only a fibrous covering over the insulated conductors.

Conductor sizes are 10, 8 and 6 Awg, and insulation thicknesses are based on a maximum of 600 volts between conductors and from 600 to 10000 volts between conductors and ground.

Recommended bending radii are given in Appendix F.

7.1.2 *Conductors*

7.1.2.1 The conductors shall be of coated copper and shall meet the requirements of 2.1.1 and 2.3.

7.1.2.2 The sizes, minimum number of strands, average cross-sectional areas and approximate diameters of the conductors shall be as follows:

Size, Awg.	Minimum Number of Strands/Conductor	Average Cross-sectional Area, Circular Mils	Approximate Diameter, Inches
10	19	10,380	0.117
8	19	16,510	0.148
6	19	26,240	0.186

The area of cross-section of any conductor shall be not less than 98 per cent of the area given in the above table.

7.1.3 *Insulation.* The insulation shall be one of the grades given in Table 11.

The average thickness of the insulation shall be not less than that given in Table 57. The minimum thickness shall be not less than 90 per cent of the values given in the table.

7.1.4 *Tape or Braid Over the Individual Conductor*

7.1.4.1 A tape or braid shall be applied over the insulation of each conductor.

7.1.4.2 Tape, where used, shall meet the requirements of 4.4.

7.1.4.3 Braid, where used, shall meet the requirements for Class B braids given in 4.5. Where circuit identification (see 7.1.5) is obtained by means of colors, the braids shall be suitably treated. Where circuit identification is obtained by means of one conductor having a pronounced large size thread tracer, the braids shall be saturated with a weather-resisting compound.

7.1.5 *Circuit Identification.* Circuit identification shall be obtained either by means of colored braids or tapes which shall be one black and one white, or by having a pronounced large size thread tracer on one conductor.

7.1.6 *Belted Cables*

7.1.6.1 In belted cable, the two insulated and taped or braided wires shall lay flat and parallel and a belt of insulation which meets the requirements of 7.1.3 shall be applied in either a round or oval shape. Fibrous fillers shall not be used. The belt insulation shall thoroughly fill the interstices of the cable.

7.1.6.2 The average thickness of the belt shall be not less

than that given in Table 57. The minimum thickness shall be not less than 90 per cent of the values given in the table.

7.1.6.3 A tape and braid or a double braid shall be applied over the belt insulation.

7.1.6.4 A tape, where used over the belt insulation, shall be compound-filled in accordance with 4.4.

[fol. 6501] 7.1.6.5 Both inner and outer braids, where used over the belt insulation, shall meet the requirements for Class B braids given in 4.5 and shall be saturated with a moisture-resisting compound.

7.1.7 *Flat Twin Cable.* A Class B braid which meets the requirements of 4.5 shall be applied over the parallel insulated and taped or braided conductors. The braid shall be saturated and finished with a moisture-resisting compound.

7.1.8 *Voltage Test*

7.1.8.1 The completed cable shall withstand the following voltage tests after being immersed in water for at least 6 hours.

7.1.8.2 On belted cables, an alternating-current test voltage of 3000 volts shall be applied between conductors for 5 minutes.

7.1.8.3 On belted and flat twin cables, the conductors shall be connected together, and the alternating-current test voltage given in Table 57 shall be applied between the conductor and water for 5 minutes.

7.1.9 *Outside Diameters.* Nominal outside diameters of the completed cables shall be in accordance with Table 57 with a tolerance of plus or minus 5 per cent.

Table 57

Pole and Bracket Cable

Open-circuit Voltage, Volts	Conductor Size, Awg	Thickness of Insulation and Belt, 64ths of an Inch			Nominal Outside Diameter	A-C Test Voltage, Kv	
		Individual Conductor	Belt	Total		Cables with Ozone-resisting Insulation	Cables with other than Ozone-resisting Insulation
0-600	10	3	0	3	0.53	4.5	3.0
	8	4	0	4	0.65	6.0	3.5
	6	4	0	4	0.73	6.0	3.5
601-1000	10	4	0	4	0.59	6.0	5.0
	8	4	0	4	0.65	6.0	5.0
	6	5	0	5	0.79	7.5	6.0
1001-2000	10	5	0	5	0.65	7.5	6.0
	8	5	0	5	0.72	7.5	6.0
	6	6	0	6	0.87	8.5	7.5
2001-3000	10	6	0	6	0.72	8.5	7.5
	8	6	0	6	0.78	8.5	7.5
	6	7	0	7	0.93	10.0	9.0
3001-4000	10	7	0	7	0.78	10.0	9.0
	10	3	4	7	0.70	10.0	9.0
	8	7	0	7	0.84	10.0	9.0
	8	3	4	7	0.76	10.0	9.0
	6	8	0	8	0.99	11.5	10.0
	6	4	4	8	0.92	11.5	10.0
4001-6000	10	9	0	9	0.91	13.0	11.0
	10	3	6	9	0.76	13.0	11.0
	8	9	0	9	0.98	13.0	11.0
	8	3	6	9	0.82	13.0	11.0
	6	4	5	9	0.95	13.0	11.0
6001-7000	10	3	7	10	0.79	14.0	12.5
	8	3	7	10	0.86	14.0	12.5
	6	4	6	10	0.98	14.0	12.5
7001-9000	10	3	8	11	0.82	15.5	13.5
	8	3	8	11	0.90	15.5	13.5
	6	4	7	11	1.01	15.5	13.5
9001-10000	10	3	9	12	0.86	17.0	15.0
	8	3	9	12	0.93	17.0	15.0
	6	4	8	12	1.04	17.0	15.0

[fol. 6502] 7.2 Nonmetallic Neoprene-jacketed Mine Power Cables

7.2.1 *Scope.* This section covers heat-, moisture- and ozone-resisting rubber-insulated shielded, three-conductor, neoprene-jacketed cables with grounding conductors in sizes 6 to 4/0 Awg for nominal alternating-current voltage service of 5 and 10 kv. They are available with two grades of insulation for operation at maximum conductor temperatures of either 75 C or 85 C.

The approximate phase-to-phase 60-cycle voltage drop per ampere per 1000 feet at various circuit power factors and ampacities are given in Appendix C. Recommended bending radii are given in Appendix F.

7.2.2 *Power and Grounding Conductors*

7.2.2.1 Power conductors, except for bore-hole and shaft cables, shall be of annealed coated copper wire and shall meet the requirements given in Part 2.

7.2.2.2 Power conductors for borehole and shaft cables shall be of annealed coated copper wire or, when the factor of safety as calculated by the following formula is less than 7, of medium hard-drawn coated copper in accordance with ASTM B 246 before stranding.

$$F = \frac{AT}{W}$$

where

F—Factor of safety.
A—Area of the three power conductors in square inches.
T—Tensile strength of copper in pounds per square inch (24000 for annealed copper and 40000 for medium hard copper).
W—Weight of the cable in pounds.

The conductor stranding shall be Class B or Class C in accordance with Part 2 and Table 58.

7.2.2.3 Grounding conductors shall be of annealed coated copper wire, shall meet the requirements of Part 2, and shall be Class B stranded. One grounding conductor shall be placed in each interstice of the cable in contact with

metallic shielding. The size of each grounding conductor shall be in accordance with Table 58. The aggregate total cross-sectional area of the three grounding conductors shall be not less than 90 per cent of the area of one power conductor. The minimum size of an individual grounding conductor shall be 10 Awg.

7.2.3 *Strand Shielding.* Strand shielding (see 2.3.2) shall be applied over the power conductors.

7.2.4 *Insulation.* The insulation shall be in accordance with Part 3.

The insulation for 75 C operation shall meet the requirements of 3.14 or 3.15.

The insulation for 85 C operation shall meet the requirements of 3.15.

The average thickness of insulation shall be not less than that given in Table 58 for grounded and ungrounded neutral circuits. The minimum thickness shall be not less than 90 per cent of the values given in the table.

Note: A circuit is considered to have a grounded neutral if it is metallically continuous to a point where the neutral is permanently connected to earth and if facilities are provided to insure prompt isolation of a faulty element of a system of which the circuit is a part.*

7.2.5 *Conductor or Circuit Identification.* Conductors shall be identified by a tape in accordance with 5.6.1.

7.2.6 *Metallic Shielding.* Metallic shielding, in accordance with Part 4, shall be applied over the individual conductors.

7.2.7 *Jacket.* A neoprene jacket which meets the requirements of 4.13.3 and Table 29 shall be applied.

[fol. 6503] 7.2.8 *Overall Diameters.* The nominal overall diameters of the cables shall be in accordance with Table 58, within plus 8 per cent and minus 5 per cent.

7.2.9 *Tests.* The cables shall be tested in accordance with Part 6 and shall meet the requirements given in Part 3 and 7.2.

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* For the purposes of NEMA, this note is approved as Authorized Engineering Information.

The corona levels shall be as follows:

Voltage Classification, Kv	Minimum Corona Level, Kv Grounded Neutral	Ungrounded Neutral
5	3.2	5.0*
10	6.4	8.9

* Unless otherwise indicated, the cable will be rated grounded neutral.

Table 58

Mine Power Cable Nonmetallic Neoprene-jacketed

Size Awg	Power Conductor Number of Strands Class B	Class C	Grounding Conductor Size in Each Interstice, Awg	Power Conductor Insulation Thickness, Inches Grounded Neutral	Ungrounded Neutral	Overall Diameters, Inches Grounded Neutral	Ungrounded Neutral
				5000-volt Cables			
6	7	19	10	0.156	0.156	1.43	1.43
4	7	19	9	"	"	1.54	1.54
2	7	19	7	"	"	1.68	1.68
1	19	37	6	"	"	1.79	1.79
1/0	19	37	5	"	"	1.88	1.88
2/0	19	37	4	"	"	1.99	1.99
3/0	19	37	3	"	"	2.10	2.10
4/0	19	37	2	"	"	2.23	2.23
				10000-volt Cables			
6	7	19	10	0.219	0.281	1.75	2.04
4	7	19	9	"	"	1.86	2.14
2	7	19	7	"	"	2.00	2.30
1	19	37	6	"	"	2.08	2.39
1/0	19	37	5	"	"	2.14	2.49
2/0	19	37	4	"	"	2.30	2.59
3/0	19	37	3	"	"	2.42	2.70
4/0	19	37	2	"	"	2.54	2.83

[fol. 6504] 7.3 Preassembled Aerial Cable Using Copper Conductors.

7.3.1 *Scope.* This section covers preassembled aerial cables with one or more copper conductors in Sizes 6 Awg to 500 MCM which are individually insulated with a rubber compound and covered and which are attached to a messenger to form self-supporting aerial cables for use on power transmission and distribution systems operating at 15 kv or less phase to phase.

The characteristics of the completed assembly shall be such that the cable can be installed at a minimum temperature of minus 10 C (14 F).

Ampacities and recommended bending radii are given in Appendices E and F, respectively.

7.3.2 *Conductors.* All insulated power conductors shall be of annealed coated copper in accordance with Part 2. The conductors shall be Class B or Class C stranded in accordance with Part 2 except that, when required, size 6 Awg may be solid. For ratings above 2000 volts, each stranded conductor shall be covered with strand shielding in accordance with 2.3.2.

7.3.3 *Insulation.* The insulation shall be applied in accordance with the applicable sections of Part 3. The average thickness of the insulation shall be not less than that given in Table 12. The minimum thickness shall be not less than 90 per cent of the values given in the table.

For cables rated 2000 volts or less, the insulation shall be one of the grades given in Table 11. For cables rated above 2000 volts, the insulation shall be in accordance with 3.14 or 3.15.

7.3.4 *Coverings.* The covering over the insulation of each conductor shall be in accordance with one of the following:

Type	Description	Maximum Operating Voltage, Phase to Phase, Kv	
		Grounded Neutral	Ungrounded Neutral
I	Nonshielded, jacketed	5	5
II	Shielded, nonjacketed	15	15
III	Shielded, jacketed	15	15

7.3.4.1 *Type I.* A jacket of nonconducting neoprene compound which meets the requirements of 4.13.4 and Table 27 shall be applied over the insulation of each conductor.

7.3.4.2 *Type II.* A fibrous or other nonmetallic tape shall be applied over the insulation of each conductor. The tape shall be either conducting or nonconducting and, if conducting, shall be so marked. An additional fibrous tape may be applied over the first tape. Over the tape or tapes, a helically wrapped nonmagnetic stainless steel, nonmagnetic monel or bronze shielding tape have a thickness of at least 0.0045 inch shall be applied with a lap of not less than 15 per cent of its width.

7.3.4.3 *Type III.* A fibrous or other nonmetallic tape shall be applied over the insulation of each conductor. The

tape shall be either conducting or nonconducting and, if conducting, shall be so marked. An additional fibrous tape may be applied over the first tape. Over the tape or tapes, a helically wrapped metallic shielding tape which meets the requirements of 4.1 shall be applied. A fibrous tape which meets the requirements of 4.4 may be applied over the shielding. A jacket of nonconducting neoprene compound which meets the requirements of 4.13.4 and Table 28 shall be applied over the shielding tape or, if used, over the fibrous tape.

7.3.5 *Conductor or Circuit Identification.* Each conductor of multiple-conductor cable shall be permanently marked so that conductor identification may be made without exposing the insulation. Identification shall be made by means of colored jackets, ribs on the outer surface of jackets, or by embossing letters or numerals on the outer covering.

Single-conductor cable shall not be identified.

Jacketed cables shall be identified to indicate the manufacturer.

7.3.6 *Assembly.* The conductors shall be cabled together with a suitable lay. The messenger shall be laid parallel to the axis of a single conductor or the cabled conductors. The cabled conductors shall be bound to the messenger by means of a soft-copper binding strip. The binding strip shall have a pitch of from 3 to 6 inches, shall be rectangular with rounded edges, and shall have the following nominal dimensions:

[fol. 6505]

Diameter of Cable Assembly, Excluding Messenger, Inches	Binding Strip	
	Thickness, Inches	Width, Inches
0–1.000	0.025	0.250
1.001 and over	0.030	0.375

The messenger shall extend 5 feet beyond each end of the conductors for use in installing the cable.

7.3.7 *Messenger Sizes.* The messenger shall be either composite stranded copper and copper-covered steel in accordance with ASTM B 229, or Grade 30 EHS stranded copper-covered steel in accordance with ASTM B 228.

The messenger sizes shall be as follows. These sizes are expressed as designations for single-conductor cables and as messenger diameters in inches for multiple-conductor cables.

Conductor Size, Awg or MCM*	Messenger Sizes Cable Voltage Rating Up to 5 Kv, Inclusive	6 to 15 Kv, Inclusive
	Single Conductor	
6†	6D	6D
4†	4D	4D
2†	2J	2J
	Two and Three Conductor	
6†	5/16	5/16
4†	5/16	5/16
2†	5/16	5/16
1	5/16	5/16
1/0	5/16	5/16
2/0	5/16	5/16
3/0	5/16	5/16
4/0	5/16	5/16
350	1/2	1/2
500.	1/2	1/2

* MCM—thousands of circular mils.
† See limits on conductor size in Table 12.

7.3.8 *Design Criteria.** The messenger size shall be based on a normal stringing tension at 60 F not exceeding 30 per cent of the ultimate strength and a maximum tension not exceeding 50 per cent of ultimate strength at fully loaded condition. The tabulation of messenger sizes given in 7.3.7 apply to grounded neutral cables up to 4/0 Awg on the basis of a 150-foot ruling span, 30 inches maximum sag under normal conditions, and after heavy loading conditions of ½ inch ice and 8 pound wind at 0° F. One-half inch messenger is the largest size messenger listed in the table and, for cable sizes over 500 MCM, greater sags or shorter spans should be used. For single-phase circuits, the resistance of the messenger should be not greater than that of the conductor.

7.3.9 *Tests.* The cable shall be tested in accordance with Part 6 and shall meet the requirements of Part 3 and 7.3.

* For the purposes of NEMA, this paragraph is approved as Authorized Engineering Information.

The final test voltage shall be 80 per cent of the test voltage specified in Table 12. Cables with Type I covering shall be immersed in water during the final test.

[fol. 6506] 7.4 Neutral-supported Secondary and Service Drop Cables

7.4.1 *Scope.* This section covers secondary and service drop cables composed of one or more neoprene-insulated conductors and one neutral conductor for use as the supporting member. These cables are for use on circuits not exceeding 300 volts to ground.

7.4.2 *Conductors*

7.4.2.1 *Insulated Conductors*

7.4.2.1.1 Copper. Copper conductors shall be annealed uncoated copper and shall meet the requirements given in Part 2. Size 8 Awg shall be solid. Sizes 6 Awg and larger shall be Class B stranded in accordance with Table 1.

7.4.2.1.2 Aluminum. Aluminum conductors shall be "EC" grade, with a minimum tensile strength of 17,000 psi. Size 6 Awg shall be solid. Size 4 Awg and larger shall be Class B stranded in accordance with Table 1, except that the outer layer shall have a right-hand lay.

7.4.2.2 *Neutral Conductors.* Neutral conductors shall be uncovered or covered and the sizes and composition shall be in accordance with Table 59.

7.4.2.2.1 Copper. Copper conductors shall be hard-drawn bare copper and shall be Class B stranded in accordance with Table 1, except that sizes 6 Awg and smaller may be solid.

7.4.2.2.2 Aluminum. Aluminum conductors shall be "EC" grade, hard-drawn aluminum, stranded in accordance with Class A, Table II, ASTM B 231, except sizes 3/0 and 4/0 shall be 19-wire stranded.

7.4.2.2.3 Copper and Copper-covered-steel Composite. Conductors shall be concentric-lay stranded copper and copper-covered steel composite conductors and shall meet the requirements given in the applicable sections of ASTM B 229.

7.4.2.2.4 Aluminum Conductors—Steel Reinforced. Aluminum conductors steel reinforced, (ACSR), shall be 7-wire strand (6 aluminum around 1 steel) and shall meet the requirements of ASTM B 232.

7.4.3 *Insulation*

7.4.3.1 *Physical and Aging Requirements.* The neoprene insulation shall be black and, when tested in accordance with Part 6, shall meet the following requirements:

Physical Requirements	
Tensile strength, minimum, psi	1200
Elongation at rupture, minimum, per cent	250
Set in 2-inch gauge length, maximum, inches	5/8
Aging Requirements	
After air oven test at 70 ± 1 C for 168 hours:	
Tensile strength, minimum, percentage of unaged value	75
Elongation at rupture, minimum, percentage of unaged value	65
After oxygen pressure test at 70 ± 1 C for 96 hours:	
Tensile strength, minimum, percentage of unaged value	75
Elongation at rupture, minimum, percentage of unaged value	65
After oil immersion test at 121 ± 1 C for 18 hours:	
Tensile strength, minimum, percentage of unaged value	60
Elongation at rupture, minimum, percentage of unaged value	60

7.4.3.2 *Thickness of Insulation.* The average thickness of the insulation shall be not less than the following:

Conductor Size, Awg	Thickness, Inches
8–2	0.062
1–4/0	0.078

The minimum thickness shall be not less than 90 percent of the foregoing values.

7.4.4 *Assembly.* One or more insulated conductors shall be twisted around the neutral conductor without fillers with a lay of 25 to 60 times the diameter of one of the insulated conductors. The direction of lay of the insulated conductors shall be the same as that of the outer layer of wires of the neutral conductor.

The size of the neutral conductor shall be in accordance with Table 59.

[fol. 6507] 7.4.5 *Tests.* Each length of completed cable shall successfully withstand, after one hour's immersion in water, an alternating-current voltage of 1500 volts applied for one minute between each insulated power conductor and ground.

Table 59

Power and Neutral Conductors

Insulated Power Conductor Sizes, Awg		Neutral Conductor Sizes, Awg			
		For Use With Copper or Aluminum Insulated Power Conductors		For Use With Aluminum Insulated Power Conductors Only	
Copper	Aluminum	Copper	Copper Covered Steel *	All Aluminum	(ACSR)
8	6	8	8 C	6	6
6	4	6	6 C	4	4
6	4	8	8 C	...	6
4	2	4	4 A	2	2
4	2	6	6 C	...	4
2	1/0	2	2 F	1/0	1/0
2	1/0	4	4 A	...	2
1	2/0	1	1 F	2/0	2/0
1	2/0	3	3 A	...	1
1/0	3/0	1/0	1/0 F	3/0	3/0
1/0	3/0	2	2 F	...	1/0
2/0	4/0	2/0	2/0 F	4/0	4/0
2/0	4/0	1	1 F	...	2/0

* See ASTM B 229 for letter designations and construction.

[fol. 6508] In United States District Court

Defendant's Exhibit 29a

Lost Business Since April, 1957 (Taken from Potential Business Reports)

Competitor	Pounds Aluminum
Anaconda	16,854,833
Central Cable	921,461
Essex	1,010,150
Genefal Cable	2,758,974
General Electric	175,643
Kaiser	25,844,457
Midland	178,602
Nehring	3,718,218
Paranite	3,248,803
Reynolds	27,749,319
Rome Cable	22,455
Southern Electric	3,449,748
Southwire	6,352,903
Texas Wire	17,700
Unknown	18,371,631
Total	110,674,897

[fol. 6509] In United States District Court

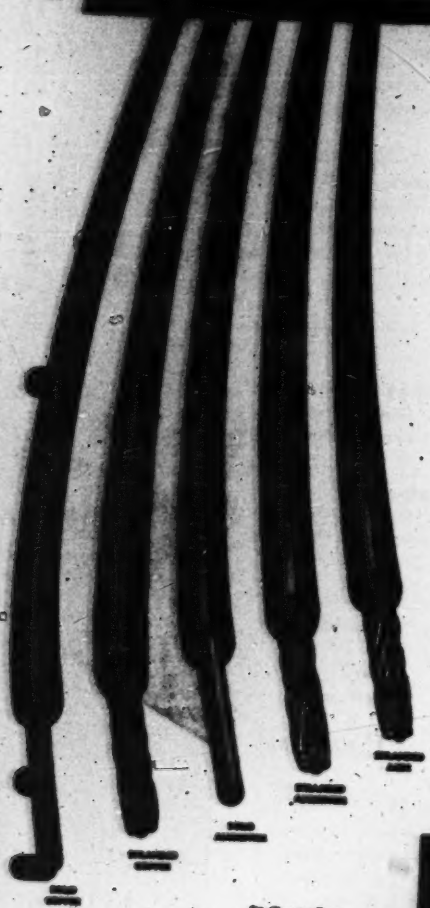
Defendants' Exhibit 30

3345

Bulletin WP-3A
Superseding WP-1A

File Index 2

Rome RoPrene



NEOPRENE COVERED WEATHERPROOF WIRE

Copper, Aluminum and Aluminum-Steel Reinforced (ACSR) Conductors

Resists Moisture, Sunlight, Weathering, Corrosive Atmospheres, Abrasion

Lighter Weight and Smaller Diameter

Smoother, Easier to Pull Over Crossarms

Nonrolling and Nonfestooning

Easier to Strip Clean

Rome RoPrene (Neoprene) Covered Weatherproof Wire provides extra service life because it is inherently tough. It has exceptional weathering stability, is unaffected by industrial fumes and is easier to handle.

RoPrene weatherproof compound provides an homogeneous, seamless covering and is completely vulcanized, i.e., thermosetting. In addition to its many desirable physical characteristics, RoPrene has insulating properties which are much superior to the more conventional fibrous coverings. RoPrene Weatherproof Wire may be used, and is recommended, for the same applications as identical sizes of braided and knitted types of weatherproof. Methods of handling and installation are the same as for the braided and knitted types.

Further, with RoPrene covering reduced wall thicknesses are possible. The result is a smaller and lighter wire. RoPrene Weatherproof is smoother, easier to pull over crossarms. Its smaller diameter and rubber-like surface make it easy to handle.

RoPrene Weatherproof Wire is manufactured in accordance with ASA specifications for weather-resistant wire, Neoprene type.

It Costs Less to Buy the Best

ROME CABLE Corporation

ROME CABLE ROME, N.Y.

[fol. 6510]

RoPrene Weatherproof Wire

SCOPE:

This specification covers Neoprene weather-resistant wire, manufactured in accordance with the requirements of the American Standards specifications for Weather-resistant Wire and Cable, Neoprene Type.

CONDUCTORS:

Before covering, the copper, aluminum or ACSR conductors shall be in accordance with the latest issue of ASA and ASTM specifications as applicable. Tolerances for tensile strength and elongation after covering shall be in accordance with the ASA specification for Weather-resistant Wire, Neoprene Type.

COVERING:

The conductor shall be covered with a tight-fitting seamless RoPrene (Neoprene) compound complying with ASA specifications to the average wall thicknesses shown in the table.

PHYSICAL PROPERTIES OF ROPRENE

Tensile strength, min. psi	1400
Elongation at rupture, min. percent	250
Set in 2-inch gauge length, max. in.	3/8
Tensile strength after 96 hrs. in oxygen bomb @ 70C and 300 psi, min. psi	75% of original
Elongation at rupture after 96 hrs. in oxygen bomb at 70C and 300 psi, min. percent	65% of original
Tensile strength after 18 hrs. in oil @ 121C, min. psi	60% of original
Elongation at rupture after 18 hrs. in oil @ 121C, min. percent	60% of original

The minimum wall thickness at any one point shall not be more than 5 mils below the specified average for thickness 3/64 inch and under, and not more than 10 percent below the specified average for 4/64 inch and over.

WEIGHTS AND TOLERANCES:

The average weight of the covering in any lot of any one size or type manufactured under this specification shall vary not more than plus or minus 15 percent of the nominal weights as listed in the tables. The finished wire weights listed in the tables are nominal weights only and are subject to conductor and covering weight tolerances.

[fol. 6511]

	Size AWG or CM	Number of Wires	Covering Average Thickness Inch	Nominal Overall Diameter Inch	Nominal Weight Pounds per 1000 Ft.			Standard Packing*	
					Bare Conductor	Nominal Covering	Finished Weatherproof	Coils Feet	Reels Feet
COPPER CONDUCTOR	12	Solid	2/64	.144	19.8	7.7	27.5	2850	
	10	Solid	2/64	.165	31.4	9.2	40.6	3470	
	8	Solid	3/64	.223	50.0	18.0	68.0	2700	5000
	6	Solid	3/64	.256	79.5	21.5	101.0	1800	4000
	4	Solid	3/64	.298	126.4	25.6	152.0	1200	2500
	2	Solid	3/64	.352	200.9	31.1	232.0	1000	1000
	6	7	3/64	.278	81.1	26.9	108.0	1800	4000
	4	7	3/64	.326	128.9	34.1	163.0	1200	2500
	2	7	3/64	.386	204.9	43.1	248.0	1000	1000
	1	7	4/64	.453	258.4	64.6	323.0		1000
	1/0	7	4/64	.493	325.8	72.2	398.0		4000
	2/0	7	4/64	.539	410.9	83.1	494.0		3500
	3/0	7	4/64	.589	518.1	93.9	612.0		3000
	4/0	7	4/64	.647	653.3	107.7	761.0		2500
ALL-ALUMINUM CONDUCTOR	8	Solid	3/64	.223	15.2	18.0	33.2	4000	
	6	Solid	3/64	.256	24.2	21.5	45.7	3100	
	4	Solid	3/64	.298	38.4	25.6	64.0	2900	
	2	Solid	3/64	.352	61.1	31.1	92.2	1800	
	6	7	3/64	.278	24.6	26.9	51.5	2800	
	4	7	3/64	.326	39.2	34.1	73.3	2000	
	2	7	3/64	.386	62.3	43.1	105.0	1500	
	1	7	4/64	.453	78.6	64.6	143.0	1000	8500
	1/0	7	4/64	.493	99.1	72.2	171.0	1000	7000
	2/0	7	4/64	.539	124.9	83.1	208.0		5500
	3/0	7	4/64	.589	157.5	93.9	251.0		4400
	4/0	7	4/64	.647	198.6	107.7	306.0		3500
	266,800	19	5/64	.750	250.4	137.5	388.0		5000
	336,400	19	5/64	.823	315.7	156.0	472.0		4000
	397,500	19	6/64	.912	373.0	202.4	575.0		3000
ALUMINUM CONDUCTOR STEEL REINFORCED (ACSR)	6	6AL/1St.	3/64	.292	36.1	28.9	65.0	2500	5800
	5	6AL/1St.	3/64	.317	45.5	33.0	78.5	2000	6800
	4	6AL/1St.	3/64	.344	57.4	37.1	94.5	1800	5400
	4	7AL/1St.	3/64	.351	67.0	38.0	105.0	1800	7100
	3	6AL/1St.	3/64	.375	72.4	41.6	114.0	1400	4300
	2	6AL/1St.	3/64	.410	91.3	47.7	139.0	1100	6800
	2	7AL/1St.	3/64	.419	106.7	48.3	155.0	1100	4500
	1	6AL/1St.	4/64	.480	115.2	69.8	185.0	900	5400
	1/0	6AL/1St.	4/64	.523	145.2	78.8	224.0	800	3200
	2/0	6AL/1St.	4/64	.572	183.1	89.9	273.0		5100
	3/0	6AL/1St.	4/64	.627	230.8	103.2	334.0		2700
	4/0	6AL/1St.	4/64	.688	291.1	117.9	409.0		2100

*See next page for Special Wholesalers Package

[fol. 6512]

3348

SPECIAL WHOLESALERS PACKAGE

Rome RoPrene soft drawn and medium hard drawn copper Weatherproof Wire is packaged in 500-foot cartons for convenient storage and handling. This special package applies to copper Weatherproof Wire only in the sizes tabulated at right and the wire is sold on a linear basis (per 1000 ft.) rather than on a weight basis.

Size AWG	Nominal Shipping Weight Per 1000 Feet
14	19.0
12	27.5
10	40.6
8	68.0
6	101.0
4*	152.0

*500 ft. jacket wrapped coils, not in a carton

OTHER ROME CABLE PRODUCTS

Power Cable
Control Cable
Street Lighting Cable
Self-supporting Aerial Cable
Mining Cable
Signal Cable
Diesel Locomotive Cable
Special Electronic Cables
Portable Cords
Hook-up Wire
Machine Tool Wire
Magnet Wire
Building Wire
Bare and Weatherproof Wire

SALES OFFICES

ATLANTA, GA.
156 Simpson St., N.W.

BOSTON 10, MASS.
Chamber of Commerce Bldg.
80 Federal St.

CHICAGO 39, ILL.
4505 West Grand Ave.

CLEVELAND 14, OHIO
Society for Savings Bldg.
145 Public Square

DALLAS 26, TEXAS
3015 Taylor St.

DENVER 4, COLO.
1160 Elati St.

DETROIT 2, MICH.
547 New Center Bldg.

HOUSTON 2, TEXAS
866 Merchants & Mfrs. Bldg.

KANSAS CITY 11, MO.
406 West 34th St.

LOS ANGELES 22, CALIF.
2510 South Malt Ave.

NEW YORK 17, N. Y.
60 East 42nd St.

PHILADELPHIA 7, PA.
12 South Twelfth St.

PITTSBURGH 22, PA.
1901 Oliver Bldg.

PORTLAND 5, ORE.
1020 S. W. Taylor St.

ST. LOUIS 8, MO.
4378 Lindell Blvd.

ST. PAUL 4, MINN.
345 N. Wheeler Ave.

SALT LAKE CITY 1, UTAH
230 South Fourth West St.

SAN FRANCISCO 24, CALIF.
1100 Selby St.

SEATTLE 4, WASH.
3430 Fourth Ave., South

Warehouse Stocks maintained at Atlanta, Chicago, Dallas, Denver, Los Angeles, Rome, St. Paul, Salt Lake City, San Francisco, Seattle

[fol. 6513] In United States District Court

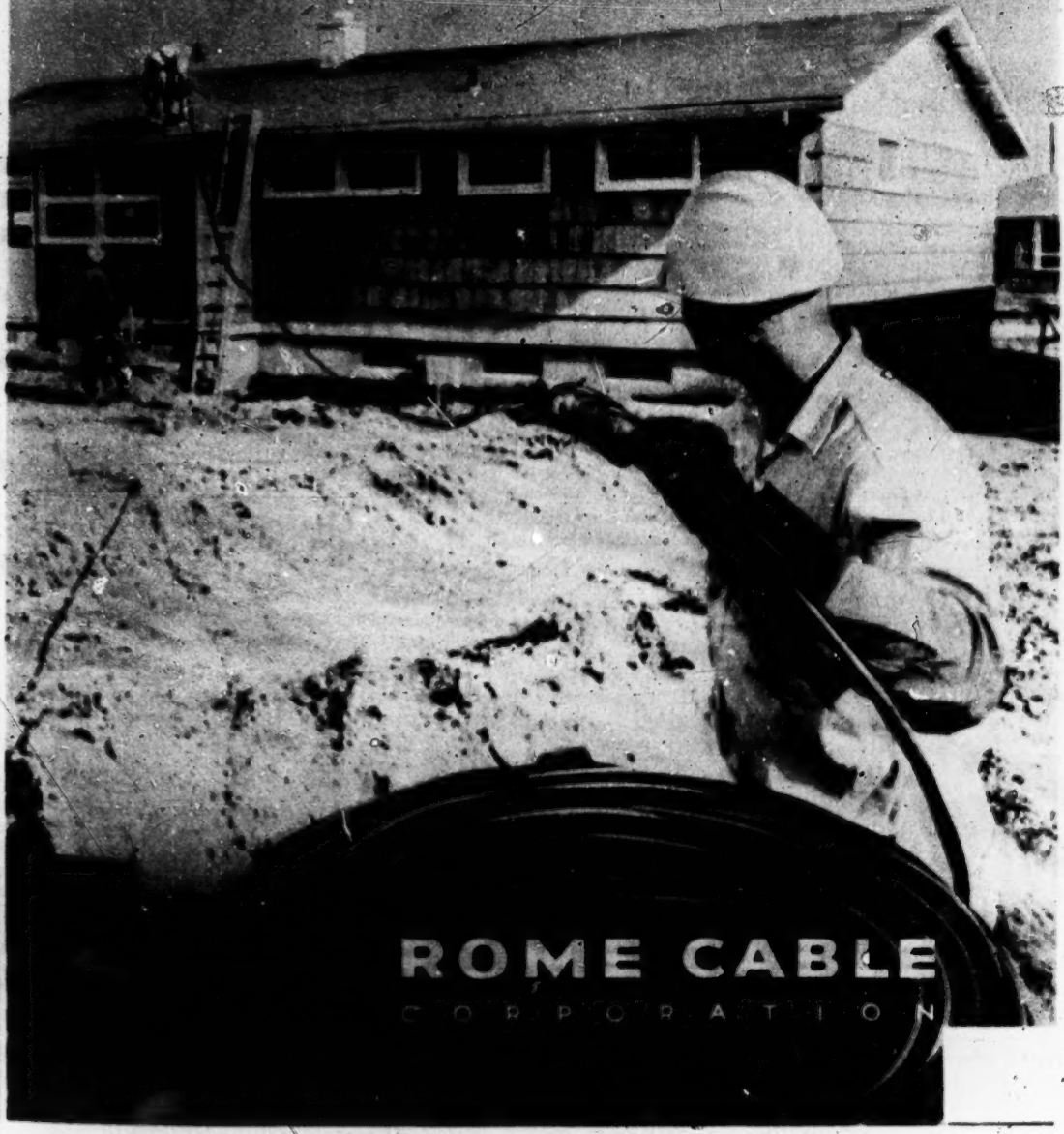
Defendants' Exhibit 31

Bulletin RCP-361
(File Index 3h)
Supersedes 82-1

Reprene and Rolene Insulated

Neutral-Supported Secondary and Service Drop Cables

with copper or aluminum power conductors



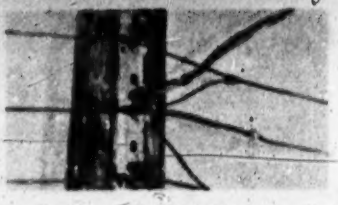
[fol. 6514]

This original Rome Cable development of time-proven construction, Reprene or Rolene Service Drop and Secondary Cable consists of Reprene (Neoprene) or Rolene (polyethylene) insulated power conductors spiralled around a "straight-away" neutral conductor for mechanical support. It offers simplicity in construction, economy of installation, longer life under all weather conditions . . . plus the neater appearance of a single cable assembly compared to open wires.

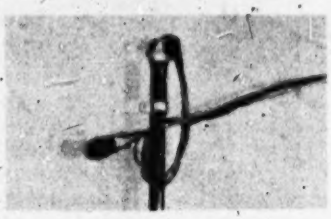
You get these advantages when you install Rome's Triplex

1. Rapid, simple installation because of compactness and less handling
2. Clean, neat appearance (no unsightly multiple wires)
3. High resistance to ice-loading, high wind and other severe winter conditions
4. Maximum protection against sunlight, heavy moisture, corrosive atmospheres and abrasion
5. Mid-span tapping of secondaries permits longer spans and fewer poles
6. Better voltage regulation on secondaries (lower reactance in long and heavily loaded circuits)
7. Eliminates the necessity of using crossarms
8. Less hardware
9. Provides a safer pole for future maintenance work by allowing free climbing and more working area

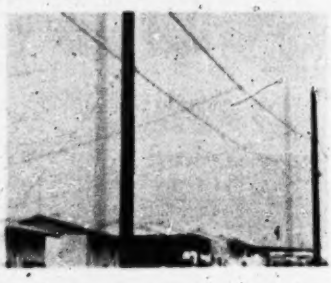
Over ten years ago, Rome Cable pioneered the development of this interesting and economical cable, which may be used for service drops, overhead multiple street lighting circuits, or for overhead secondary cable. Years of trouble-free service have proved the economy and utility of this cable construction.



Less Hardware needed for service tap connection at the pole.



Simplified dead-head connection at the house or industrial establishment



Mid-span taps permit longer spans with fewer poles

SPECIFICATIONS

for Neutral-supported Secondary and Service Drop Cables

SCOPE

This specification applies to secondary and service drop cable consisting of one or more power conductors covered with insulating Roprene (polychloroprene) or Rolene (polyethylene) and twisted around a neutral messenger. This product which is most generally a duplex (2 conductors), triplex (3 conductors), or quadrex (4 conductors) type, is intended for service drops and overhead secondary applications. This specification is based upon IPCEA standards.

CONDUCTORS

A. Power

1. Copper power conductors shall be soft annealed bare copper conforming to ASTM specification B 3. Size No. 8 AWG shall be solid. Sizes No. 6 AWG and larger shall be Class B stranded in accordance with ASTM specification B 8.
2. Aluminum power conductors shall be "EC" grade with a minimum tensile strength of 17,000. psi. Size No. 6 AWG shall be solid. Sizes No. 4 AWG and larger shall be Class B stranded in accordance with ASTM specification B 231.

B. *Neutral Messenger

1. Copper conductors shall be hard-drawn bare copper stranded in accordance with Class B, ASTM specification B 8, except No. 6 AWG and smaller may be solid.
2. Aluminum conductors shall be "EC" grade, hard-drawn aluminum stranded in accordance with Class A, ASTM specification B 231, except sizes No. 3/0 and 4/0 shall be 19-wire stranded.
3. Copperweld conductors shall be stranded copper and copper covered steel composite conductors in accordance with the applicable sections of ASTM specification B 229.
4. ACSR (aluminum cable, steel reinforced) conductors shall be 7 strand (6 aluminum around 1 steel) in accordance with ASTM specification B 232.

*A double braid, Roprene or Rolene type of weatherproof wire will be supplied for the neutral conductor when specifically requested.

INSULATION

1. Polychloroprene

The power conductors shall be covered with insulating Roprene to a minimum wall thickness of at least 90% of the specified values.

The nominal thickness of insulation shall be 4/64" on sizes No. 8 to No. 2 AWG, and 5/64" on sizes No. 1 to No. 4/0 AWG.

Physical Properties of Polychloroprene	
Tensile strength, min. psi	1200
Elongation at rupture, min. percent	250
Set in 2 in. gauge length, max. in	⅝
Tensile strength after 96 hrs. in oxygen-bomb test, min. psi	75% of original
Elongation at rupture after 96 hrs. in oxygen-bomb test, min. percent	65% of original
Tensile strength after 168 hrs. in air oven test @ 69-71 c., min. psi	75% of original
Elongation at rupture after 168 hrs. in air oven test @ 69-71 c., min. percent	65% of original
Tensile strength after 18 hrs. in oil (ASTM-D732) @ 120-122 c., min. psi	60% of original
Elongation at rupture after 18 hrs. in oil (ASTM-D732) @ 120-122 c., min. percent	60% of original

2. Polyethylene

The power conductors shall be covered with Rolene to a minimum wall thickness of at least 90% of the specified values. The nominal thickness of insulation shall be 3/64" for sizes No. 8 to No. 2 AWG and 4/64" for sizes No. 1 to No. 4/0 AWG. Rolene insulation shall be black in color and shall be compounded to be resistant to sunlight and weathering.

Physical Properties of Polyethylene	
Tensile strength, min. psi	1400
Elongation at rupture, min. percent	350
Tensile strength after 48 hrs. in air oven test @ 98-100 c., min. psi	75% of original
Elongation at rupture after 48 hrs. in air oven test @ 98-100 c., min. percent	75% of original

ASSEMBLY

One or more power conductors shall be spirally wrapped around the neutral messenger with a lay of 25 to 60 times the diameter of one of the insulated conductors. The direction of lay shall be the same as the direction of lay of wires in the neutral conductor. The resistance of the neutral conductor shall be substantially the same as that of the insulated conductor or, as an alternate, it may be the equivalent of two AWG sizes smaller for cable having a resistance less than No. 8 AWG copper. If a reduced neutral conductor is aluminum, such reduced neutral shall be ACSR unless otherwise specified.

TESTS

All finished cable shall be immersed in water for at least one (1) hour and tested at 1500 volts for one minute without failure between each insulated conductor and ground.

PUT UP

As indicated in the accompanying tabulation, unless otherwise specified on the purchase order.

[fol. 6516]

GENERAL INFORMATION

on Rome's Neutral-supported Service Cable

This popular design is available in a large range of sizes with either one, two, or three insulated conductors spiraled around the generally uncovered neutral-messenger (this messenger is also available with appropriate coverings as required by local codes or standards).

The neutral size may be equal to, or smaller than, power conductors as desired.

Rome's self-supporting service drop cable is available with either copper or aluminum conductors as shown below. The conventional type of messenger may be stranded hard-drawn copper, Copperweld, hard-drawn aluminum, or ACSR (aluminum cable, steel reinforced). Various types of fittings and hardware are readily available.

Two types of special construction are available: (1) a rubber-insulated, neoprene-jacketed (so called "two-shot") construction; (2) a special cable covering for areas where tree abrasion is encountered. Further information on these and other special constructions will be supplied on request.

Power Condr. AWG	Strand	Insulation Thickness 64ths		*Messenger		Neoprene Insulation		Rolene Insulation		Current Carrying Capacity See Pg. 7	Breaking Strength Pounds	Standard Put-up (Triplex)
		Neoprene	Rolene	Size	Type	O.D. Inch	Weight lbs/M'	O.D. Inch	Weight lbs/M'			
Copper Conductors												
8	Solid	4	3	8 Sol. or Str.	Copper	.52	207	.45	180	60	826	1500'R (24")
8	Solid	4	3	8 C	Copperweld	.52	218	.45	191	60	1362	
6	7	4	3	6 Sol. or Str.	Copper	.63	323	.56	277	80	1228	1500'R (27")
6	7	4	3	6 C	Copperweld	.63	339	.56	295	80	2143	or 500'C
6	7	4	3	8 Sol. or Str.	Copper	.63	292	.56	248	80	826	
6	7	4	3	8 C	Copperweld	.63	303	.56	256	80	1362	
4	7	4	3	4 Strand	Copper	.72	486	.66	430	100	1938	1500'R (30")
4	7	4	3	4 A	Copperweld	.72	519	.66	467	100	3938	or 500'C
4	7	4	3	6 Sol. or Str.	Copper	.72	438	.66	383	100	1228	
4	7	4	3	6 C	Copperweld	.72	454	.66	400	100	2143	
2	7	4	3	2 Strand	Copper	.84	740	.78	672	135	3045	1000'R (30")
2	7	4	3	2 F	Copperweld	.84	758	.78	693	135	4233	
2	7	4	3	4 Strand	Copper	.84	664	.78	597	135	1938	
2	7	4	3	4 A	Copperweld	.84	697	.78	632	135	3938	
Aluminum Conductors												
†6	Solid	4	3	6 Strand	All Aluminum	.58	138	.54	101	60	528	1500'R (27")
†6	Solid	4	3	6	ACSR	.58	150	.54	112	60	1170	or 500'C
4	7	4	3	4 Strand	All Aluminum	.72	215	.66	161	80	826	1500'R (30")
†4	7	4	3	4	ACSR	.72	233	.66	180	80	1830	or 500'C
4	7	4	3	6	ACSR	.72	212	.66	158	80	1170	
2	7	4	3	2 Strand	All Aluminum	.84	308	.78	240	105	1266	1000'R (30")
†2	7	4	3	2	ACSR	.84	337	.78	270	105	2790	
2	7	4	3	4	ACSR	.84	303	.78	235	105	1830	
1/0	19	5	4	1/0 Strand	All Aluminum	1.07	480	1.00	390	140	1865	1000'R (36")
1/0	19	5	4	1/0	ACSR	1.07	526	1.00	426	140	4280	
1/0	19	5	4	2	ACSR	1.07	472	1.00	382	140	2790	

*All stranded messengers are 7 wire—ACSR is 6 aluminum and 1 steel core. Special ACSR neutral constructions available upon request.

†These sizes, insulated with Neoprene (neoprene), are covered by the accepted list of materials of the R.E.A. Duplex and Quadrex Cable information supplied upon request.

Overhead Triplex Secondary Cable

The use of more and more electrical appliances and equipment is making each residential customer increasingly "service conscious." Therefore, modern distribution systems must stress these features: better performance; neat appearance; lower cost.

A dependable power supply must be maintained by the servicing utility. Utilities must eliminate as many causes of service interruptions as possible. One of the major problems is tree damage to the power lines. In some cases, trimming trees to obtain greater clearance between tree and line or providing wider pin spacing can reduce the danger of tree damage.

But, in densely wooded areas, where tree-trimming is expensive, or in areas where tree-trimming is restricted, the use of high quality polyethylene or neoprene covered wire (such as overhead triplex secondary cable) offers the best protection against this cause of service interruptions.

The use of overhead triplex secondary cable is growing rapidly. While the material costs are somewhat higher than open-wire systems, they are usually more than offset by the reduction in installation time that is required. The neater appearance of triplex secondary systems has received good public acceptance. With this system there is an improvement in voltage regulation as a result of reduced reactance. Flicker voltage problems are minimized and the customer gets a higher average voltage.

Other advantages of overhead triplex secondary cable as compared to conventional open-wire systems are as follows:

1. Flexibility of transformer-secondary layout.
2. Less pole space is required. Normally a 35-foot pole can provide space for a transformer installation and clearance to telephone attachments. Open-wire secondaries require 40-foot poles.
3. Greater resistance to storm damage.
4. Overhead triplex secondary cable will support its services within reaching distance of the poles or in mid-span, thereby leaving the pole free of service attachments. This provides a safer pole for future maintenance work by allowing free climbing and more working area.
5. Long spans can be used because they are independent of services.

Secondary cable may also be installed in the field by using a "spinner." The spinner lashes two, three, or four single wires to an installed messenger. The messenger is first strung from the poles by means of an open saddle-type suspension clamp. The phase conductors are then pulled in and as the spinner or lashing machine is pulled along the messenger, the drum containing the lashing wire rotates around the entire assembly, binding the insulated conductors tightly to the messenger.

The most difficult problem of the overhead triplex secondary cable program has been mid-span tapping. However, newly developed clamps and connectors are now available to provide a solution to this problem. The following examples of tapping devices are offered for your information.

R. M. Gregan, Long Island Lighting Co., "Development and Experience with Aerial Triplex Cable Secondary," (Chicago, Ill., April 1956)

A. A. Hill, Jr., Baltimore Gas & Electric Co., "Distribution Costs Lowered with Triplex Secondary Use," (Electrical South, Nov. 1954)

F. T. Nessle, Long Island Lighting Co., "New Design for Secondary System," (Electrical World, July 1955)

Sam J. Pearson, Portland General Electric Co., "Cabled Aluminum Secondaries," (Electric Light & Power, March 1953)

T. A. Phillips, Arizona Public Service Co., "Make Economical Distribution," (Electric Light & Power, Nov. 1953)

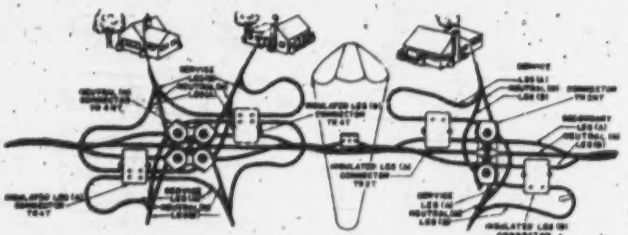
E. S. Stroud, Delaware Power & Light Co., "Aerial Cable Solves Feeder Problem," (Electrical World, July 1954)

Charlie H. Wyatt, Oklahoma Gas & Electric Co., "The Use of Aerial Cable for Secondary," (Kansas City, Mo. April 1956)

TRIPL-X-TAP 3-unit Connector

Two insulated connectors plus a neutral connector comprise the compact, low cost TRIPL-X-TAP "package." This type of connection assures positive electrical joints and, through use of supporting neutrals, guarantees mechanical permanence.

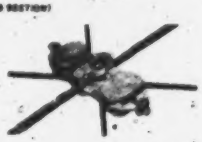
(Diagrams and photo courtesy of Dessert Mfg. Corp., Brooklyn, New York)



SPANTAP INSTALLATION

Triplex secondary cable can be tapped—midspan or near the pole—economically, dependably, and neatly with connectors especially engineered for this purpose. One set of SPANTAPS—two phase units and one neutral—connects up to four Triplex services to a cabled secondary.

(Photo and diagram courtesy of Burndy Corporation, Norwalk, Connecticut)



[fol. 6518]

3354

GENERAL INFORMATION

on Rome Neutral-supported Secondary Cable

Triplex secondary cable consists of two insulated (neoprene or polyethylene) conductors spiraled around a suitable neutral-messenger. Conventional power conductor sizes are No. 1/0 to No. 4/0 AWG aluminum, while the high-strength neutral-messenger may be either stranded hard-drawn copper, Copperweld, hard-drawn aluminum, or ACSR.

The factory-assembled Triplex construction offers certain advantages for secondary use.

Elimination of cross-arms, joint pole use, reduction of hardware, ease of installation, greatly improved appearance, decreased storm vulnerability and substantially lower reactance or improved regulation, are only a few of the advantages to be realized by using secondary cable instead of open-wire construction.

Aluminum Conductors—Copperweld Neutral

Power Condr. AWG	Strand	Insulation Thickness 64ths		*Messenger		Neoprene Insulation		Rolene Insulation		Current Carrying Capacity (See Pg. 7)	Breaking Strength Pounds	Standard Put-up (Triplex)
		Neoprene	Rolene	Size	Type	O.D. Inch	Weight lbs/M'	O.D. Inch	Weight lbs/M'			
2	7	4	3	4 A	Copperweld	.84	408	.78	342	105	3938	1000'R
2	7	4	3	6 C	Copperweld	.84	343	.78	277	105	2143	(30" x 18" NR)
1/0	19	5	4	2 F	Copperweld	1.07	603	1.00	510	140	4233	1000'R
1/0	19	5	4	4 A	Copperweld	1.07	542	1.00	449	140	3938	(36" x 22" NR)
2/0	19	5	4	1 F	Copperweld	1.16	736	1.10	631	165	5266	1500'R
2/0	19	5	4	3 A	Copperweld	1.16	659	1.10	554	165	4810	(42" x 26½" NR)
3/0	19	5	4	1/0 F	Copperweld	1.26	884	1.20	776	190	6536	1000'R
3/0	19	5	4	2 F	Copperweld	1.26	753	1.20	645	190	4233	(42" x 26½" NR)
4/0	19	5	4	2/0 F	Copperweld	1.38	1087	1.32	966	220	8094	1000'R
4/0	19	5	4	1 F	Copperweld	1.38	921	1.32	801	220	5266	(42" x 26½" NR)

Aluminum Conductors—ACSR Neutral

Power Condr. AWG	Strand	Insulation Thickness 64ths		*Messenger		Neoprene Insulation		Rolene Insulation		Current Carrying Capacity (See Pg. 7)	Breaking Strength Pounds	Standard Put-up (Triplex)
		Neoprene	Rolene	Size	Type	O.D. Inch	Weight lbs/M'	O.D. Inch	Weight lbs/M'			
†2	7	4	3	2	ACSR	.84	337	.78	270	105	2790	1000'R
2	7	4	3	4	ACSR	.84	303	.78	235	105	1830	(30" x 18" NR)
1/0	19	5	4	1/0	ACSR	1.07	526	1.00	426	140	4280	1000'R
1/0	19	5	4	2	ACSR	1.07	472	1.00	382	140	2790	(36" x 22" NR)
2/0	19	5	4	2/0	ACSR	1.16	638	1.10	536	165	5345	1500'R
2/0	19	5	4	1	ACSR	1.16	570	1.10	468	165	3480	(42" x 26½" NR)
3/0	19	5	4	3/0	ACSR	1.28	761	1.23	653	190	6675	1000'R
3/0	19	5	4	1/0	ACSR	1.26	675	1.20	568	190	4280	(42" x 26½" NR)
4/0	19	5	4	4/0	ACSR	1.41	931	1.35	810	220	8420	1000'R
4/0	19	5	4	2/0	ACSR	1.38	823	1.32	802	220	5345	(42" x 26½" NR)

*All stranded messengers are 7 wire—ACSR is 6 aluminum and 1 steel core. Special ACSR neutral constructions available upon request.

†These" sizes, insulated with Neoprene (neoprene), are covered by the accepted list of materials of the R.E.A. Duplex and Quadrex Cable information supplied upon request.

Sag and Tension Data—Three Conductor (Neoprene) Neutral-supported Secondary and Service Drop Cable

Cable Size	Brk'ng Str. Pounds	Span Feet	LIGHT LOADING				MEDIUM LOADING				HEAVY LOADING			
			Final Stringing		Final Loaded		Final Stringing		Final Loaded		Final Stringing		Final Loaded	
			Sag In. 60° F	Tension Pounds 60° F	Sag In. 30° F	Tension Pounds 30° F	Sag In. 60° F	Tension Pounds 60° F	Sag In. 15° F	Tension Pounds 15° F	Sag In. 60° F	Tension Pounds 60° F	Sag In. 0° F	Tension Pounds 0° F
Aluminum Conductors—Aluminum Neutral														
6 AWG Power Conductors—6 AWG Aluminum Neutral	525	125	42	85	48	265	66	55	70	260	—	—	—	—
4 AWG Power Conductors—4 AWG Aluminum Neutral	825	125	29	175	36	413	45	110	50	413	80	60	81	413
2 AWG Power Conductors—2 AWG Aluminum Neutral	1266	125	27	270	31	560	33	220	37	633	57	125	60	633
1/0 AWG Power Conductors—1/0 AWG Aluminum Neutral	1865	125	28	395	31	745	30	365	33	870	47	240	48	933
Aluminum Conductors—ACSR Neutral														
4 AWG Power Conductors—4 AWG ACSR Neutral	1830	75	6	345	9	565	7	295	12	636	8	249	16	787
		100	10	352	16	607	12	310	19	705	13	274	24	896
		125	15	369	22	678	17	329	27	774	25	230	38	915
2 AWG Power Conductors—2 AWG ACSR Neutral	2790	75	6	508	8	806	7	438	10	888	8	368	13	1055
		100	10	529	13	863	12	456	16	967	13	406	21	1180
		125	15	541	20	906	17	486	23	1046	18	447	30	1301
1/0 AWG Power Conductors—1/0 AWG ACSR Neutral	4280	100	10	789	12	1245	11	694	15	1352	13	604	18	1622
		125	15	820	18	1305	17	728	28	1451	18	662	26	1770
		150	22	860	26	1370	23	770	45	1540	25	706	35	1910
Aluminum Conductors—Reduced ACSR Neutral														
4 AWG Power Conductors—6 AWG ACSR Neutral	1170	50	6	227	14	354	8	199	16	535	5	160	11	508
		100	14	238	20	450	16	210	23	585	28	118	37	585
		150	29	254	41	522	36	192	49	585	76	100	84	585
2 AWG Power Conductors—4 AWG ACSR Neutral	1830	75	6	360	10	590	9	306	14	651	10	262	17	810
		100	13	368	18	630	14	326	21	728	16	290	26	927
		125	20	375	26	670	21	343	32	791	24	299	37	1010
1/0 AWG Power Conductors—2 AWG ACSR Neutral	2790	100	14	505	16	880	14	496	18	1003	13	413	22	1228
		150	19	575	24	960	29	544	36	1155	26	474	41	1477
		200	43	625	46	1043	48	590	58	1280	43	523	64	1690

Current Carrying Capacities

The current carrying capacities shown in the columns on page 4 and page 6 are in accordance with IPCEA recommendations. These capacities are based upon 75°C maximum continuous conductor temperature and 40°C ambient air temperature.

3356

[fol. 6520]

Sag and Tension Data—Three Conductor (Neoprene) Neutral-supported Secondary and Service Drop Cable

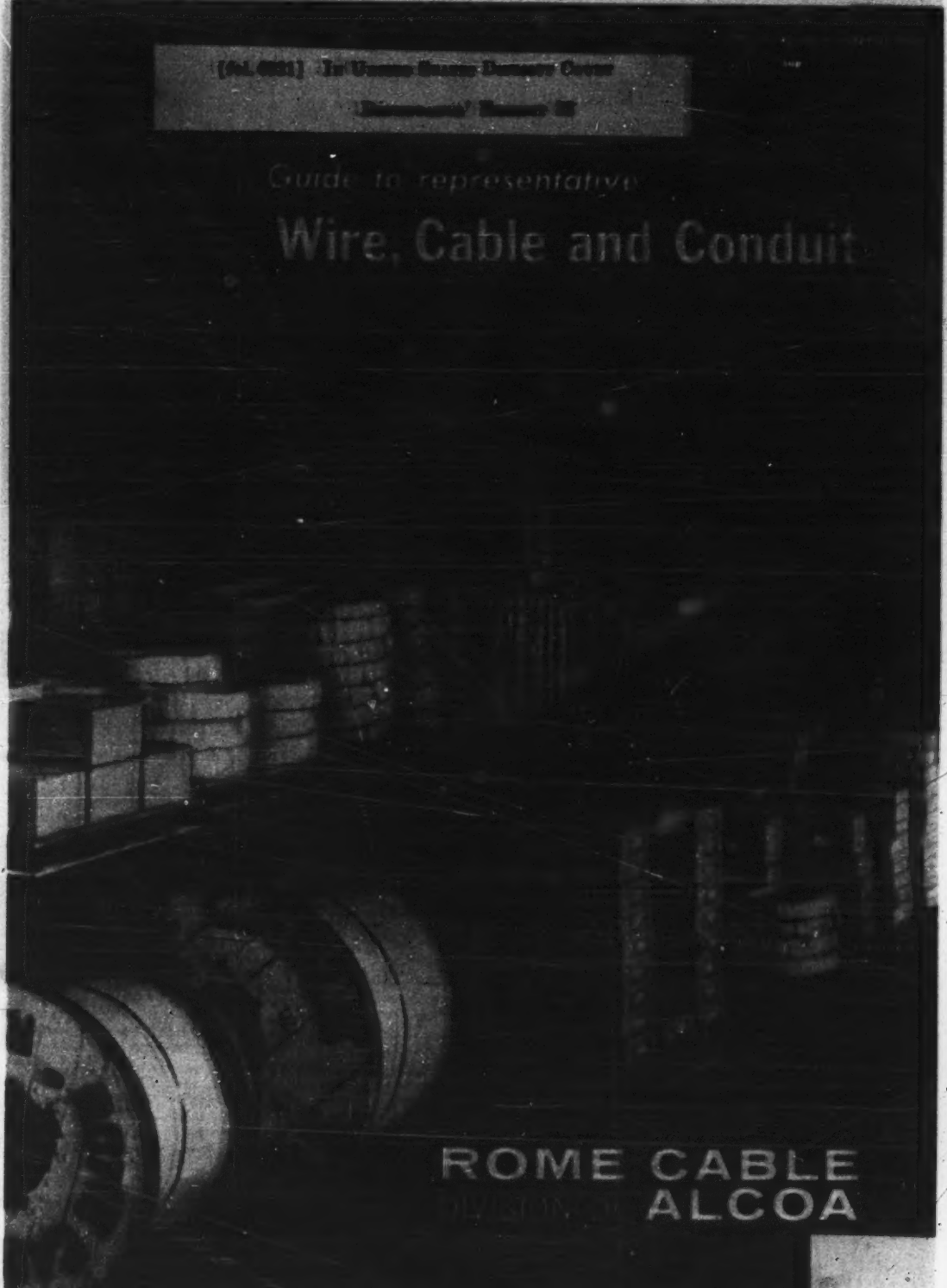
Cable Size	Brk'ng Str. Pounds	Span Feet	LIGHT LOADING				MEDIUM LOADING				HEAVY LOADING			
			Final Stringing		Final Loaded		Final Stringing		Final Loaded		Final Stringing		Final Loaded	
			Sag In. 60° F	Tension Pounds 60° F	Sag In. 30° F	Tension Pounds 30° F	Sag In. 60° F	Tension Pounds 60° F	Sag In. 15° F	Tension Pounds 15° F	Sag In. 60° F	Tension Pounds 60° F	Sag In. 0° F	Tension Pounds 0° F
Aluminum Conductors—Copperweld Neutral														
6 AWG Power Conductors—6C Copperweld Neutral	1362	50	2	409	4	514	2	409	5	570	2	409	7	675
		100	6	409	14	568	6	409	17	666	15	190	29	681
		150	14	409	28	633	19	306	38	681	51	117	85	681
4 AWG Power Conductors—6C Copperweld Neutral	2143	50	2	643	3	796	2	643	4	880	2	643	6	998
		100	6	643	12	848	6	643	14	965	8	495	21	1072
		150	14	643	24	925	14	643	28	1068	30	308	47	1072
4 AWG Power Conductors—8C Copperweld Neutral	1362	50	2	409	5	525	2	409	6	586	2	387	7	681
		100	9	409	17	587	9	404	19	681	20	177	32	681
		150	20	409	32	675	27	290	43	681	61	135	73	681
2 AWG Power Conductors—4A Copperweld Neutral	3938	50	2	1181	3	1310	2	1181	3	1420	2	1181	4	1680
		100	5	1181	7	1469	5	1181	10	1605	5	1181	12	1828
		150	12	1181	18	1510	12	1181	21	1695	12	1111	29	1969
2 AWG Power Conductors—6C Copperweld Neutral	2143	50	2	643	4	800	2	643	4	894	2	643	6	1010
		100	8	643	13	872	8	643	15	990	11	490	23	1072
		150	18	643	26	995	21	559	32	1072	38	308	51	1072
1/0 AWG Power Conductors—2F Copperweld Neutral	4233	100	7	1270	10	1650	7	1270	12	1825	7	1255	14	2117
		150	16	1270	21	1705	16	1270	23	1940	20	1005	32	2117
		200	29	1270	36	1772	29	1270	40	2010	44	825	58	2117
1/0 AWG Power Conductors—4A Copperweld Neutral	3938	100	7	1181	10	1490	7	1181	12	1636	7	1181	16	1895
		150	12	1181	22	1570	12	1181	22	1760	18	1000	34	1969
		200	28	1181	38	1630	28	1181	42	1855	41	806	60	1969
2/0 AWG Power Conductors—1F Copperweld Neutral	5366	100	7	1580	9	2018	7	1580	10	2250	7	1580	13	2570
		150	16	1580	20	2075	16	1580	25	2350	18	1405	28	2633
		200	28	1580	34	2134	28	1580	37	2460	37	1200	51	2633
2/0 AWG Power Conductors—3A Copperweld Neutral	4810	100	7	1443	10	1810	7	1443	11	1955	7	1443	14	2280
		150	16	1443	21	1880	16	1443	23	2080	17	1345	30	2405
		200	28	1443	36	1925	28	1443	39	2160	34	1175	53	2405

ROME CABLE
CORPORATION

[illegible]

Guide to representative

Wire, Cable and Conduit



ROME CABLE
ALCOA

[fol. 6532]

Bare and Weatherproof Wire

Bare copper wire, aluminum, or ACSR in all tempers—sizes up to 1500 MCM.

Weatherproof wire—Roprene (neoprene), Rolene (polyethylene), or URC types. Conductors may be copper, aluminum, or ACSR. Roprene and URC types are also available in handy 500-foot coils packed in individual cartons—sizes 14 through 4 AWG soft copper.

Magnet Wire

Round, square, and rectangular with insulations of cotton, paper, glass, dacron and glass, silicone-treated glass and high-temperature enamel.

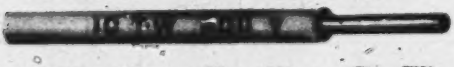
Building Wire

Rubber and Braided or Neoprene Jacketed — 600 volts, Type RHW, for wet or dry installations—75 C.

Rubber and Braided or Neoprene Jacketed — 600 volts, Type RHH for dry installations—90 C.

Thermoplastic Insulated — 600 volts, Type THW, for wet or dry installations—75 C.

All types are available with solid or stranded, copper or aluminum conductors, in the complete range of standard sizes.



Thermoplastic Building Wire—600 volts. Type TW. Rome Synthinol, a polyvinyl chloride thermoplastic used on building wire, is approved by U/L for use in wet or dry locations at 60 C. It is highly resistant to heat, sunlight, oils, acids, alkalies, moisture, and flame.

Synthinol 901 is a special PVC compound developed specifically for wiring in Chemical Plants, Oil Refineries, Paper Mills, and other industrial "hot spots" where additional resistance to heat, oil, and chemical hazards is needed.

- U/L approved as Type TW for 60 C under the National Electrical Code
- U/L approved as appliance lead wire for 600 volts at 105 C on sizes 28 through 8 AWG and at 90 C on sizes 6 through 4/0 AWG.
- Conforms to standards of the National Machine Tool Builders Association for machine tool wire.

Nonmetallic Sheathed Cable — 600 volts. Rome Rolen—Type NM. Two and three conductors, with or without ground, insulated with a high-quality Synthinol thermoplastic compound, covered with an over-all braid and an improved nonflaking finish. Sizes 14 through 4 AWG. U/L approved.

Multipurpose Nonmetallic Sheathed Cable — 600 volts. Rome FlexAll—Types UF and NMC. Approved by Underwriters as underground feeder and branch circuit cable, and nonmetallic sheathed cable — corrosive-resistant. Rome FlexAll is particularly recommended for between-building wiring in farm, industrial, and residential yard lighting and interior wiring of livestock buildings, dairies, breweries, packing houses, cold storage, and ice plants.

Rome FlexAll, single conductor, comes in sizes 14 through 4/0 AWG. Two- and three-conductor FlexAll is made in sizes 14 through 10 AWG and is available with or without ground wire.

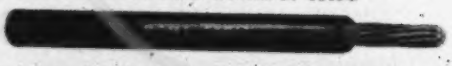
Service Cables

Service Entrance Cable—600 volts. Type SE, Style U. Rome Type SE, Style U, Service Entrance Cables are designed for long life and neat appearance. Specifically recognized by the NEC for attachment to the side of the building from the weather-head to the meter equipment, Rome Type SE cable may also be used from the pole to the meter as well as from the meter to the electric range, clothes dryer, and water heater. U/L approved for 75 C in wet or dry locations, with aluminum or copper conductors.

Self-Supporting Service Drop and Secondary Cable. Embodies the time-proven construction of insulated power conductors spiraled around a bare neutral for mechanical support. Power conductors are Roprene (neoprene) or Rolene (polyethylene) insulated. Power conductors and neutral messengers may be copper, aluminum, or ACSR. Copperweld neutrals are also available. Rome Cable manufactures a special self-supporting cable for overhead distribution where tree conditions are a problem.

[fol. 6523]

Machine Tool and Control Wire



A wire insulated with Rome Synthinol, designed for the wiring of automatic machine tools and control circuits. This product has superior characteristics of long life, high resistance to heat, oils, chemicals, and solvents and uniformly small diameters for more room in tight places. Available in sizes 18 AWG through 4/0 AWG with thermoplastic insulation of clear permanent colors. Rome Synthinol Machine Tool Wire is U/L approved for use at 80 C where exposed to oil; and 90 C on switchboards and in appliances where exposed to air. Conforms to National Machine Tool Builders Association Standards. Voltage rating, 600 volts.

Hook-up Wires

Rome Cable manufactures a broad line of hook-up and appliance wires with both rubber and thermoplastic insulations in a wide range of sizes for commercial and military uses. Outer coverings are available in the form of a transparent nylon sheath or treated braids of cotton, rayon, nylon, or glass.

Power Cables

For aerial, duct, raceway, or direct-in-earth installation.

Romarine-Roprene. This combination of conductor, heat- and moisture-resistant rubber insulation, and neoprene sheath is a multipurpose power distribution and service entrance cable—generally recommended for 600-volt service. Romarine-Roprene may be installed aerially, on open racks, in ducts, or by direct earth burial. U/L approved as Type USE.

Ozone-resistant Cables for High Voltage. Rozone (oil-base) and Rozone A (butyl-base) are both recommended for high-voltage applications where stability of electrical characteristics and exceptionally long life are factors. Manufactured for service up to 15 KV, these cables combine superior ozone resistance with the ruggedness of Roseal—a special flame-retarding polyethylene—or a Roprene sheath. Other sheathing materials are also available. Power cables are manufactured in a full range of sizes as single-, two-, or three-conductor, shielded or unshielded in accordance with industry or customer standards.

Mine Power and Industrial Feeder Cable 0-5000 volts. Type MPT. Rome Type MPT Mine Power and Industrial Feeder Cable is a new economical and easy-to-handle, nonmetallic sheathed power cable with included ground wires for mine feeder and industrial service. Insulated with polyethylene and sheathed with Roseal (flameproof polyethylene), it is less expensive, lighter in weight, and smaller in diameter than conventional rubber and neoprene types which are also available.

Interlocked Armor Cable. Rome Interlocked Armor Cable is available in sizes No. 8 AWG to 750 MCM with copper or aluminum conductors in voltage ratings up to 15 KV. The Armor may be aluminum, bronze, or galvanized steel—insulation may be Rozone (oil-base), Rozone A (butyl-base), Romarine (RH-RW), Synthinol, or polyethylene.

Preassembled Aerial Cable. Individually insulated power conductors are cabled together and bound to a bare Copperweld messenger. Rome's standard design for this product utilizes a reverse lay. As the name suggests, the lay of the power conductors is reversed at regular short distances — approximately every five feet. This reversed lay provides built-in slack to facilitate easy mid-span tapping—even when the circuit is "hot."

The installation of this type cable relieves wire congestion on poles, eliminates or greatly reduces tree trimming, and provides continued service during storm hazards.

Portable Cords and Cables

Portable Cords. Rome Cable offers two grades of portable cords. Rome 50 Types SO and SJO cords are synthetic-rubber-insulated and Roprene (neoprene) sheathed for regular service, while premium Rome 60 cord is mold-cured for extra tough service in hazardous locations. Both Rome 50 and Rome 60 cords are U/L approved.

Rome 60 Portable Power Cables. Round Types W and G. Round multiple-conductor Type W cables are

made up with the specified number of flexible, color coded insulated conductors, assembled and protected over all by a reinforced sheath of neoprene.

Type G cables are similar in construction to Type W cables except that grounding conductors are placed in the interstices of the cable assembly. These cables are designed for use as trailing cables where extra flexibility is required. Each length carries the symbol P 105 BM, denoting compliance with Federal and Pennsylvania Bureau of Mines Safety Codes.

Rome 60 Parallel Duplex Mining Machine Cable. Rome 60 BA twin mining machine cable consists of two heat resistant synthetic rubber insulated and braid reinforced conductors laid parallel, spaced by a "web," and sheathed with a rugged neoprene jacket. Flat twin Type W cable without grounding conductor is used on track mounted equipment in ungrounded systems. Flat twin Type G cable with grounding conductor is used for portable and rubber tired equipment where grounding is required. Type G cable is similar in construction to Type W cable except that a braid-covered flexible grounding conductor is located between the two insulated power conductors. These cables are relatively small in diameter, flexible, easy to handle, and offer maximum resistance to physical abuse. The molded neoprene, P 105 BM, denotes compliance with Federal and Pennsylvania Safety Codes.

Street Lighting Cables

Rome Cable offers a variety of street lighting cables for underground or overhead wiring of series and multiple lighting systems. Insulations may be of rubber or thermoplastic compounds protected with economical nonmetallic jackets, shielding, or lead sheath as required.

Pole and Bracket Cable—600 to 10000 volts, Open Circuit. An improved construction, offering small diameter and low cost. Smoothly clean, neat, easy to use. Unaffected by moisture, ozone, and weather. Insulated with Rome Synthanol (polyvinyl chloride) with an over all sheath of Rolene (polyethylene). Recommended for the interior wiring of ornamental poles, cutout wiring of pole top bracket fixtures.

U. S. DIST. COURT
N. D. N. Y.

Ex. No.
Sent ☐ PH ☐ Def ☐

Instrumentation, Station Control, Supervisory and Signal Cables

Instrumentation cables are specially designed and built in a variety of constructions for telemetering and data transmission.

Station Control Cables 600 volts. Rome Cable is a leader in the manufacture of station control and supervisory control cables. Sound engineering, expensive and modern manufacturing facilities enable Rome Cable to produce a variety of constructions. Some typical constructions utilize (1) Rolene insulation with Rolene sheath (Type CRO-1), (2) Romarine insulation with Rolene sheath, (Type CRM-1) and (3) all thermoplastic construction (Type CT-2) (Type CT-B) (Type CT-C).

Signal Cables — IMSA Types, 600 volts. Rome Cable regularly supplies cables in conformance with IMSA Specifications No. 1, 3, 4, 5, 19, and 20. The popular Type 19, Specification No. 5 embodies moisture resistant insulation, (Romarine) and a non metallic sheath (Rolene).

Conduit

Rome EMT Electrical Metallic Tubing. A superior thin wall steel conduit. Solid electrogalvanized zinc exterior finish resists corrosion and abrasion. Mirror smooth interior makes fishing and pulling easy. Underwriters approved.

Alsus Aluminum Conduit offers many advantages such as light weight, low cost, good appearance, corrosion resistance, non sparking, non magnetic, easy installation and is Underwriters approved.

[fol. 6541] [SALES DEPT. COPY]

3377 (2)

Engineering Department
Recommendations for Quoting

Number 300
Inquiry No. (Cont.)
Date 11/26/58.

Customer
Ultimate User
Spec. or Correspondence References

RECOMMENDED CONSTRUCTION DETAILS

ITEM 3 — 15000 FT — 2/C - # 2/0 AWG - Copper - Pressurized Marine Power Cable - STK Code. 03-1712

2/C - # 2/0 AWG - 37/STR - Tinned - Copper
.62" / 2 / 1.248 — 4/64" Polyethylene Insulation (2361)
.348 — 2/64" Neoprene Sheath (6065) - Ridge Ident.
.080 — O.D. .624
1.676

Assembly - 2/C - # 2/0 AWG Twisted with neoprene lay filler bound to w 4D - EHS - 30% Cond. Copper weld Messenger with nn .040 x .375 soft copper binder strip.
1.248 / .030 / 1.348

O.D. 1.33" x 1.68"

P.U. 1000 FT (±100 FT) on 54" Reel.

ITEM — 15000 FT — 2/C - # 4/0 AWG - Aluminum - Pressurized Marine Power Cable - STK. Code - 03-1733.

.549 / 1.56 / .094 — 2/C ea # 4/0 AWG - 37/STR - ECH 26 Alloy (¾ Hd)
.779 — 5/64 Polyethylene Insulation (2361)
.009 / .010 — 3/64" Neoprene Sheath (6065) Ridge Ident.
.797 — O.D. .797
2
1.594 / .090 / 1.674 — 2/C - # 4/0 AWG Twisted with neoprene lay filler bound to w 4D - EHS - 30% Cond. Copper weld Messenger with nn .040" x .375" soft copper binder strip
1.694 / .348 / 2.042

O.D. 1.67" x 2.02"

P.U. 1000 FT (±100 FT) on 60" Reel.

Prepared by: J. J. Beaudoin

[fol. 6542] 3378 ROME CABLE CORPORATION
TWX MESSAGE
ROME, N. Y. 8078

To Buck

phone 12/4

Date 12/4

Refer Public Service Elec + Gas NV-665-C - revise price item 3 to $850.00 M/ft - if unable to revise pull your quotation

[fol. 6543]

3379

December 1, 1958

Public Service Elec. & Gas Company
80 Park Place
Newark 1, New Jersey

Attention: Mr. J. J. Coleman, Buyer

Gentlemen:

In response to your form letter inquiry dated November 24th covering Cable, Self-Supporting Secondary, we are pleased to quote as follows:

Specification No. 84-1 - Copper
Specification No. 85-1 - Aluminum

Stock Code		Description	Quantity - Feet	Price H' Net
03-1808 or 03-1739	#1	3/cond. - Copper	30,000	$1080.00
	#2/0	3/cond. - Aluminum		$1204.00
03-1712 or 03-1733	#2/0	2/cond. - Copper	15,000	$ 502.00
	#4/0	2/cond. - Aluminum		$ 792.00

Delivery: F.O.B. Destination
Terms: ½ of 1% 10 days, not 30
Shipment: Approx. 7 weeks lead time required.

The terms and conditions appearing on the reverse side are to be considered a part of this quotation. Prices stated herein shall be subject to adjustment to the Company's prices in effect on date of shipment. However, such prices shall not exceed any lawful ceiling prices established and in effect at the time of shipment.

Very truly yours,

ROME CABLE CORPORATION

WSW:DSB

W. S. Williams

[fol. 6544] 3380

December 5, 1958

Public Service Elec. & Gas Company
80 Park Place
Newark 1, New Jersey

Attention: Mr. J. J. Coleman, Buyer

Gentlemen:

In connection with our quotation letter dated December 1st, we wish to confirm our conversation of December 4th in which we asked that you kindly revise figure on Item 3 as follows:

Stock Code	Description		
		Revise From:	$502.00/M'
03-1712	#2/0-2/cond. - Copper	To:	$850.00/M'

All other terms and conditions to remain as originally quoted.

We thank you for permitting us to make this revision and remain,

Very truly yours,

ROME CABLE CORPORATION

W. S. Williams

WSW:DSB

[fol. 6545] IN UNITED STATES DISTRICT COURT

3381

DEFENDANTS' EXHIBIT 38

Request for Quotation

I. C. C. D. FILE (Continued)

INQUIRY NO. NY-639-C

FROM: NEW YORK DISTRICT DATE: 11/3/38

TO: CENTRAL QUOTATION DEPT., ROME, N.Y.

INQUIRY FROM: PUBLIC SERVICE ELEC. & GAS CO.

FOR SHIPMENT TO:

— THE FOLLOWING MATERIAL —

U. S. Dist. Court
So. Dist. N. Y.
Ex. No. AR 3691
Staff ☐ Pltf ☐ Def ☐

"We shall be pleased to receive your quotation not later than Nov. 12, 1938 for furnishing on a commitment basis the following 4KV self-supporting cable, to be manufactured to either our Spec. No. 14-2, Aluminum or Spec. No. 22-4, copper:

Stock Code		Quantity-Feet	Price M ft.
03-1524	#4 3/cond. copper	30,000	$1210.00
03-1549 or similar to 03-1524	#2/0 3/cond. Alum.	10,000	$1488.00
	#1 3/cond. copper	10,000	$1665.00
03-1528 or 03-1550	#2/0 3/cond. copper	10,000	$2260.00
	#4/0 3/cond. aluminum	10,000	$1986.00
03-1530 or 03-1560	#4/0 3/cond. copper	10,000	$3010.00
	397,500cm 3/cond. alum.	10,000	$3755.00
03-1533 or 03-1565	350MCM 3/cond. copper	40,000	$4290.00
	600MCM 3/cond. alum.	40,000	$4280.00
03-1534 or 03-1538	500MCM 3/cond. copper	5,000	$5710.00
	800MCM 3/cond. alum.	5,000	$5110.00

Delivery to New Jersey points in Public Service territory.
Please quote estimated lead time in weeks."

W.S.WILLIAMS:DSB

TERMS: (Standard discount dates apply) Distributor Comm. if any
☒ ½ of 1% ☐ 2% Other_____ ☐ Net ☐ 5% Other_____ ☐ Competitive Report Requested
Shipment if other than mill condition sheet 7 weeks
F. O. B. Destination unless otherwise noted.

gab:mab G.A. Brodock

District Office Note That All Inquiries Must Contain All Necessary Data Including the Following Details Wherever They Are Applicable:

1. Size and Stranding.
2. Temper.
3. Number of Conductors.
4. Voltage, if other than 600.
5. Type of Insulation.
6. Type of Sheath, Jacket, or Covering.
7. Finish.
8. Lengths and/or Put-up Required.
9. Any Special Specification, Requirement or Application.
10. Delivery Desired.

3382

[fol. 6546]

1 o'clock - Wed.

"1/15.

Sir -

In reply refer to file EBK-253
U.S. Treas. - 618-C

The two items on the EBR-253 in lieu of items 2 and 3 on the EBR-218

Can you give us this information on the ready and your earliest -

Paul

[fol. 6548] **3384** [SALES DEPT. COPY]

Engineering Department
Recommendations for Quoting

Number 276
Inquiry No. NY - 639-C
Date 11/7/58

Customer Public Service Elec. & Gas Co. - New Jersey -

Ultimate User -

Spec. or Correspondence Reference Spec. 14-2 & Alum (ex) 22-4 Copper. (See EDR-253 (NY-613-C) dtd 10/21/58 for complete write up outline, same as items 2 and 3 below.

RECOMMENDED CONSTRUCTION DETAILS

ITEM 1 General Description - ON items - 5 KV, Aerial Cable.

3/c - Tinned Copperstrand (ex) ECHR 6 Alum (34%), S.C. Tape, Butyl Ins. (60 mils) Neoprene Sheathed (9055), Ridge identifying Marker Tape under S.C. Tape, assembled with Reverse Lay, bound To a copper weld wire service with 30T copper binder strip. -

ITEM NO	Stock Code	Quantity	No Conds	Size AWG	Strand & Type	Ins Thk	Shld Thk	Twists per ft	Size Messg.	O.D. Nom.	P.U.
1	03-1527	30.000'	3	#4	19/Str. Cop.	110/64	5/64		4 II	2.07"	1000'-60"R.
2	03-1549	10.000'	3	#2/0	37/Str. Alum	110/64	6/64		4 II	2.41"	1000'-72"R
3	03-1534	10.000'	3	#1	37/Str. Cop.	110/64	6/64		4 II	2.22"	1000'-72"R
4	03-1528	10.000	3	#2/0	37/Str. Cop.	110/64	5/64		7/16 @	2.50"	1000'-78"R.
5	03-1550	10.000'	3	#4/0	37/Str. Alum	110/64	6/64		7/16 @	2.80"	900'-78"R
6	03-1530	10.000	3	#4/0	37/Str. Cop.	110/64	6/64		7/16 @	2.80"	900'-78"R
7	03-1560	10.000'	3	397.5 MCM	61/Str. Alum	111/64	6/64		7/16 @@	3.30"	750'-78"R
8	03-1533	40.000	3	350 MCM	61/Str. Cop.	111/64	6/64		7/16 @@	3.21"	750'-78"R
9	03-1565	40.000'	3	600 MCM	91/Str. Alum	111/64	6/64		7/16 @@	3.67"	600'-78"R
10	03-1539	5.000'	3	500 MCM	61/Str. Cop.	111/64	6/64		7/16 @@	3.50"	700'-78"R
11	03-1535	5.000'	3	800 MCM	91/Str. Alum	111/64	6/64		7/16 @@	3.97"	500'-78"R

@ 7/Strand, 30% High Strength Copperweld
@@ 7/Strand, 30% Extra High Strength Copperweld

NOTE: Messenger To extend five (5) feet beyond The end of The conductor for use in pulling The cable. -

Prepared by: G. H. Beaham

[fol. 6549]

2 R CG 11/7/58 PM G

3385

STEW.

REF STEINER 3/ C 2 SH- D 5 KV 49 STRD 8424.00 133 STRD 8550.00 - ROME 60 LIST OUR WEIGHTS ARE NET , SIMPLEX GROSS

BRODOCK

EEEEDDEEDEEEDDEEEDEEEDEEE GA WITH ROME 7 XXX 8078

Ref. Steiner 3/c 2 SH D 5KV 49 std 1424 ft 133 std 8550 ft - Rome 60 list: Our weights are net, Simplex Gross.

6 CGR 11-6-58 PM LW

BRODOCK

WANT PRICE FOR STEINER ON 1500 FT 2 3 CONDR 5 KV TYPE SHD ALSO 1500 FT 4 3 CONDR DITTO CONFIRM WEIGHTS PER M FT ARE THOSE SHOWN ON PAGE 19 ROME CATALOGUE NET WEIGHTS THEY DO NOT AGREE WITH SIMPLEX PLS TWX FRI SURE

STEW

[fol. 6550] 3386

November 11, 1958

Public Service Elec. & Gas Company
80 Park Place
Newark 1, New Jersey

Cable: Self-Supporting 4KV

Attention: Mr. J. J. Coleman, Buyer

Gentlemen:

In response to your form letter inquiry dated November 3rd, we are pleased to quote as follows:

To be manufactured to either Spec. 14-2, Aluminum or Spec. 22-4, Copper

Stock Code	Description	Quantity - Feet	Price M' Net
03-1524	#4 - 3/cond. copper	30,000	$1210.00
03-1549 OR 03-1524	#2/0 3/cond. aluminum	10,000	$1468.00
	#1 3/cond. copper	10,000	$1865.00
03-1528 OR 03-1550	#2/0 3/cond. copper	10,000	$2260.00
	#4/0 3/cond. aluminum	10,000	$1986.00
03-1530 OR 03-1560	#4/0 3/cond. copper	10,000	$3010.00
	397,500cm 3/cond. aluminum	10,000	$3735.00
03-1533 OR 03-1565	350MCM 3/cond. copper	40,000	$4290.00
	600MCM 3/cond. aluminum	40,000	$4280.00
03-1534 OR 03-1538	500MCM 3/cond. copper	5,000	$5710.00
	800MCM 3/cond. aluminum	5,000	$5110.00

Delivery: F.O.B. Destination
Terms: ½ of 1% 10 days, net 30
Shipment: Approx. 7 weeks after receipt of order at our plant.

The terms and conditions appearing on the reverse side are to be considered a part of this quotation.

[fol. 6551]

To: Public Service Elec. & Gas Company

November 11, 1958

Prices stated herein shall be subject to adjustment to the Company's prices in effect on date of shipment. However, such prices shall not exceed any lawful ceiling prices established and in effect at the time of shipment.

Very truly yours,

ROME CABLE CORPORATION

D

W. S. Williams

WSW:DSD

[fol. 6552] IN UNITED STATES DISTRICT COURT

3388

DEFENDANTS' EXHIBIT 39

2. C. O. D. FILE (Customer)

Request for Quotation

INQUIRY NO. NY-362-C

FROM: NEW YORK DISTRICT DATE: 1/27/58

TO: CENTRAL QUOTATION DEPT., ROME, N. Y.

INQUIRY FROM: CON EDISON

FOR SHIPMENT TO:

— THE FOLLOWING MATERIAL —

Inv. to Bid C-197 - 1/24/58
Bid due: 2/3/58

$285.00

65,000 ft. 3 x 4/0 AWG copper or rubber $2693.00 M ft. 5KV Self-Supporting Aerial Cable #573-2

65,000 ft. 3 x 300MCM aluminum or rubber neoprene 5KV Self-Supporting Aerial Cable #253A-2

$2510.00 M ft.

On 1000 ft. rls. State flange diameter and max. outside width of reels you would furnish

State max. lgths. you can furnish on reels that do not exceed the following dimensions. What are the dimensions of the reels you would use.

1. Flange Dia. 96" Max. Outside Width 50"
2. " " 84" " " " 48"
3. " " 72" " " " 65"

The cable is to furnished per our Spec. No. EO-11-1 App. "C" dated 10/14/57 except insulated condrs. shall be cabled together with reverse lay.

State price of copper and aluminum and pulling eye.

Delivery required 2Q58.

E.T.BUCKENMAIER:DSD

TERMS: (Standard discount dates apply) ☐ ½ of 1% ☐ 2% Other

Distributor Comm. if any ☐ Net ☐ 5% Other

☐ Competitive Report Requested

Shipment if other than mill condition sheet

F.O.B. Destination unless otherwise noted.

District Office Note That All Inquiries Must Contain All Necessary Data Including the Following Details Wherever They Are Applicable:

1. Size and Stranding.
2. Temper.
3. Number of Conductors.
4. Voltage, if other than 600.
5. Type of Insulation.
6. Type of Sheath, Jacket, or Covering.
7. Finish.
8. Lengths and/or Put-up Required.
9. Any Special Specification, Requirement or Application.
10. Delivery Desired.

3389

[fol. 6553]

2, C. O. D. FILE (Customer)

Request for Quotation

INQUIRY NO. KY-362-C

FROM: New York Office DISTRICT DATE: Feb. 10, 1958

TO: CENTRAL QUOTATION DEPT., ROME, N. Y.

INQUIRY FROM: Consolidated Edison Co.

FOR SHIPMENT TO:

THE FOLLOWING MATERIAL —

-2-

In accordance with our various phone conversations, we advised you that if you could in any way revise the price on the aluminum from $2510.00 M ft. to $2300.00 in the hopes of getting a portion of this business, please do so. You advised that competitive price on this item was around $2000.00. We can not as yet live with this price in view of our costs, but in an effort to get some of this type business from this account we would be willing to take some of it around $2300.00.

If you can find out who is quoting the $2000 price please pass it along to us.

gab:mab

G.A. Brodock

Brock said that he believes the 2000 figure was for 4/0 - 2/0 ... was in the running

TERMS: (Standard discount dates apply) ☐ ½ of 1% ☐ 2% Other_____

Distributor Comm. if any ☐ Net ☐ 5% Other_____ ☐ Competitive Report Requested

Shipment if other than mill condition shee?_____

F.O.B. Destination unless otherwise noted.

District Office Note That All Inquiries Must Contain All Necessary Data Including the Following Details Wherever They Are Applicable:

1. Size and Stranding.
2. Temper.
3. Number of Conductors.
4. Voltage, if other than 600.
5. Type of Insulation.
6. Type of Sheath, Jacket, or Covering.
7. Finish.
8. Lengths and/or Put-up Required.
9. Any Special Specification, Requirement or Application.
10. Delivery Desired.

[fol. 6554] 3390

2 R NY 2/5/58 AM GG

BUCK

REF CON EDISON NY 362 C SORRY CANNOT BETTER PRICES ON EXX AERIAL CABLE

BRODOCK

[fol. 6555] **3391** (SALES DEPT. COPY) ①

Engineering Department
Recommendations for Quoting

Number 8296
Inquiry No. NY-362-C
Date January 30, 1964

Customer Consolidated Edison
Ultimate User
Spec. or Correspondence References EO-11 Aug. C"

RECOMMENDED CONSTRUCTION DETAILS

ITEM 1 65,000' 3/c #4/0 Rubene Reprene 5 KV reverse lay conical cable
Part No CC679-2 3/c Each

#4/0 37/Str Tin Copper
2 Semi-con thermo intercalated
10/64 Rubene A
6/1/64 Reprene 1/c no mil. 1/c-2, 3 1/c-3
Tape - Cover level

Assembly
Cable together with reverse lay and Bind to 7/16" Messenger with .040 x .375" Binder tape
Final Tape - Common level
Put up 1000' on 78" x 48" reel
Note: Our 72" reel is the only one which meets our limits
Pulling Eye to be attached

Item 2 65,000' 3/c 300 mcm Rubene Reprene 15 KV reverse lay conical Cable
Part No EO-288A-2 3/c Each

300 mcm. 61/Str Aluminum
2 semi Con types interwith bed
11/64 Rubene A
6/64 Reprene voltage identification
Tape - Common level

Assembly
Cable together with reverse lay and Bind to 7/16" 40% Messenger with .040 x .375" Binder tape
Final Tape - Common level
Put up 750' on 78" x 48"
Note: Our 72" reel is the only one which meets our limits
Pulling Eye to be attached

Prepared by: W. R. [illegible]

Truck. —

Labor 24.48

Exp. 59.77

Eng. & T 22.03

Ship 5.51 4.69

B. & a 9.5 10.54

Due —

$121.51 saving

20835.6
121.51
190 x 01

	Lab.	Exp.
V.C.	5.595	13.875
607	18.169	44.150
	23.764	58.025
	103	103
	$24.48	$59.77

19 x 2
4
23 50

[fol. 6525] IN UNITED STATES DISTRICT COURT

Form A-C7 Rev.

DEFENDANTS' EXHIBIT 34

2 C. O. D. File (Customer)

Request for Quotation

INQUIRY NO. BC-1383

FROM: Boston Office DISTRICT DATE: Jan. 5, 1953

TO: CENTRAL QUOTATION DEPT., ROME, N.Y.

INQUIRY FROM: Boston Edison Co., Boston, Mass.

FOR SHIPMENT TO:

— THE FOLLOWING MATERIAL —

With reference to the attached, please quote the following construction and estimating prices:

Item 1 - 2000 ft. - 3 Condrs. #4/0 - 19 strand bare, semi-conducting tape, .220" ntrual polyethylene, bedding and shielding tapes, 6/64" KoSeal sheath; three such conductors twisted with reverse lay and bound to a 1/2" 30% EHS copperweld messenger by means of a .030" x .375" bare soft copper binding strap, putup 1000 ft. on 84" reels.
Recommended maximum span - 175 ft.
Stringing sag @ 60F - 32"
Ampacity - 285 amperes @ 75C copper temperature and 40C ambient.
O.D. 3.319" x 2.833" @ - - - - - -$3918.00 M ft.

Item 1A 2000 ft. - Ditto above except 336,400 C.M. - 19 strand ECH 26 aluminum conductor, putup 700 ft. on 84" reels.
Recommended maximum span - 200 ft.
Stringing sag @ 60F - 34"
Ampacity - 285 amperes @ 75C conductor temperature and 40C ambient.
O.D. 3.663" x 3.177" @ - - - - -$4185.00 M ft.

Item 1B 6000 ft. - Single Condr. #4/0 - 19 strand bare, semi-conducting tape, .220" natural polyethylene, bedding and shielding tapes, 6/64" KoSeal sheath, putup 2500 ft. on 72" reels @ - -$1150.00 M ft.

Item 1C 6000 ft. - S.C. Ditto Item 1B except 336,400 C.M. - 19 strand ECH 26 aluminum conductor, putup 2500 ft. on 72" reels @ - $1235.00 M ft.

F.O.B. Destination
TERMS: ½ of 1%
SHIPMENT: 7-8 weeks

TERMS: (Standard discount dates apply) ☐ ½ of 1% ☐ 2% Other_____
Shipment if other than mill condition sheet_____
F. O. B. Destination unless otherwise noted.

Distributor Comm. if any ☐ Net ☐ 5% Other_____

R.A. Dunn:mab

☐ Competitive Report Requested

District Office Note That All Inquiries Must Contain All Necessary Data Including the Following Details Wherever They Are Applicable:

1. Size and Stranding.
2. Temper.
3. Number of Conductors.
4. Voltage, if other than 600.
5. Type of Insulation.
6. Type of Sheath, Jacket, or Covering.
7. Finish.
8. Lengths and/or Put-up Required.
9. Any Special Specification, Requirement or Application.
10. Delivery Desired.

[fol. 6526]

3362

Request for Quotation

INQUIRY NO. HE 1389

FROM: Boston DISTRICT DATE: December 22, 1958

TO: CENTRAL QUOTATION DEPT., ROME, N.Y.

INQUIRY FROM: Boston Edison Co., Boston, Mass. (Mr. A. Corry) or (Mr. Don Gatson)

FOR SHIPMENT TO:

— THE FOLLOWING MATERIAL —

Please let us have price and delivery - for estimating purposes - on the following:

2,000 ft. 3- Single Condr. #4/0 19 w. copper polyethylene insulation shielded, RoSeal jacket, 15 KV grd. neutral bound to a suitable messenger (advise size) self-supporting cable to be installed on longest spans recommended

Give Sag & recommended Spnn, O.D. and Ampacity

Alternate A
2,000 ft. 3-Single Condr. #336400 Aluminum

Alternate B
6,000 ft. Single Condr. 4/0 copper polyethylene insulation, shielded, RoSeal jacket, 15 KV grd. neutral - for spinning - as an aerial cable

Alternate C
6,000 ft. Single Condr. #336400 CM Aluminum polyethylene insulation shielded, RoSeal jacket, 15 KV grd. neutral for spinning as aerial cable

TERMS: (Standard discount dates apply) ☐ % of 1 % ☐ 2% Other

Distributor Comm. if any ☐ Net ☐ 5% Other ☐ Competitive Report Requested

Shipment if other than mill condition sheet

F. O. B. Destination unless otherwise noted:

District Office Note That All Inquiries Must Contain All Necessary Data Including the Following Details Wherever They Are Applicable:

1. Size and Stranding.
2. Temper.
3. Number of Conductors.
4. Voltage, if other than 600.
5. Type of Insulation.
6. Type of Sheath, Jacket, or Covering.
7. Finish.
8. Lengths and/or Put-up Required.
9. Any Special Specification, Requirement or Application
10. Delivery Desired.

[fol. 6527] [SALES COPY]

Engineering Department
Recommendations for Quoting

Number 549
Inquiry No. UE - 1813
Date 10/20/41

Customer Kerite Electric Co.
Ultimate User
Spec. or Correspondence Reference

RECOMMENDED CONSTRUCTION DETAILS

ITEM 1
2000' 3/c + 4/o AWG Type III Polyethylene Rubber Insulated Aerial Cable, 15 kv

3/c unit: + 4/o AWG
1958 - Bare
L.C. Tape
.220" Nat Polyethylene
Std Shielding and shielding tapes
4/64" Rubber Sheath
Test

3/c twisted, reverse lay, and bound to 1/2" 20% E/S
Copperweld messenger by means of .030 x .375" bare soft copper binding strip.
Aerial Test
Pot-hyp: 1000' on 84"R
Recommended maximum span — 175 feet.
Stringing sag @ 60F — 32"
Ampacity — 285 Amperes @ 75C Copper Temp & 40C Ambient
O.D. — 3.319 x 2.833"

3912.-0

Stem 14
2000' Stranded 37/4/0 CM — 19.54 #26 Aluminum Conductor

Pot-hyp: 7'6" on 84"R
Recommended max span — 200 feet
Stringing sag @ 60F — 34.11
Ampacity — 285 Amperes @ 75C conductor Temp & 40C Ambient
O.D. — 3.663 x 3.177"

4165.-0

Prepared by:

[Fol. 6528] **3364** [SALES DEPT. COPY]

Engineering Department
Recommendations for Quoting

Number _____
Inquiry No. _____
Date _____

Customer _____

Ultimate User _____

Spec. or Correspondence Reference _____

RECOMMENDED CONSTRUCTION DETAILS

ITEM 1B 1000' Single Conductor #4/0 Awg Polyethylene Jacket, 15 lbs per foot spinning.

#4/0 Awg
19#-Bare
H.C. tape
.331" Ret. Polyethylene
Std Bedding & shielding type
4/0 Braid Shield
Final Test
Part-No: 256-1m-3-R

1150.00

.528 .070 .140 .269 1.077 .168 1.245

1511 1150

Item 1C 1000' Single Conductor with item 1B except 32,800-19#-#26 Aluminum Conductor

Part-No: 256-1m-3-R

1.163" 1537 337 1200 1225

1225-

Prepared by: R. Kopchik

[fol. 6329] In United States District Court

Defendants' Exhibit 35

Request for Quotation

INQUIRY NO. NY-663-C

FROM: NEW YORK DISTRICT DATE 12/1/38

TO: CENTRAL QUOTATION DEPT., ROME, N.Y.

INQUIRY FROM: PUBLIC SERVICE ELEC. & GAS CO.

FOR SHIPMENT TO

—THE FOLLOWING MATERIAL—

SALES TO ENGR.
REVIEWED BY
DATE RETURNED

"Please quote prices not later than December 8 for furnishing on a commitment basis the following spacer-type, primary, self-supporting cable, to be manufactured to either of the following specifications:

We are to supply the Copperweld Messenger per D. Dixon 12/9/38

SPECIFICATION NO. 88 - Copper
SPECIFICATION NO. 87 - Aluminum

Stock Code	Size	Required - 1939 Jan.	Feb.	March	Total Feet	
03-1580 or similar to 03-1597	#2/0 3/cond. - aluminum) #1 3/cond. - Copper)	50,000	50,000	50,000	150,000	@ - $902.00 M @ - $974.00 M
03-1590 or 03-1599	397,500 cm 3/cond. Alum.) #4/0 3/cond. - Copper)	25,000	30,000	20,000	65,000	@ - $1690.00 M @ - $1650.00 M

Delivery to New Jersey points in Public Service territory.

Please quote estimated lead time in weeks."

December 8, 1938

F.O B. Destination
TERMS: ½ of 1%
SHIPMENT: 4-5 weeks after receipt of order.

We get 10 M 3/0 - 902 ~ Very Very Low

W.S.WILLIAMS:DSB

You are fully familiar with our spacer as compared to the spacer outlined in their Spec. and I believe we have to point out that our spacer has 3" spacing. This probably has already been done with them.

TERMS: (Standard discount dates apply) Distributor Comm. if any
☐ ½ of 1% ☐ 2% Other_____ ☐ Net ☐ 5% Other_____ ☑ Competitive Report Requested
Shipment if other than mill condition sheet_____
F. O. B. Destination unless otherwise noted.

C.A.Brodock:mab

District Office Note That All Inquiries Must Contain All Necessary Data Including the Following Details Wherever They Are Applicable:

1. Size and Stranding.
2. Temper.
3. Number of Conductors.
4. Voltage, if other than 600.
5. Type of Insulation.
6. Type of Sheath, Jacket, or Covering.
7. Finish.
8. Lengths and/or Put-up Required.
9. Any Special Specification, Requirement or Application.
10. Delivery Desired.

[Fol. 6530] **3366** (SALES DEPT. COPY)

Engineering Department
Recommendations for Quoting

Number 8455 Rev 1
Inquiry No.
Date 12-2-58

Customer Pat Service Elec + Gas

Ultimate User

Spec. or Correspondence Reference Spec #84

RECOMMENDED CONSTRUCTION DETAILS

ITEM 1

HP Capacity	Size + Std.	Rotor Assembly	P.P. Set.	Nom O.D.	Messenger Size + Type	Strength 1000	Standard Wire Rope (Galvanized) Pitch	Messenger Lay	Pitch Diameter
3	1 1/4" AMD Station	5/64"	3/64	.60"	3/8" 6x7 IWRC IPS	35	10	25	105

NOTE This is not listed in Pat Service Spec #86 but this is our recommended construction using #86 as a guide.

Assume same details as on EDR 8455.

Prepared by R. Ward

[fol. 6532]

3368

	PCC	ACW
	974	965
	974	974
	1650	1647
	1690	1704

[fol. 6133]

T1 R NY 12/9/58 PM GG

W S WILLIAMS

REF PUB SERV NY 663- C OUR SPACER HAS 6" SPACING NOT 3" AS I SAY IN QUOTE- ASSUME YOU CAUGHT THIS-

BRODOCK

[fol. 6534]

3370

December 8, 1958

Public Service Electric & Gas Co.
80 Park Place
Newark 1, New Jersey

Attention: Mr. J. J. Coleman, Buyer

Gent'lemen:

In response to your form letter inquiry dated November 23th re. spacer-type, primary, self-supporting cable, we are pleased to quote as follows:

Specification No. 86- Copper
Specification No. 87 - Aluminum

Stock Code	Size	Required - 1959 Jan.	Feb.	March	Total Feet	Net Price F'
03-1533 or similarto	#2/0 3/cond. - Aluminum	50,000	50,000	50,000	150,000	$ 902.00
03-1537	#1 3/cond. - Copper					$ 974.00
03-1530 OR	397,800cm 3/cond. Aluminum	25,000	20,000	20,000	65,000	$1690.00
03-1539	#4/0 3/cond - Copper					$1650.00

Delivery: F.O.B. Destination
Terms: ½ of 1% 10 days, net 30
Shipment: Approx. 4-6 weeks after receipt of order at our plant.

The terms and conditions appearing on the reverse side are to be considered a part of this quotation.

Prices stated herein shall be subject to adjustment to the Company's prices in effect on date of shipment. However, such prices shall not exceed any lawful ceiling prices established and in effect at the time of shipment.

Very truly yours,
ROME CABLE CORPORATION

WSW:DSB

W. S. Williams

[fol. 6535]

[SALES DEPT. COPY]

3371

Engineering Department
Recommendations for Quoting

Number 8455 A
Inquiry No.
Date 11-13-58

Customer Public Service of Elec & Gas
Ultimate User
Spec. or Correspondence References Spec # 86 + 87

RECOMMENDED CONSTRUCTION DETAILS

ITEM 1 JIM: Might be a good idea to have a composite EDR on Public Service Elec + Gas Company Specs + Requirements. Spec # 86 covers Copper + Spec # 87 covers Alum. On both these specs position 6" spacing between conductors + in this item 3-3½" is specified.

* Cost

Spec # 86 - 5KV rated Spacer Cable MHD Copper

No of Units	Size + Stranding	Rozone "A" Insul.	RDR	Nom O.D.	Messenger Size + Type	Spacers per 1000'	Grommets to fit		
							Clevis Pin ⅝"	Messenger	Phase Conds
3	#4 7/.0772 tin	5/64"	3/64"	.50"	⅜" 40% HS Cu	35	10	25	105
3	#2/0 19/.0837 "	5/64	3/64	.69"	⅜" 40% HS Cu	35	10	25	105
3	#4/0 19/.1055 "	5/64	3/64	.80"	7/16" 30% HS Cu	35	10	25	105
3	336MCM 37/.0772 "	5/64	3/64	.95"	7/16" 30% EHS Cu	35	10	25	105
Spec # 87 Alum		5KV rated Spacer Cable HD Alum							
3	#2 7/.0974	5/64	3/64	.56"	⅜" 40% HS Cu	35	10	25	105
3 * 3773	#2/0 19/.0837 "	5/64	3/64	.69"	⅜" 40% HS Cu	35	10	25	105
3 * 3774	#4/0 19/.1055 "	5/64	3/64	.80"	⅜" 40% HS Cu	35	10	25	105
3 * 3775	336MCM 37/.0772 "	5/64	3/64	1.00"	7/16" 30% HS Cu	35	10	25	105

Marker: Mfgrs year of mfgr shall be permanently identified per 1000'
PUT-UP: 3 - 1000' lengths paralleled on one reel
1 - 1000' - messenger on another reel

NOTE: 1) Neoprene shall adhere to shroud
2) shroud shall be free stripping

Prepared by R A Marker

[fol. 0336] 3372

Cont.

3 - 7 15 000 ft guantlun cable

S/c 3/8 19/26 EC&Ig alum 5/64 Rope A
3/64 Neoprene

S/c 39780 37/26 EC&Ig alum 5/64 Rope A
3/64 Neoprene

Put up 3x1000 parallel on reel

Defendants' Exhibit 38

Request for Quotation

INQUIRY NO. NY-807-C

FROM: NEW YORK DISTRICT DATE: 12/1/38

TO: CENTRAL QUOTATION DEPT., ROME, N.Y.

INQUIRY FROM: PUBLIC SERVICE ELEC. & GAS CO.

FOR SHIPMENT TO:

—THE FOLLOWING MATERIAL—

"Please quote prices not later than December 8 for furnishing on a commitment basis the following reverse lay, SEV Self-Supporting Cable, to be manufactured to either of the following specifications:

Specification No. 22-4 - Copper
Specification No. 14-8 - Aluminum

Stock Code	Size	Quantity - Feet	
08-1880 or 08-1860	#4/0 3/cond. - copper	20,000	$3010.00 M ft.
	397.5 MCM 3/cond. - aluminum		$3755.00 M ft.

Delivery to New Jersey points in Public Service territory.

Required: 10,000 ft. each month January & February '39

Please quote estimated lead time in weeks."

December 2, 1938

F.O.B. Destination
TERMS: ½ of 1%
DELIVERY: 7 weeks lead time

W.S.WILLIAMS:DGB

R.A. Dunnineb

TERMS: (Standard discount dates apply)
☐ ½ of 1% ☐ 2% Other_____
Shipment if other than mill condition sheet_____
F. O. B. Destination unless otherwise noted.

Distributor Comm. if any
☐ Net ☐ 5% Other_____

☐ Competitive Report Requested

District Office Note That All Inquiries Must Contain All Necessary Data Including the Following Details Wherever They Are Applicable

1. Size and Stranding.
2. Temper.
3. Number of Conductors.
4. Voltage, if other than 600.
5. Type of Insulation.
6. Type of Sheath, Jacket, or Covering.
7. Finish.
8. Lengths and/or Put-up Required.
9. Any Special Specification, Requirement or Application.
10. Delivery Desired.

[fol. 6538] 3374 December 8, 1950

Public Service Elec. & Gas Company
80 Park Place
Newark 1, New Jersey

Attention: Mr. J. J. Coleman

Gentlemen:

In response to your form letter inquiry dated November 20th, we are pleased to quote on 5KV Self-Supporting Cable per Spec. 23-4 - Copper and Spec. 14-2 - Aluminum, as follows:

Stock Code	Size	Quantity - Feet	Price N' Net
03-1530	#4/0 - 3/cond. - copper	20,000	$3010.00
OR			
03-1560	397.5 MCM 3/cond.-Alum.		$3755.00

Delivery: F.O.B. Destination
Terms: ½ of 1% 10 days, net 30
Shipment: Approx. 7 weeks lead time required.

The terms and conditions appearing on the reverse side are to be considered a part of this quotation.

Prices stated herein shall be subject to adjustment to the Company's prices in effect on date of shipment. However, such prices shall not exceed any lawful ceiling prices established and in effect at the time of shipment.

Very truly yours,

ROME CABLE CORPORATION

WSW:DSB

W. S. Williams

[fol. 6539] IN UNITED STATES DISTRICT COURT
DEFENDANTS' EXHIBIT 37

3375

Request for Quotation

INQUIRY NO. NY-CCQ-C

FROM: NEW YORK DISTRICT DATE: 11/28/58

TO: CENTRAL QUOTATION DEPT., ROME, N.Y.

INQUIRY FROM: PUBLIC SERVICE ELEC. & GAS COMPANY

FOR SHIPMENT TO:

— THE FOLLOWING MATERIAL —

"Please quote prices not later than December 2 for furnishing on a commitment basis the following secondary self-supporting cable, to be manufactured to either of the following specifications:

Specification No. 84-1 - Copper
Specification No. 85-1 - Aluminum

Stock Code	Description	Quantity - Feet
03-1808 OR 03-1739	#1 3/cond. - Copper / #2/0 " - Aluminum	30,000 @ - $1086.00 M' / @ - $1204.00 M'
03-1712 OR 03-1733	#2/0 2/cond. - Copper / #4/0 " - Aluminum	650 @ - $ 502.00 M' / 15,000 @ - $ 792.00 M ft.

Delivery: to New Jersey points in Public Service Territory.

Required: Item 1 or 2 - 10,000 ft. each month starting Jan., '59
Item 3 or 4 - 5,000 ft. " " " " "

Please quote estimated lead time in weeks."

December 1, 1958

F.O.B. Destination
TERMS: ½ of 1%
SHIPMENT: 7 weeks lead time.

R.A. Dunnimab

W.S.WILLIAMS:bm

TERMS: (Standard discount dates apply)
☐ ½ of 1% ☐ 2% Other_____
Shipment if other than mill condition sheet_____
F. O. B. Destination unless otherwise noted.

Distributor Comm. if any
☐ Net ☐ 5% Other_____

☐ Competitive Report Requested

District Office Note That All Inquiries Must Contain All Necessary Data Including the Following Details Wherever They Are Applicable:

1. Size and Stranding. 1007 1025 1086 1204
2. Temper.
3. Number of Conductors.
4. Voltage, if other than 600.
5. Type of Insulation.
6. Type of Sheath, Jacket, or Covering.
7. Finish.
8. Lengths and/or Put-up Required.
9. Any Special Specification, Requirement or Application.
10. Delivery Desired.

[Fol. 6340] **3376** (SALES DEPT. COPY)

Engineering Department
Recommendations for Quoting

Number 300.
Inquiry No. NY- 665-C
Date 11/26/58.

Customer Public Service Elect & Gas Company
Ultimate User
Spec. or Correspondence Reference Spec-84-1 Copper, Spec 85-1 Alum.

RECOMMENDED CONSTRUCTION DETAILS

ITEM 1 30,000 FT - 3/C - #1 AWG - Copper - Preassembled Aerial Power Cable - STK Code-03-1808

3/c each - #1 AWG - 37/str. - Tin. copper
.333 4/64" Performance Insulation (2361)
.145 2/64" Reference Strength (0065)
.063 Ridge Identification
.541 O.D. .541"
.006
.010
.557
Assembly - 3/c - #6 AWG Twisted with reverse Lay and bound to a 4D - EHS - 30% cond. -
Copper weld messenger with min. str. of 1,225 Soft copper binder strand. -
1.160
.348
.050
1.558 O.D. 1.24" x 1.59"

P.U. - 1000 FT (± 10%) on 48" Reel.

ITEM 2 - 30,000 FT - 3/C - #2/0 AWG Alum - Preassembled Aerial Power Cable - STK Code-03-1737

.490
.145
.063
.608
.006
.010
.624
2.16
3.78
6.37
.795
34.785
.851
1.423

3/c each #2/0 AWG - 37/,000 - ECH 26 Alum. (3/4 Hd)
4/64" Performance Insulation (2361)
2/64" Reference Strength (60 65) - Ridge Ident.
Assembly - 3/c - #2/0 AWG Twisted with reverse Lay and bound to a 4D - EHS - 30% Cond. Copper weld messenger with min. str. of 1,225 Soft Bare Copper Binder strand -
1.093
.348
.050
1.776 O.D. 1.43" x 1.78"

P.U. - 1000 FT (± 10%) on 5.4" Reel. 58.8

Prepared by: G A Beckman

[fol. 6557]

3393

COPY

Orig. rec. - 1/27/58
Ret. to cust. - 2/5/58

C-197 - 1/24/58
T.L.Harrigan

Due: 2/3/58

65,000 ft. 3 x 4/0 AWG copper or rubber neoprene 5KV self-supporting Aerial Cable No. 573-2 $2330.00/M' Net

65,000 ft. 3 x 300MCM aluminum or rubber-neoprene ditto - Cable No. 253A-2 $2510.00/M' Net

On 1000 ft. reels - state flange diameter and max. outside width of reels you would furnish.

State max. lgths. you can furnish on reels that do not exceed the following dimensions. What are the dimensions of the reels you would use.

1. Flange Dia. 96" Max. Outside Width 50"
2. " " 84" " " " 48"
3. " " 72" " " " 65"

The cable is to be furnished per our Spec. No. EO-11-1, App. "C" dated 10/14/57 except insulated condrs. shall be cabled together with reverse lay.

State price of copper & alum & pulling eye.

Delivery required 2Q58

Prices stated herein shall be subject to adjustment to the Company's prices in effect on date of shipment. However, such prices shall not exceed any lawful ceiling prices established and in effect at the time of shipment.

As Req'd

Rome, New York
Destination

1/2 of 1% 10 38-20008

2/3/58

[fol. 6589] IN UNITED STATES DISTRICT COURT

3394

DEFENDANTS' EXHIBIT 40

Request for Quotation

I. C. O. D. FILE (Customer)

BOSTON

INQUIRY NO. NY-379-C

FROM: New York Office DISTRICT DATE: Feb. 21, 1958

TO: CENTRAL QUOTATION DEPT., ROME, N. Y.

INQUIRY FROM: Long Island Lighting Co.

FOR SHIPMENT TO: Hicksville, L.I., N.Y.

U. S. Dis. Court N. D. N. Y.
Ex. No. AR 40 21
Def't ☐ Pff ☐ Def ☒

— THE FOLLOWING MATERIAL —

With reference to the attached, please quote as follows:

Item 1 - 2 Condrs. each #1/0 - 19 strand bare copper, 5/64" NePrene, 1/C #1/0 - 7 strand bare copper, neutral, twist two insulated conductors around the bare messenger, approx. 39" lay @ - - -$447.00 M ft.

Item 2 - 2 Condrs. each #4/0 - 19 strand bare copper, 5/64" NePrene, conductors twisted and bound to a 5/16" copperweld messenger with a soft bare copper binding strap @ - - - - - - - - - - - - - $888.00 M ft.

Item 3 - 3 Condrs. each #1/0 - 19 strand bare copper, 5/64" NePrene, 1/C #1/0 - 7 strand bare copper neutral, twist three insulated conductors around the bare messenger, approx. 39" lay @ - - -$642.00 M ft.

Item 4 - 3 Condrs. each #4/0 - 19 strand bare copper, 5/64" NePrene twisted and bound to a 5/16" copperweld messenger by means of a soft bare copper binding strap @ - - - - - - - - - - - - - $1148.00 M ft.

Item 5 - 2 Condrs. each #3/0 - 19 strand aluminum, 5/64" NePrene twisted and bound to a 5/16" copperweld messenger by means of a soft bare copper binding strap @ - - - - - - - - - - - - - -$482.00 M ft.

Item 6 - 2 Condrs. each 336,400 C.M. - 19 strand aluminum, 6/64" NePrene twisted and bound to a 3/8" copperweld messenger by means of a soft bare copper binding strap @ - - - - - - - - - - - - $729.00M ft.

Item 7 - 3 Condrs. each #1/0 - 19 strand aluminum, 5/64" NePrene, 1/C #1/0 6/1 ACSR, twist three insulated conductors around the bare messenger, approx. 39" lay @ - - - - - - - - - - - - - - - - - $431.00 M ft.

Item 8 - 3 Condr. each #/0 - 19 strand aluminum, 5/64" NePrene, conductors twisted and bound to a 5/16" copper weld messenger by means of a soft bare copper binding strap @ - - - - - - - - - - - - $701.00 M ft.

TERMS: (Standard discount dates apply) Distributor Comm. if any
☐ ½ of 1% ☐ 2% Other_____ ☐ Net ☐ 5% Other_____ ☐ Competitive Report Requested

Shipment if other than mill condition sheet_____

F.O.B. Destination unless otherwise noted.

District Office Note That All Inquiries Must Contain All Necessary Data Including the Following Details Wherever They Are Applicable:

1. Size and Stranding.
2. Temper.
3. Number of Conductors.
4. Voltage, if other than 600.
5. Type of Insulation.
6. Type of Sheath, Jacket, or Covering.
7. Finish.
8. Lengths and/or Put-up Required.
9. Any Special Specification, Requirement or Application.
10. Delivery Desired.

[fol. 6559] 3395

2 C. O. D. FILE (Customer)

Request for Quotation

B00301

INQUIRY NO. NY-379-C

FROM: New York Office DISTRICT DATE: Feb. 21, 1938

TO: CENTRAL QUOTATION DEPT., ROME, N. Y.

INQUIRY FROM: Long Island Lighting Co.

FOR SHIPMENT TO: Richville, L.I., N.Y.

— THE FOLLOWING MATERIAL —

-2-

Item 9 - 3 Conds. each 2336,400 C.M. - 19 strand, 6/64" ReProm, conductors twisted and bound to a 3/8" copperweld messenger by means of a soft bare copper binding strap @ - -$974.00 M ft.

All twisted assemblies have approximately 39" lay.

The above prices are for estimating purposes in quantities of 10,000 ft.

On the items of copper self-supporting the terms are 2% 10th prox. net. 31 st prox. On the items of aluminum self-supporting the terms are net 30 days; and on the items with the copperweld messenger the terms are ½ off1 new terms.

jw:mab

J.H. Wright

TERMS: (Standard discount dates apply) ☐ ½ of 1% ☐ 2% Other_____

Distributor Comm. if any ☐ Net ☐ 5% Other_____ ☐ Competitive Report Requested

Shipment if other than mill condition sheet_____

F.O.B. Destination unless otherwise noted.

District Office Note That All Inquiries Must Contain All Necessary Data Including the Following Details Wherever They Are Applicable:

1. Size and Stranding.
2. Temper.
3. Number of Conductors.
4. Voltage, if other than 600.
5. Type of Insulation.
6. Type of Sheath, Jacket, or Covering.
7. Finish.
8. Lengths and/or Put-up Required.
9. Any Special Specification, Requirement or Application.
10. Delivery Desired.

3396 [fol. 6560] In United States District Court

Defendants' Exhibit 41

ROME CABLE DIVISION OF ALCOA

ROME, NEW YORK

SALES SERVICE CLERK

SALES ORDER

SHIP FROM
ROME, NEW YORK

INVOICE TO
BOSTON EDISON COMPANY
39 BOYLSTON STREET
BOSTON 12, MASS

SHIP TO
BOSTON EDISON COMPANY
200 CALVARY STREET
WALTHAM 54, MASS

CUSTOMER P.O. NO.
39347
Products as follows

GOVT. CONTRACT NO.
20-017

DATE ENTERED	CODE NUMBER	ORDER NUMBER
11 23 60	069 094	11 BO X 35239-C

RENEGOTIATION	SALES OR USE TAX
NO	NONE EXEMPT

TERMS
1/2 OF 1% 10 DAYS
NET 30 DAYS FROM DATE OF INVOICE

F.O.B.
DESTINATION

VIA
TRUCK LATER

PROD. NO.	NO. WK. YR	SHIPMENT ESTIMATED BY WEEK ENDING	SHIPMENT SUBJECT TO
	12 31 60	NO	SEE NOTE

CUST. NAME ABBREVIATION	CONTROL NUMBER
BOS EDISON	

PACKING
SEE ITEM

ORDER NUMBER		INSPECTION AT SOURCE	PARTIAL SHIPMENTS	QUANTITY TOLERANCE PLUS % MINUS %
BO X 35239-C	300	ROME ALCOA	YES	STD

ITEM NO.	ITEM DESCRIPTION	PRODUCT CODE	QUANTITY ORDERED PCS., FT., ETC.	POUNDS	PRICE PER POUND OR AS INDICATED
1	NO 2-7 STR S D 3/64 IN ROPRENE W/P PER E2.4-3, 3 REV 12-3-58 MIN 80 LB MAX 120 LB COIL 143-02-23-0304	1/3 - 1/9 800	200,000 FT		$99.00/M FT → 97.00

227.61

U. S. Dist. Court N.D.N.Y. Exhibit No. AR 41 Rec'd ☐ Mkd ☐ Def'd ☐

11/29

BO 10200

TOTAL ALUM. LBS	CONFER BEFORE PROD	CONFER BEFORE SHIP	DUP. NO.	INVOICE COPIES	NO	SHIPMENT NOTICES
	NO	NO	4	3	0	

CUSTOMER'S USE
5110-POW R TRANSMISSION

NO. TYPE INSPECTION REPORTS
0

NOTES
1 SHIP AND INVOICE ON ROME PAPER
2 PRICING POLICY NO 3
3 PRICED PER QUOTATION NOV 14, COPY TO D B DUFFY
4 SHIPMENT REQUIRED 150,000 FT ON 1-2-61, AND 50,000 FT 2-1-61
5 REFER TO J A MC GUINNES PROM WK 12/31 SURE

A VAN VLACK/WGD MSB JH

BF.6006-10M-8-60

DEFENDANTS' EXHIBIT 42

EXTRA COPIES

ROME CABLE CORPORATION
ROME, NEW YORK

DESIRED ON _____ LOCATION

CUSTOMER ORDER NO.	DATE	TERRITORY	ROME ORDER NO.	DATE ENTERED	
70090-7-LL	5/11/60	ST-L.	A 5993	5/16/60	1 Pl.

BILL NOTES

Con't'd. Furnish 4 copies of outgoing test reports.

SOLD TO
DOW CHEMICAL COMPANY
PURCH DEPT. - LOUISIANA DIV.
POST OFFICE BOX 150
PLAQUEMINE, LOUISIANA.

SHIP TO
DOW CHEMICAL COMPANY
RECEIVING DEPT.
PLANT SITE
PLAQUEMINE, LOUISIANA.

OTHER SHIP

TERMS
NET 30 DAYS.

SHIPPING NOTES
LATER PPD. Coated
F.O.B. POINT
DEST.
NYC-ABS-MP
T&P
T&P 24116

Terms are Correct
Price dedated 7/18.

Should be dyed back Cy

ITEM NO.	QUANTITY ORDERED		DESCRIPTION 265	EXTENSION	PRICE
1.	45,135 FT.	wk 6/20	700,000 CM-61 STR. EC-H19 ALUMINUM 6/64" BLK POLYETHYLENE DOW CHEMICAL COMPOUND 305A3 ON 84" REELS AS FOLLOWS: 3 REELS --4575 FT. EACH. 3 REELS --5700 FT. EACH. 3 REELS --4770 FT. EACH. 198-64-41-010	45,170	$405.00 PER M FT.

BILLING NOTES

POLICY #1.

33997

3398

DEFENDANTS' EXHIBIT 43

UNUSED PRIMARY ALUMINUM CAPACITY

Year	U.S. Primary Aluminum Capacity			Alcoa Primary Aluminum Capacity		
	Total	Unused Amount	Unused Percent %	Total	Unused Amount	Unused Percent %
1948	1,298,000	51,088	4	650,000	(2,309)	-
1949	1,454,150	247,226	17	588,000	5,217	1
1950	1,710,000	272,756	16	739,500	31,546	4
1951	1,691,500	17,738	1	742,500	(108,580)	(15)
1952	2,283,900	409,240	18	968,500	33,364	3
1953	2,621,400	117,374	4	1,096,000	(126,614)	(12)
1954	2,776,400	(144,730)	(5)	1,141,000	(190,874)	(17)
1955	3,218,400	86,958	3	1,413,000	8,539	1
1956	3,551,000	193,092	5	1,585,000	72,722	5
1957	3,683,500	388,082	11	1,585,000	160,905	10
1958	4,388,500	1,257,386	29	1,596,500	554,776	35
1959	4,805,500	899,150	19	1,596,500	342,915	21
1960	4,937,500	908,506	18	1,706,500	252,530	15

Quantities are thousands of pounds.

Note: The above tabulation shows that Alcoa production exceeded Alcoa capacity in the years 1951, 1953 and 1954. This results from capacity having been based on median water conditions and assumed no purchase of high cost power. High cost power was actually used during the year 1951, and better than median water conditions existed in 1953 and 1954 resulting in Alcoa production exceeding Alcoa capacity. As a result of Alcoa production exceeding Alcoa capacity in 1954, total U.S. production exceeded total U.S. capacity in that year.

Source of Data

UNITED STATES PRIMARY ALUMINUM CAPACITY
U.S. BUREAU OF MINES MINERALS YEARBOOK
OR "ALUMINUM" PREPRINTS
YEAR 1948-EDITION OF 1948 PREPRINT, TEXT PAGE 3
YEAR 1949-EDITION OF 1951 YEARBOOK, TABLE 3, PAGE 133
YEAR 1950-EDITION OF 1951 YEARBOOK, TABLE 3, PAGE 133
YEAR 1955-EDITION OF 1955 PREPRINT, TEXT PAGE 1
YEAR 1956-EDITION OF 1956 PREPRINT, TABLE 3, PAGE 4
YEAR 1957-EDITION OF 1957 PREPRINT, TABLE 2, PAGE 4
YEAR 1958-EDITION OF 1958 PREPRINT, TABLE 3, PAGE 4
YEAR 1960-EDITION OF 1959 PREPRINT, TABLE 4, PAGE 3

U.S. BUREAU OF MINES, MINERAL INDUSTRY SURVEYS, MINERAL MARKET REPORT-YEAR 1960-SURVEY NO. 3258, "ALUMINUM IN 1960", TABLE 4, PAGE 4

AMERICAN BUREAU OF METAL STATISTICS YEARBOOK
YEAR 1951 - PAGE 96
YEAR 1952 - PAGE 96
YEAR 1953 - PAGE 97
YEAR 1954 - PAGE 98

UNUSED UNITED STATES PRIMARY ALUMINUM CAPACITY
CALCULATED USING CAPACITY SHOWN, AND UNITED STATES PRIMARY ALUMINUM PRODUCTION FROM FOLLOWING SOURCE
U.S. BUREAU OF MINES MINERALS YEARBOOK ("ALUMINUM" PREPRINTS)
YEARS 1948 & 1949 - EDITION OF 1951, TABLE 1, PAGE 1
YEARS 1950 TO 1954 - EDITION OF 1954, TABLE 1, PAGE 1
YEARS 1955 TO 1959 - EDITION OF 1959, TABLE 1, PAGE 1

U.S. BUREAU OF MINES, MINERAL INDUSTRY SURVEYS, MINERAL MARKET REPORT-YEAR 1960-SURVEY NO. 3258, "ALUMINUM IN 1960" TABLE 4, PAGE 4

ALCOA PRIMARY ALUMINUM CAPACITY
AMERICAN METAL MARKET NEWSPAPER, ISSUE DATED 8-29-61

UNUSED ALCOA PRIMARY ALUMINUM CAPACITY
CALCULATED USING CAPACITY SHOWN, AND ALCOA PRIMARY ALUMINUM PRODUCTION FROM ALUMINUM STOCK REPORTS (COMPANY RECORDS)

[fol. 6563] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 45

ALUMINUM PIG, INGOT OR BILLET
TO BE MADE AVAILABLE TO NON-INTEGRATED USERS
UNDER PROVISIONS OF GSA SUPPLY CONTRACTS

	Alcoa		Kaiser		Reynolds		Harvey		Total	
Year	Quantity	Percent of Alcoa 1960 Capacity	Quantity	Percent of Kaiser 1960 Capacity	Quantity	Percent of Reynolds 1960 Capacity	Quantity	Percent of Harvey 1960 Capacity	Quantity (1)	Percent of Total U.S. 1960 Capacity
	#	%	#	%	#	%	#	%	#	%
1959	150,500	8.8	-	-	126,000	9.0	Unknown		276,500	5.6
1960	150,500	8.8	175,136	14.4	126,000	9.0	Unknown		451,636	9.1
1961	150,500	8.8	175,136	14.4	126,000	9.0	Unknown		451,636	9.1
1962	150,500	8.8	175,136	14.4	126,000	9.0	Unknown		451,636	9.1
1963	150,500	8.8	175,136	14.4	126,000	9.0	Unknown		451,636	9.1
1964	150,500	8.8	175,136	14.4	126,000	9.0	Unknown		451,636	9.1
1965	150,500	8.8	175,136	14.4	126,000	9.0	Unknown		451,636	9.1
1966	150,500	8.8	175,136	14.4	126,000	9.0	Unknown		451,636	9.1
1967	150,500	8.8	175,136	14.4	126,000	9.0	Unknown		451,636	9.1
1968	150,500	8.8	175,136	14.4	126,000	9.0	Unknown		451,636	9.1
1969	150,500	8.8	175,136	14.4	126,000	9.0	Unknown		451,636	9.1
1970	150,500	8.8	175,136	14.4	126,000	9.0	Unknown		451,636	9.1
1971	150,500	8.8	175,136	14.4	126,000	9.0	Unknown		451,636	9.1
1972	139,500	8.2	171,286	14.1	126,000	9.0	Unknown		436,786	8.8
1973	112,500	6.6	59,184	4.9	126,000	9.0	Unknown		297,684	6.0

Thousands of Pounds

Source of Data

Alcoa - Amendment dated 12/31/58 to GSA supply contracts nos. GS-00P-(D) - 12007 and - 12096
Kaiser - Amendment dated 8/14/59 to GSA supply contracts nos. GS-00P-(D) - 12006, - 12143, - 12192 and - 12213
Reynolds - Letter agreement dated 9/16/57 amending GSA supply contracts nos. GS-00P-(D) - 12008, - 12202 and - 12214
Percentages based on capacity given in U.S. Bureau of Mines Mineral Industry Surveys, Mineral Market Report Year 1960 - Survey No. 3258, "Aluminum in 1960", table 4, page 4

(1) Excludes Harvey for which we do not have information.

3399

[fol. 6564]

IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 47

Primary Aluminum Purchased by Rome

Year	Total Primary Aluminum Sales to Non-Integrated Fabricators by U.S. Primary Producers	Alcoa Primary Aluminum Sales to Non-Integrated Fabricators	Rome Primary Aluminum Purchases	Rome Primary Aluminum Purchases % of Total Sales to Non-Integrated Fabricators	Rome Primary Aluminum Purchases % of Alcoa Sales to Non-Integrated Fabricators
1954	$ 85,324	$27,227	$ 327	.4	1.2
1955	177,394	71,531	692	.4	1.0
1956	177,656(1)	91,549	1,277	.7	1.4
1957		58,633	836		1.4
1958		46,038	785		1.7

Thousands of Dollars

(1) First 9 months

Source of Data

Total Primary Aluminum Sales to Non-Integrated Fabricators by U.S. Primary Producers
United States v. Aluminum Company of America, 153 F. Supp. 132, 173 (S.D.N.Y. 1957)

Alcoa Primary Aluminum Sales to Non-Integrated Fabricators
Compiled from Analysis of Shipments and Transfers and Record of Shipments to Customers (company records)

Rome Primary Aluminum Purchases
Raw Materials Receipts Records (company records)

3401

[fol. 6565]

In United States District Court

Defendants' Exhibit 48

Primary Aluminum Purchased by Rome

Year	Total Primary Aluminum Sales to Non-Integrated Fabricators by U.S. Primary Producers	Alcoa Primary Aluminum Sales to Non-Integrated Fabricators	Rome Primary Aluminum Purchases	Rome Primary Aluminum Purchases: % of Total Sales to Non-Integrated Fabricators	Rome Primary Aluminum Purchases: % of Alcoa Sales to Non-Integrated Fabricators
1954	386,767 #	115,082 #	1,611 #	.4	1.4
1955	751,742	294,723	3,175	.4	1.1
1956	704,206(1)	348,386	5,258	.7	1.5
1957		209,119	3,236		1.5
1958		175,499	3,133		1.8

Thousands of Pounds

(1) First 9 months

Source of Data

Total Primary Aluminum Sales to Non-Integrated Fabricators by U.S. Primary Producers
United States v. Aluminum Company of America, 153 F. Supp. 132, 173 (S.D.N.Y, 1957)

Alcoa Primary Aluminum Sales to Non-Integrated Fabricators
Compiled from Analysis of Shipments and Transfers and Record of Shipments to Customers (company records)

Rome Primary Aluminum Purchases
Raw Materials Receipts Records (company records)

[fol. 6566] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 49

Primary Aluminum Purchased by Rome

Year	Total U.S. Primary Aluminum Production	Alcoa Primary Aluminum Production	Rome Primary Aluminum Purchases	Rome Primary Aluminum Purchases: % of Total U.S. Primary Aluminum Production	Rome Primary Aluminum Purchases: % of Alcoa Primary Aluminum Production
1954	2,921,130#	1,331,874#	1,611#	.1	.1
1955	3,131,442	1,404,461	3,175	.1	.2
1956	3,357,908	1,512,278	5,258	.2	.3
1957	3,295,418	1,424,095	3,236	.1	.2
1958	3,131,114	1,041,724	3,133	.1	.3

Thousands of Pounds

Source of Data

United States Primary Aluminum Production
U.S. Bureau of Mines Minerals Yearbook ("Aluminum" Preprints)
Year 1954—Edition of 1954, table 1, page 1
Years 1955 to 1958—Edition of 1959, table 1, page 1

Alcoa Primary Aluminum Production
Compiled from Aluminum Stock Reports (company records)

Rome Primary Aluminum Purchases
Raw Materials Receipts Records (company records)

[fol. 6567] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 50

Copper and Aluminum Purchased by Rome (1)

Year	Copper	Aluminum	Total	Percent Copper
1954(2)	$16,850	$ 401	$17,251	97.7
1955(2)	24,549	659	25,208	97.4
1956(2)	27,067	1,258	28,325	95.6
1957(2)	15,709	790	16,499	95.2
1958	12,152	813	12,965	93.7
1959 (1st Qtr.)	3,942	239	4,181	94.3

Thousands of Dollars.

(1) Rome plant only.

(2) Net after deducting value of scrap generated.

Source of Data:
Raw Material Receipts Records (company records).

[fol. 6568] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 51

Copper and Aluminum Purchased By Rome
Pounds (In Thousands)

Year	Copper	Aluminum	Total	% Copper
1954	56,166#	1,980#	58,146	96.6
1955	61,561	3,028	64,589	95.3
1956	62,462	5,189	67,651	92.3
1957	52,580	3,058	55,638	94.5
1958	47,519	3,234	50,753	93.6
1959 (1st Quarter)	13,155	948	14,103	93.3

(1) Rome Plant only.

Source of Data:
Raw Materials Receipt Record (Company records).

[fol. 6569] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 52

Copper and Aluminum Wire and Cable Sold by Rome

Year	Copper Wire & Cable	Aluminum Wire & Cable	Total	Percent Copper
1954	$27,142	$ 1,770	$28,912	93.9
1955	36,921	2,458	39,379	93.8
1956	39,119	3,646	42,765	91.5
1957	26,992	2,888	29,880	90.3
1958	21,261	2,191	23,452	90.7
1959 (1st Qtr.)	5,891	509	6,400	92.0

Thousands of Dollars.

Source of Data:
Product Sales Records (company records).

[fol. 6570] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 53

Aluminum Wire and Cable Overlap Products Sold by Rome

Year	Overlap Wire and Cable	Total Wire and Cable	Percent Overlap
1954	$1,716	$28,912	5.9
1955	2,302	39,379	5.8
1956	3,396	42,765	7.9
1957	2,317	29,880	7.8
1958	1,989	23,452	8.5
1959 (1st Qtr.)	403	6,400	6.3

Thousands of Dollars.

Source of Data:
Product Sales Records (company records).

[fol. 6571] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 54

Rome Sales of Weatherproof
(1956–1960) (Thousands of Dollars)

Year	Total Value	Aluminum Value	Aluminum %	Copper Value	Copper %
1956	4,430	1,031	23.3	3,399	76.7
1957	3,153	579	18.4	2,574	81.6
1958	2,221	482	21.8	1,739	78.2
1959	2,235	332	14.9	1,903	85.1
1960	1,971	245	12.5	1,726	87.5

Source: Table I (page 8) of Defendants' Answers to Plaintiff's Interrogatories.

[fol. 6572] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 55

Rome Sales of Service Drop Cable
(1956–1960) (Thousands of Dollars)

Year	Total Value	Aluminum Value	Aluminum %	Copper Value	Copper %
1956	2,636	2,085	79.1	551	20.9
1957	1,850	1,492	80.7	358	19.3
1958	1,528	1,250	81.8	278	18.2
1959	1,643	1,327	80.8	316	19.2
1960	1,567	1,312	83.7	255	16.3

Source: Table I (page 9) of Defendants' Answers to Plaintiff's Interrogatories.

[fol. 6573] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 56

Rome Sales of Service Drop and Weatherproof
(1956–1960) (Thousands of Dollars)

Year	Total Value	Aluminum Value	Aluminum %	Copper Value	Copper %
1956	7,066	3,116	44.1	3,950	55.9
1957	5,003	2,071	41.4	2,932	58.6
1958	3,749	1,732	46.2	2,017	53.8
1959	3,878	1,659	42.8	2,219	57.2
1960	3,538	1,557	44.1	1,981	55.9

Source: Table I (pages 8–9) of Defendants' Answers to Plaintiff's Interrogatories.

[fol. 6574] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 57

CHANGES IN BASE PRICE OF PRIMARY ALUMINUM(4), E.C. REDRAW ROD AND SELECTED CABLE SIZES FROM JULY 22, 1946 TO DATE AND COMPARISON OF SPREAD BETWEEN THESE PRODUCTS DURING SAME PERIOD

Date of Price Change(2)	Base Price Per Aluminum Pound								Spread in Base Price		
	Primary Aluminum(4)	E.C. H12 & H14 Redraw Rod	Cable								
			1/0 6/1 ACSR	4 7/1 ACSR	795,000 26/7 ACSR	900,000 54/7 ACSR	336,400 19 All Alum.	795,000 37 All Alum.	Arithmetic Average	Pig to Redraw Rod	Redraw Rod To Cable(3)	Pig To Cable
	$	$	$	$	$	$	$	$	$	$	$	$
7/22/46	.140	.185	.290(1)	.327(1)	.288(1)	.281(1)	.268(1)	.261(1)	.285(1)	.045	.100	.145
12/10/46	.140	.190	.295(1)	.352(1)	.299(1)	.294(1)	.268(1)	.242(1)	.291(1)	.050	.101	.151
7/25/47	.140	.194	.310(1)	.373(1)	.315(1)	.307(1)	.271(1)	.247(1)	.304(1)	.054	.110	.164
6/28/48	.150	.210	.329(1)	.394(1)	.334(1)	.325(1)	.291(1)	.266(1)	.323(1)	.060	.113	.173
10/11/48	.160	.225	.346(1)	.414(1)	.351(1)	.342(1)	.306(1)	.281(1)	.340(1)	.065	.115	.180
1/27/50		.220	.345	.414	.350	.340	.303	.277	.338	.060	.118	.178
5/22/50	.165									.055	.118	.173
10/4/50	.180	.240	.369	.439	.374	.365	.316	.301	.361	.060	.121	.181
8/4/52	.190	.252	.387	.461	.393	.383	.332	.317	.379	.062	.127	.189
1/23/53	.195	.262	.400	.476	.406	.396	.345	.329	.392	.067	.130	.197
7/27/53	.200		.411	.493	.410	.400	.345	.330	.398	.062	.136	.198
3/8/54			.402	.484	.401	.392	.342	.327	.391	.062	.129	.191
8/9/54	.205	.270	.420	.506	.418	.410	.357	.342	.409	.065	.139	.204
1/13/55	.215	.280	.430	.516	.429	.419	.367	.352	.419	.065	.139	.204
8/11/55	.225	.295	.461	.551	.459	.448	.390	.375	.447	.070	.152	.222
2/28/56	.230	.305	.476	.566	.474	.463	.405	.390	.462	.075	.157	.232
3/29/56	.245	.320	.490	.582	.489	.478	.420	.405	.477	.075	.157	.232
8/10/56	.255	.333	.520	.618	.516	.505	.442	.426	.505	.078	.172	.250
2/8/57	.255	.333	.515	.611	.513	.502	.441	.425	.501	.078	.168	.246
8/1/57	.265	.346	.539	.642	.536	.524	.451	.425	.520	.081	.174	.255
10/7/57			.495	.591	.493	.483	.411	.385	.478	.081	.130	.211
4/1/58	.245	.326								.081	.150	.231
8/1/58	.258	.333								.081	.143	.224
11/25/58			.476	.568	.474	.466	.398	.372	.459	.081	.126	.207
1/13/59			.436	.522	.434	.429	.371	.345	.423	.081	.090	.171
4/27/59			.434	.519	.432	.427	.369	.344	.421	.081	.086	.167
5/11/59			.430	.514	.428	.422	.366	.340	.417	.081	.084	.165
11/2/59			.445	.531	.438	.432	.373	.347	.423	.081	.095	.176
12/17/59	.265	.348	.465	.551	.458	.452	.393	.367	.443	.083	.100	.183
8/1/60		.350	.475	.561	.468	.462	.403	.377	.453	.085	.108	.193
12/14/60			.475	.561	.468	.462	.403	.361	.443	.085	.098	.183
4/12/61		.307								.042	.141	.183
6/9/61			.498	.581	.485	.468	.408	.382	.470	.042	.163	.205
9/28/61	.245	.297	.494	.576	.480	.463	.403	.377	.460	.056	.169	.221
10/23/61		.280								.035	.186	.221

(1) Prior to 1/27/50 there was no transportation allowance on cable, therefore, $.0135 per composite pound has been added to the price schedule indicated to adjust for the present full transportation allowance basis.

(2) These are the exact dates of the cable price changes. In some cases the pig and redraw price changes vary from these dates by a few days.

(3) The spread between redraw and cable is based on the difference between the redraw price and the arithmetic average of the cable prices shown above.

Source of Data - Above prices taken or calculated from yellow price data sheets.

(4) 7-22-46 to 2-27-56 - 99% Minimum Average Pig
2-28-56 to 7-31-60 - E.C. Alloy Pig
8-1-60 to date - E.C. Alloy Ingot

[fol. 6575] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 58

Alcoa

Electrical Conductor Business Reported Lost to All Competitors
April 1957 Through March 1959

Competitor	Aluminum Weight
Anaconda Co.	11,927,225#
Central Cable Corp.	456,074
Essex Wire Co.	1,010,150
General Cable Corp.	1,270,630
General Electric Co.	138,536
Kaiser Aluminum & Chemical Corp.	22,566,850
Midland	178,602
Nehring Electrical Works	1,627,667
Paranite Wire and Cable	3,131,695
Reynolds Metals Co.	18,364,188
Rome Cable	22,455
Southern Electrical Corp.	2,541,201
Southwire Co.	3,246,504
Texas Wire	17,700
Unknown	11,768,243
Total	78,267,721

Total Lost to Rome Cable

Known (see above)	22,455
Portion of "Unknown" (see above)	17,059
Total	39,514
Rome's Percentage of Total Lost Business	.05%

Source of Data.
Summaries of Alcoa's Potential Business Reports and Rome's Sales Orders (company records).

[fol. 6576]

In United States District Court

Defendants' Exhibit 59

Shipments of ACSR and Aluminum Cable, Bare
By Primary Producers or Affiliates (Including Merged Companies) and Other Producers (1954–1961)(1)
(Thousands of Pounds)

Year	Total(2)	Primary Producers or Affiliates(3)	%	Other Producers(4)	%	Alcoa(5)	%	Rome(5)	%
1954	147,166	129,692	88.1	17,474	11.9	71,215	48.4	241	0.2
1955	157,237	139,159	88.5	18,078	11.5	67,850	43.2	224	0.1
1956	188,282	152,905	81.2	35,377	18.8	56,161	29.8	603	0.3
1957	181,701	148,888	81.9	32,813	18.1	58,964	32.3	535	0.3
1958	175,157	151,668	86.6	23,489	13.4	56,990	32.5	537	0.3
1959	197,065	165,007	83.7	32,058	16.3	61,934	31.4	1,342	0.7
1960	184,402	154,443	83.8	29,959	16.2	56,399	30.6	255	0.1
1961	234,265	203,133	86.7	31,132	13.3	61,106	26.1	37	....

Sources:

(1) Primary producers or affiliates included, for all years 1954–1960, are Aluminum Company of America, Anaconda Wire & Cable Co., Kaiser Aluminum and Chemical Corp., Olin Mathieson Chemical Corp., and Reynolds Metals Co., and the merged companies included for years prior to merger are Rome Cable Corp., Southern Electrical Corp., and U. S. Rubber Co.

(2) U.S. Department of Commerce, BDSA, Aluminum & Magnesium Division, reports entitled, "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers" for the period in question.

(3) Same as (2), except that "Integrated Producers" volume is increased by addition of volumes of merged companies for years prior to merger, obtained from documents and answers supplied by Plaintiff in answer to Defendants' Interrogatories and Document Production.

(4) Same as (2), except that "Nonintegrated Producers" volume is reduced by subtraction of volumes of merged companies for years prior to merger, obtained from documents and answers supplied by Plaintiff in answer to Defendants' Interrogatories and Document Production.

(5) Shipments reported by both Alcoa and Rome to U.S. Department of Commerce on Form BDSAF–122 during the period in question.

[fol. 6577]

IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 60

Shipments of Aluminum Insulated or Covered Wire and Cable
By Primary Producers or Affiliates (Including Merged Companies) and Other Producers (1954–1961)(1)
(Thousands of Pounds)

Year	Total(2)	Primary Producers or Affiliates(2)	%	Other Producers(2)	%	Alcoa(3)	%	Rome(3)	%
1954	25,009	17,059	68.2	7,950	31.8	2,513	10.0	1,718	6.9
1955	40,091	29,190	72.8	10,901	27.2	4,349	10.8	2,782	6.9
1956	57,588	36,024	62.5	21,564	37.5	4,919	8.5	3,596	6.2
1957	50,753	32,287	63.6	18,466	36.4	4,778	9.4	2,707	5.3
1958	51,346	36,056	70.2	15,290	29.8	5,970	11.6	2,411	4.7
1959	61,153	41,641	68.1	19,512	31.9	7,461	12.2	2,680	4.4
1960	64,215	43,197	67.3	21,018	32.7	6,800	10.6	2,736	4.2
1961	68,876	45,789	66.5	23,087	33.5	5,058	7.3	3,889	5.7

Sources:

(1) Primary producers or affiliates included, for all years 1954–1960, are Aluminum Company of America, Anaconda Wire & Cable Co., Kaiser Aluminum and Chemical Corp., Olin Mathieson Chemical Corp., and Reynolds Metals Co., and the merged companies included for years prior to merger are Rome Cable Corp., Southern Electrical Corp., and U.S. Rubber Co. "Other producers" include captive plants in all years.

(2) U.S. Department of Commerce, BDSA, Aluminum and Magnesium Division report dated November 8, 1961, entitled: "Shipments of Wire by Primary Producers or Affiliates (Including Merged Companies) and Other Producers, 1954–1960." Data for 1961 from current quarterly reports entitled, "Gross Shipments of Aluminum Mill Shapes By Integrated and Nonintegrated Producers."

(3) Shipments reported by Alcoa and Rome to U.S. Department of Commerce on Form BDSAF–122 during the period in question.

[fol. 6578]

In United States District Court

Defendants' Exhibit 61

Shipments of Aluminum Conductor Wire and Cable
By Primary Producers or Affiliates (Including Merged Companies) and Other Producers (1954–1961)(1)
(Thousands of Pounds)

Year	Total(2)	Primary Producers or Affiliates(3)	%	Other Producers(4)	%	Alcoa(5)	%	Rome(5)	%
1954	172,175	146,751	85.2	25,424	14.8	73,728	42.8	1,959	1.1
1955	197,328	168,349	85.3	28,979	14.7	72,199	36.6	3,006	1.5
1956	245,870	188,929	76.8	56,941	23.2	61,080	24.8	4,199	1.7
1957	232,454	181,175	77.9	51,279	22.1	63,742	27.4	3,242	1.4
1958	226,503	187,724	82.9	38,779	17.1	62,960	27.8	2,948	1.3
1959	258,218	206,648	80.0	51,570	20.0	69,395	26.9	4,022	1.5
1960	248,617	197,640	79.5	50,977	20.5	63,199	25.4	2,991	1.2
1961	303,141	248,922	82.1	54,219	17.9	71,164	23.5	3,926	1.3

Sources:

(1) Primary producers or affiliates included, for all years 1954–1960, are Aluminum Company of America, Anaconda Wire & Cable Co., Kaiser Aluminum and Chemical Corp., Olin Mathieson Chemical Corp., and Reynolds Metals Co., and the merged companies included for years prior to merger are Rome Cable Corp., Southern Electrical Corp., and U.S. Rubber Co. "Other producers" include captive plants in all years.

(2) The sum of "Insulated or Covered Wire and Cable" and "ACSR and Bare Cable" items from the U.S. Department of Commerce, BDSA, Aluminum and Magnesium Division reports entitled "Gross Shipments of Aluminum Mill Shapes by Integrated and Nonintegrated Producers" for the period in question.

(3) The sum of the following:

(a) "Integrated Producers" shipments taken from reports in note (2) above, increased by addition of shipments of merged companies for years prior to merger, obtained fron documents and answers supplied by Plaintiff in answer to Defendants' Interrogatories and Document Production; and

(b) "Primary Producers or Affiliates" shipments of "Insulated or Covered Wire and Cable" reported in the U.S. Department of Commerce, BDSA, Aluminum and Magnesium Division report dated November 8, 1961, entitled "Shipments of Wire by Primary Producers or Affiliates (Including Merged Companies) and Other Producers, 1954–1960."

(4) The sum of the following:

(a) "Nonintegrated Producers" shipments, taken from reports in note (2) above, decreased by subtracting shipments of merged companies for years prior to merger, obtained from documents and answers supplied by Plaintiff in answer to Defendants' Interrogatories and Document Production; and

(b) "Other Producers" shipments of "Insulated or Covered Wire and Cable" reported in the U.S. Department of Commerce, BDSA, Aluminum and Magnesium Division report dated November 8, 1961, entitled "Shipments of Wire by Primary Producers or Affiliates (Including Merged Companies) and Other Producers, 1954–1960."

(5) Shipments reported by Alcoa and Rome to U.S. Department of Commerce on Form BDSAF–122 during the period in question.

[fol. 6579]

IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 62

Post-Acquisition Growth of Non-Integrated Producers of ACSR and Aluminum Cabel, Bare (1958–1961) (1)

Year	Total (2)		Primary Producers or Affiliates (3)			Other Producers (4)			Alcoa—Rome (5)		
	Thou. Pounds	% Change from 1958	Thou. Pounds	%	% Change from 1958	Thou. Pounds	%	% Change from 1958	Thou. Pounds	%	% Change from 1958
1958	175,157	....	151,668	86.6	....	23,489	13.4	....	57,527	32.8	....
1959	197,065	+12.5	165,007	83.7	+ 8.8	32,058	16.3	+36.5	63,276	32.1	+10.0
1960	184,402	+ 5.3	154,443	83.8	+ 1.8	29,959	16.2	+27.5	56,654	30.7	− 1.5
1961	234,265	+33.7	203,133	86.7	+33.9	31,132	13.3	+32.5	66,143	26.1	+15.0

Sources:

(1) Primary producers or affiliates included, for all years 1954–1960, are Aluminum Company of America, Anaconda Wire & Cable Co., Kaiser Aluminum and Chemical Corp., Olin Mathieson Chemical Corp., and Reynolds Metals Co., and the merged companies included for years prior to merger are Rome Cable Corp., Southern Electrical Corp., and U.S. Rubber Co.

(2) U.S. Department of Commerce, BDSA, Aluminum & Magnesium Division, reports entitled, "Gross Shipments of Aluminum Mill Shapes by Integrated and Non-Integrated Producers" for the period in question.

(3) Same as (2), except that "Integrated Producers" volume is increased by addition of volumes of merged companies for years prior to merger, obtained from documents and answers supplied by Plaintiff in answer to Defendants' Interrogatories and Document Production.

(4) Same as (2), except that "Non-Integrated Producers" volume is reduced by subtraction of volumes of merged companies for years prior to merger, obtained from documents and answers supplied by Plaintiff in answer to Defendants' Interrogatories and Document Production.

(5) Shipments reported by both Alcoa and Rome to U.S. Department of Commerce on Form BDSAF–122 during the period in question.

[fol. 6580]

IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 63

Post-Acquisition Growth of Non-Integrated Producers of Aluminum Insulated or Covered Wire and Cable (1958–1961) (1)

Year	Total (2)		Primary Producers or Affiliates (2)			Other Producers (2)			Alcoa—Rome (3)		
	Thou. Pounds	% Change from 1958	Thou. Pounds	%	% Change from 1958	Thou. Pounds	%	% Change from 1958	Thou. Pounds	%	% Change from 1958
1958	51,346	....	36,056	70.2	....	15,290	29.8	....	8,381	16.3	....
1959	61,153	+19.0	41,641	68.1	+15.4	19,512	31.9	+27.6	10,141	16.6	+20.9
1960	64,215	+25.0	43,197	67.3	+19.8	21,018	32.7	+37.5	9,536	14.8	+13.8
1961	68,876	+34.1	45,789	66.5	+27.0	23,087	33.5	+51.0	8,947	13.0	+ 6.7

Sources:

(1) Primary producers or affiliates included, for all years 1954–1960, are Aluminum Company of America, Anaconda Wire & Cable Co., Kaiser Aluminum and Chemical Corp., Olin Mathieson Chemical Corp., and Reynolds Metals Co., and the merged companies included for years prior to merger are Rome Cable Corp., Southern Electrical Corp., and U.S. Rubber Co. "Other producers" include captive plants in all years.

(2) U.S. Department of Commerce, BDSA, Aluminum and Magnesium Division report dated November 8, 1961, entitled, "Shipments of Wire by Primary Producers or Affiliates (Including Merged Companies) and Other Producers, 1954–1960." Data for 1961 from current quarterly reports entitled, "Gross Shipments of Aluminum Mill Shapes by Integrated and Non-Integrated Producers."

(3) Shipments reported by Alcoa and Rome to U.S. Department of Commerce on Form BDSAF-122 during the period in question.

[fol. 6581]

[fol. 6581]

IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 64

Post-Acquisition Growth of Non-Integrated Producers of Aluminum Conductor Wire and Cable (1958–1961) (1)

Year	Total (2)		Primary Producers or Affiliates (3)			Other Producers (4)			Alcoa—Rome (5)		
	Thou. Pounds	% Change from 1958	Thou. Pounds	%	% Change from 1958	Thou. Pounds	%	% Change from 1958	Thou. Pounds	%	% Change from 1958
1958	226,503	....	187,724	82.9	....	38,779	17.1	....	65,908	29.1	....
1959	258,218	+14.0	206,648	80.0	+10.1	51,570	20.0	+33.0	73,417	28.4	+11.4
1960	248,617	+ 9.8	197,640	79.5	+ 5.3	50,977	20.5	+31.5	66,190	26.6	+ 0.4
1961	303,141	+33.8	248,922	82.1	+32.6	54,219	17.9	+39.8	75,090	24.8	+13.9

Sources:

(1) Primary producers or affiliates included, for all years 1954–1960, are Aluminum Company of America, Anaconda Wire & Cable Co., Kaiser Aluminum and Chemical Corp., Olin Mathieson Chemical Corp., and Reynolds Metals Co., and the merged companies included for years prior to merger are Rome Cable Corp., Southern Electrical Corp., and U.S. Rubber Co. "Other producers" include captive plants in all years.

(2) The sum of "Insulated or Covered Wire and Cable" and "ACSR and Bare Cables" item from the U.S. Department of Commerce, BDSA, Aluminum and Magnesium Division reports entitled "Gross Shipments of Aluminum Mill Shapes by Integrated and Non-Integrated Producers" for the period in question.

(3) The sum of the following:

(a) "Integrated Producers" shipments taken from reports in note (2) above, increased by addition of shipments of merged companies for years prior to merger, obtained from documents and answers supplied by Plaintiff in answer to Defendants' Interrogatories and Document Production; and

(b) "Primary Producers or Affiliates" shipments of "Insulated or Covered Wire and Cables" reported in the U.S .Department of Commerce, BDSA, Aluminum and Magnesuim Division report dated November 8, 1961, entitled "Shipments of Wire by Primary Producers or Affiliates (Including Merged Companies) and Other Producers, 1954–1960."

(4) The sum of the following:

(a) "Non-Integrated Producers" shipments, taken from reports in note (2) above, decreased by subtracting shipments of merged companies for years prior to merger, obtained from documents and answers supplied by Plaintiff in answer to Defendants' Interrogatories and Document Production; and

(b) "Other Producers" shipments of "Insulated or Covered Wire and Cable" reported in the U.S. Department or Commerce, BDSA, Aluminum and Magnesium Division report dated November 8, 1961, entitled "Shipments of Wire by Primary Producers or Affiliates (Including Merged Companies) and Other Producers, 1954–1960."

(5) Shipments reported by Alcoa and Rome to U.S. Department of Commerce on Form BDSAF–122 during the period in question.

[fol. 6582] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 65

Copper and Aluminum Utilization in Weatherproof Wire
(Thousands of Dollars)

	1958			1959		
	Total	Aluminum	Copper	Total	Aluminum	Copper
Total—Census of Manufactures (1)	$37,988					
Alcoa (2)	$ 1,368	$1,368	.....	$1,447	$1,447	.....
Anaconda Co.(4)	5,690	1,749	$3,941		(5)	
General Cable Corp.(4)	4,464	1,027	3,437	4,983	1,087	$3,896
Kaiser Alum. & Chemical Corp.(4)	788	788			(5)	
Olin Mathieson Chemical		(5)			(5)	
Reynolds Metals					(5)	
Rome Cable (3)	2,221	482	1,739	2,235	332	1,903
Southwire Co.(4)		(5)	825		(5)	

Other Companies Known to Manufacture Weatherproof—No Data Available

American Insulated Wire Corp.
Circle Wire & Cable
Collyer Insulated Wire Co.
General Electric Co.
Hendrix Wire & Cable Copr.
Kennecott Copper
Narragansett Wire & Cable Co.
Nehring Electrical Works
Roeblings, John A. & Sons Corp.
Triangle Conduit & Cable Co.
United States Steel Corp.

Notes:

(1) 1958 Census of Manufactures, U.S. Department of Commerce, Bureau of Census, Preprint Report No. MC 58(2)-33D, "Nonferrous Metal Mill and Foundry Products," Table 6A, page 33D-23. S.I.C. codes 33579-31, 33579-37 and 33579-39, ("Weatherproof and slow burning wire").

(2) Dollar sales as shown in Table I (page 5) of Defendants' Answers to Plaintiff's Interrogatories.

(3) Dollar sales as shown in Table I (page 8) of Defendants' Answers to Plaintiff's Interrogatories.

(4) Other companies' sales data from documents supplied Defendants by Department of Justice pursuant to Defendants' R-34 Motion.

(5) Quantities reported—no dollar values.

[fol. 6583] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 66

Copper and Aluminum Utilization in Service Drop Cable
(Thousands of Dollars)

	1958			1959		
	Total	Aluminum	Copper	Total	Aluminum	Copper
Total—Census of Manufactures (1)	$28,053					
Alcoa (2)	$ 2,841	$2,841	.....	$3,410	$3,410	.....
Anaconda Co.(4)	3,683	3,472	$211		(5)	
General Cable Corp.(4)	2,610	2,432	178	3,485	3,194	$291
Kaiser Alum. & Chemical Corp.		(5)			(5)	
Olin Mathieson Chemical		(5)			(5)	
Reynolds Metals					(5)	
Rome Cable (3)	1,528	1,250	278	1,643	1,327	316
Southwire Co.(4)	889	812	77		(5)	

Other Companies Known to Manufacture Service Drop—No Data Available

Central Cable Corp.	Kennecott Copper
Circle Wire and Cable	Narragansett Wire & Cable
Collyer Insulated Wire Co.	Nehring Electrical Works
General Electric Co.	Phelps Dodge

Notes:

(1) 1958 Census of Manufactures, U.S. Department of Commerce, Bureau of Census, Preprint Report No. MC 58(2)-33D, "Nonferrous Metal Mill and Foundry Products," Table 6A, page 33D-23. S.I.C. codes 33579-44, 33579-45, ("Service Cable, Rubber" and "Service Cable, Thermoplastic").

(2) Dollar sales as shown in Table I (page 5) of Defendants' Answers to Plaintiff's Interrogatories.

(3) Dollar sales as shown in Table I (page 9) of Defendants' Answers to Plaintiff's Interrogatories.

(4) Other companies' sales data from documents supplied Defendants by Department of Justice pursuant to Defendants' R-34 Motion.

(5) Quantities reported—no dollar values available.

[fol. 6584] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 67

Copper and Aluminum Utilization in Weatherproof and Service Drop Cable
(Thousands of Dollars)

	1958			1959		
	Total	Aluminum	Copper	Total	Aluminum	Copper
Total—Census of Manufactures (1)	$66,041					
Alcoa (2)	$ 4,209	$4,209	.....	$4,857	$4,857	.....
Anaconda Co.(4)	9,373	5,221	$4,152		(5)	
General Cable Corp.(4)	7,074	3,459	3,615	8,468	4,281	$4,187
Kaiser Alum. & Chemical Corp.(4)		788(6)			(5)	
Olin Mathieson Chemical		(5)			(5)	
Reynolds Metals Co.					(5)	
Rome Cable (3)	3,749	1,732	2,017	3,878	1,659	2,219
Southwire Co.(4)		812(7)	902		(5)	

Other Companies Known to Manufacture Weatherproof and/or Service Drop Cable—No Data Available

American Insulated Wire Corp.
Central Cable Corp.
Circle Wire and Cable
Collyer Insulated Wire Co.
General Electric Co.
Hendrix Wire & Cable Corp.
Kennecott Copper
Narragansett Wire & Cable Co.
Nehring Electrical Works
Phelps Dodge
Roeblings, John A. & Sons Corp.
Triangle Conduit & Cable Co.
United States Steel Corp.

Notes:

(1) 1958 Census of Manufactures, U.S. Department of Commerce, Bureau of Census, Preprint Report No. MC 58(2)-33D, "Nonferrous Metal Mill and Foundry Products," Table 6A, page 33D-23. S.I.C. codes 33579-31, 33579-37, 33579-39, 33579-44 and 33579-45.

(2) Dollar sales as shown in Table I (page 5) of Defendants' Answers to Plaintiff's Interrogatories.

(3) Dollar sales as shown in Table I (pages 8-9) of Defendants' Answers to Plaintiff's Interrogtories.

(4) Other companies' sales data from documents supplied Defendants by Department of Justice pursuant to Defendants' R-34 Motion.

(5) Quantities reported for both weatherproof and service drop, but no dollar values available.

(6) Weatherproof only.

(7) Service Drop only.

THE ALUMINUM ASSOCIATION
420 LEXINGTON AVENUE
NEW YORK 17, NEW YORK

DEFENDANTS' EXHIBIT 69

Revised: May 1, 1961
Supersedes: November 15, 1960

REGISTRATION RECORD OF ALUMINUM ASSOCIATION ALLOY DESIGNATIONS AND CHEMICAL COMPOSITION LIMITS FOR WROUGHT ALUMINUM ALLOYS

Chemical Composition Limits (1) [illegible]

Only compositions which conform to those listed [illegible] with the Aluminum Association should be designated as "AA" alloys

AA NUMBER	FORMER DESIGNATION	REGISTERED BY	SILICON	IRON	COPPER	MANGANESE	MAGNESIUM	CHROMIUM	NICKEL	ZINC	TITANIUM	OTHERS (3) Each	OTHERS (3) Total	ALUMINUM Min (4) (5)
EC (6)	EC	.....												
1100	32	.....	1.0 Si + Fe		0.20	0.05	.....	.....	.....	0.10	.....	0.05 (7)	0.15	99.00
1200	A52	.....	1.0 Si + Fe		0.10	0.05	.....	.....	.....	0.10	.....	0.05	0.15	99.00
1300	A615	.....	0.30	0.6	0.10	0.05	0.05	.....	.....	0.05	0.05	0.03	.....	99.30
1130 (2)	E250	.....	0.7 Si + Fe		0.30	.....	.....	.....	.....	.....	.....	0.03	.....	99.30
1230 (7)	80.3	.....	0.7 Si + Fe		0.10	0.05	.....	.....	.....	0.10	.....	0.05	.....	99.30
1230	E615	.....	0.7 Si + Fe		0.30	.....	.....	.....	.....	0.10	.....	0.05	.....	99.30
1135	.....	Alcoa	0.65 Si + Fe		0.20	0.04	.....	.....	.....	.....	.....	0.05	.....	99.35
1145 (8)	E600,80.35	.....	0.55 Si + Fe		0.05	.....	.....	.....	.....	.....	.....	0.05	.....	99.45
1235	.....	Reiner	0.15	0.30-0.50	.....	.....	.....	.....	.....	.....	0.03	0.05	.....	99.35
1435	.....	Reiner	0.15	0.30-0.50	0.05	.....	.....	.....	.....	.....	0.03	0.05	.....	99.35
1145 (8)	E615	.....	0.55 Si + Fe		0.05	0.05	.....	.....	.....	.....	0.03	0.05	.....	99.45
1345	.....	Alcoa	(9)	(9)	0.04	0.03	0.01	0.03	0.01	0.03	0.03	(9)	.....	99.45
1345 (10)	.....	Alcoa	0.30	0.40	0.10	0.05	0.01	0.03	0.01	0.03	0.03	0.05	.....	99.45
1050	A615	.....	0.25	0.40	0.05	0.05	0.05	.....	.....	0.05	0.03	0.03	.....	99.50
1150	.....	Reiner	0.65 Si + Fe		0.20	.....	.....	.....	.....	.....	.....	0.05	.....	99.30
1250	.....	Alcoa	0.30	0.40	0.10	0.01	0.01	0.01	.....	0.05	(11)	0.03 (12)	.....	99.50
1060	E615	.....	0.25	0.35	0.05	0.03	0.03	.....	.....	0.05	0.03	0.03 (13)	.....	99.60
1160	C260,E8.6	.....	Canceled April 22, 1958.			Superseded by 1060								
1360	E615	.....	0.08 Si + Fe		0.04	0.01	.....	.....	.....	.....	.....	0.03 (12)	.....	99.60 (5)
1260	.....	*ASTC	0.40 Si + Fe		0.04	0.05	.....	.....	.....	.....	.....	0.03	.....	99.60 (5)
1345	.....	Reiner	0.05	0.10	0.10-0.30	0.03	0.03	0.03	.....	0.03	0.03	0.03	0.10	99.60 (5)
1070	EC18	.....	0.20	0.25	0.04	0.03	0.03	.....	.....	0.04	0.03	0.03	.....	99.70
1170	EC18	.....	0.20 Si + Fe		0.03	0.03	0.03	0.03	.....	0.03	0.03	0.03	.....	99.70
1270	EC18	.....	0.20 Si + Fe		0.01	0.01	.....	.....	.....	.....	.....	0.03	.....	99.70
1075	JC18	.....	0.30	0.30	0.04	0.03	0.03	.....	.....	0.04	0.03	0.03	.....	99.75
1175 (6)	99.75	.....	0.15 Si + Fe		0.10	.....	.....	.....	.....	.....	.....	0.03	.....	99.75
1080	EC18,E600	.....	0.15	0.15	0.03	0.03	0.03	.....	.....	0.03	0.03	0.02	.....	99.80
1180 (10)	CC18,99.8	.....	0.08	0.08	0.01	.....	.....	.....	.....	.....	0.03	0.02	.....	99.80
1085	A85	.....	0.10	0.12	0.03	0.03	0.03	.....	.....	0.03	0.03	0.02	.....	99.85
1185	C85	.....	0.15 Si + Fe		0.01	.....	.....	.....	.....	.....	.....	0.01 (12)	.....	99.85
1285	E615	.....	0.08 (14)	0.08 (14)	0.03	.....	.....	.....	.....	.....	.....	0.03	.....	99.85
1187 (15)	E615,99.87	.....	Canceled	September	10, 1958.	Superseded by 1185								
1188 (6)	E615	.....	0.06	0.06	0.005	0.01	0.01			0.02	0.01	0.01 (16)	.....	99.88
1090	F715	.....	0.07	0.07	0.02	0.01	0.01			0.02	0.01	0.01 (16)	.....	99.90
1095	AA19	.....	0.050	0.060	0.010	0.010	0.010			0.010	0.005	0.005	.....	99.95
1197 (15)	CA19	.....	Canceled	September	10, 1958.	Superseded by 1199								
1098	BA19	.....												
1198 (15)	.....	Alcoa	0.006	0.006	0.006	.....	0.006			0.006	.....	0.002	.....	99.98
3011	118	.....	0.40	0.7	0.5-0.8	.....	.....			0.30	.....	0.05 (16)	0.15	Remainder
3014	148,E301 core	.....	0.50-1.3	1.0	3.9-5.0	0.40-1.2	0.30-0.8	0.10		0.25	0.15	0.05 (16)	0.15	Remainder
23014	E3148	.....	0.50-1.3	0.35	3.9-5.0	0.40-1.2	0.30-0.8	0.10		0.25	0.15	0.05	0.15	Remainder
23014	E3148	.....	Canceled	September	22, 1960									
23017	E3168	.....	0.50-1.5	1.2	3.5-5.0	0.50-1.0	0.30-0.8		0.6	0.6		0.15 (16)	0.30	Remainder
3017	178	.....	0.8	1.0	3.5-4.5	0.40-1.0	0.30-0.8	0.10		0.25		0.05	0.15	Remainder
3117	A178	.....	0.8	1.0	3.2-3.8	0.20	0.20-0.50	0.10		0.25		0.05	0.15	Remainder
3018	188	.....	0.9	1.0	3.5-4.5	0.20	0.40-0.9	0.10	1.7-2.3	0.25		0.05	0.15	Remainder
3118	E188	.....	0.9	1.0	3.5-4.5	0.20	1.2-1.8	0.10	1.7-2.3	0.25		0.05	0.15	Remainder
23018	F188,E254	.....	0.26	0.8-1.3	1.0-3.7		1.3-1.8		0.9-1.3			0.05	0.15	Remainder
23119	XA198	.....	0.40	0.40	3.8-4.4	0.17-0.25					0.04-0.10	0.05	0.15	Remainder
3219	.....	Alcoa	0.30	0.30	5.8-6.8	0.20-0.40	0.02			0.10	0.10-0.30	0.05	0.15	Remainder
3219 (17)	.....	Alcoa	0.30	0.30	5.8-6.8	0.20-0.40	0.02			0.10	0.10-0.30	0.05 (17)	0.15	Remainder
23030	.....	Alcoa	0.40	0.40	4.0-5.0	0.20-0.8	0.03			0.25	0.10	0.05	0.15	Remainder
3024	248	.....	0.50	0.50	3.8-4.8	0.20-0.8	1.2-1.8	0.10		0.25		0.05	0.15	Remainder
3025	258	.....	0.50-1.3	1.0	3.8-5.0	0.40-1.2	0.05	0.10		0.25	0.15	0.05	0.15	Remainder
3225	E255	.....	0.50-1.3	0.50	3.8-5.0	0.40-1.2	0.05	0.10		0.25	0.15	0.05	0.15	Remainder
3003	38	.....	0.6	0.7	0.20	1.0-1.5				0.10		0.05 (18)	0.15	Remainder
23103	.....	Harvey	Canceled	September	22, 1960									
3004	48	.....	0.30	0.7	0.25	1.0-1.5	0.8-1.3			0.25		0.05 (18)	0.25	Remainder
23005	2A58	.....	0.6	0.7	0.25	1.0-1.5	0.20-0.6	0.10		0.25	0.10	0.05	0.15	Remainder
3105	.....	Alcoa	0.6	0.7	0.40	0.30-1.5	0.20-0.8	0.25		0.40	0.10	0.05	0.15	Remainder
3305	.....	Reynolds	0.6	0.7	0.25	0.10-1.5	0.10-0.6	0.10		0.25	0.10	0.05	0.15	Remainder
4001	.....	Reynolds	1.5-2.5	0.8	0.30	0.10	0.05			0.10	0.15	0.05	0.15	Remainder
4101	.....	Reynolds	1.5-3.0	0.8	0.30	0.10	0.10-0.30			0.10		0.05	0.15	Remainder
4032	328	.....	11.0-13.5	1.0	0.30-1.3		0.8-1.3	0.10	0.50-1.3	0.25		0.05	0.15	Remainder
4043	428,E145	.....	4.5-6.0	0.8	0.30	0.05	0.05			0.10	0.20	0.05 (18)	0.15	Remainder
4343 (19)	C438,448,E143	.....	6.8-8.2	0.8	0.25	0.10				0.20		0.05	0.15	Remainder
4543	E3439	.....	5.0-7.0	0.50	0.10	0.05	0.10-0.40	0.05		0.10	0.10	0.05	0.15	Remainder
4045	438	.....	9.0-11.0	0.8	0.30	0.05	0.05			0.10	0.20	0.05	0.15	Remainder
4145 (19)	.....	Alcoa	9.3-10.7	0.8	3.3-4.7	0.15	0.15	0.15		0.20		0.05	0.15	Remainder
4345 (19)	.....	Alcoa	9.3-10.7	0.8	3.3-4.7	0.07	0.07	0.07		0.3-10.7		0.05	0.15	Remainder
4047 (19)	3478	.....	11.0-13.0	0.8	0.30	0.15	0.10			0.20		0.05	0.15	Remainder
23001	.....	Revere	Canceled	April 28,	1960									
23003	.....	Reiner	0.10	0.15	0.10-0.20	.....	0.9-1.5	.....	.....	.....	.....	0.05	0.15	Remainder
23003	.....	Reiner	Canceled	April 28,	1960									
23004	.....	Bridgeport			0.30 (12)		1.0 (19)							Remainder
3005	A305,E305AX155	.....	0.40	0.7	0.30	0.30	0.50-1.1	0.10	.....	0.25	.....	0.05	0.15	Remainder
5105	.....	Revere	Canceled	April 28,	1960									
5305	.....	Reiner	0.15	0.7	0.10	0.3%	0.50-1.1	0.10	.....	0.25	.....	0.05	0.15	Remainder
23400	E3608	.....					0.50-1.1						0.03	Remainder
23008	E3539	.....	Canceled	September	22, 1960									
3007	.....	Consolidated	0.006	0.006	0.006	0.001	0.40-0.6	0.001	0.001	0.003	0.002	0.002		99.35

For Footnotes see Page 3

[fol. 6586]

Chemical Composition Limits ① ② (Continued)

Only compositions which conform to those listed herein or are registered with The Aluminum Association should be designated as "AA" alloys.

AA Number	Former Designation	Registered By	Silicon	Iron	Copper	Manganese	Magnesium	Chromium	Nickel	Zinc	Titanium	Others ③ Each	Others ③ Total	Aluminum Min ④ ⑤
8090	....	Consolidated	0.006	0.006	0.006	0.001	0.6-1.1	0.001		0.003	0.002	0.002	....	99.56
8085	....	Consolidated	0.005	0.005	0.005	0.001	1.0-2.0	0.001		0.003	0.002	0.002	....	97.75
21200	....	Bridgeport												
21300	....	Alcoa	0.30	0.7	0.35	0.6-1.0	1.0-1.5	0.10		0.25		0.05	0.15	Remainder
8004	302	....	0.40	0.7	0.30	0.15	1.0-1.5	0.10		0.25		0.05	0.15	Remainder
8005	303	....	0.45 Si + Fe		0.10	0.10	2.3-2.8	0.15-0.35		0.10		0.05	0.15	Remainder
8103	....	Kaiser	0.40	0.50	0.30	0.30	2.6-3.6	0.35		0.25		0.05	0.15	Remainder
8002	....	Kaiser	0.90	0.10	0.10	0.10	2.3-2.8					0.05	0.10	Remainder
8003	7003	....	0.40 Si + Fe		0.04	0.01	2.3-2.7	0.15-0.35		0.10		0.05	0.15	Remainder
8104	7004	....	0.45 Si + Fe		0.10	0.10	2.1-2.6	0.15-0.35		0.20	0.02	0.05	0.15	Remainder
8004	7005	....	0.45 Si + Fe		0.06	0.01	2.1-2.6	0.15-0.35		0.20	0.06	0.05	0.15	Remainder
8484	....	....	0.45 Si + Fe		0.10	0.50-1.0	2.6-3.6	0.05-0.20		0.25	0.20	0.05	0.15	Remainder
8004 ⑥	....	Alcoa	0.40 Si + Fe		0.10	0.50-1.0	2.6-3.6	0.05-0.20		0.25	0.05-0.20	0.05 ⑥	0.15	Remainder
21000	2000	Canceled October 19, 1956.												
8005	....	Reynolds	0.30	0.7	0.35	0.30-0.6	2.6-3.6	0.05-0.25		0.25	0.15	0.05	0.15	Remainder
8006	800	....	0.30	0.40	0.10	0.05-0.20	2.6-3.6	0.05-0.20		0.25		0.05 ⑥	0.15	Remainder
21100	....	Kaiser	....	....	....	....	....	....		....	....	....	....	....
8006	3003	....	0.50 Si + Fe		0.10	0.05-0.20	0.8-1.5	0.05-0.20		0.10	0.05-0.20	0.05 ⑥	0.15	Remainder
8008	....	Alcoa	0.40 Si + Fe		0.10	0.05-1.0	0.8-1.5	0.05-0.20		0.25		0.05 ⑥	0.15	Remainder
8009 ⑥	....	Alcoa,	0.40 Si + Fe		0.10	0.50-1.0	0.7-1.5	0.05-0.20		0.25	0.05-0.20	0.05 ⑥	0.15	Remainder
8027	....	Reynolds	0.08	0.10	0.10	0.03	5.0-6.0			0.03		0.03	0.08	Remainder
8287	C370, K157	....	0.13	0.17	0.20	0.10-0.40	0.8-1.3					0.05	0.15	Remainder
8487	....	Alcoa	0.08	0.10	0.20	0.10-0.40	0.8-1.3					0.05	0.10	Remainder
8007	....	Alcoa	0.10	0.13	0.15	0.10-0.40	0.40-0.8					0.03	0.10	Remainder
8057	....	Reynolds	0.08	0.10	0.10	0.03	0.8-1.0			0.03		0.03	0.08	Remainder
87757	....	Alcoa	0.08	0.10	0.08-0.12		0.8-1.0	0.06-0.15			0.08	0.03	0.10	Remainder
8027	....	Ellis	0.08	0.13	0.08-0.20	0.10	0.50-0.8					0.03	0.10	Remainder
8007	....	Kaiser	0.40	0.7	0.35	0.10-0.50	0.60-0.8	0.15		0.25		0.05	0.15	Remainder
8083	LK180	....	0.40	0.40	0.10	0.30-1.0	4.0-4.9	0.05-0.25		0.25	0.15	0.05	0.15	Remainder
81083 ⑥	....	Kaiser	0.40	0.40	0.10	0.50-1.0	4.0-4.9	0.05-0.25		0.25	0.15	0.05	0.15	Remainder
82084	....	Kaiser	0.40	0.40	....	0.8	1.0 ⑥	0.10 ⑥		1.0 ⑥	....	....	....	....
81104 ⑥	....	Kaiser	0.40	0.40	....	0.8	1.0 ⑥	0.10		1.0 ⑥	....	....	....	....
8085	2180	....	0.40	0.50	0.10	0.50-0.7	3.5-4.7	0.05-0.25		0.25	0.15	0.05	0.15	Remainder
8081 ⑥	....	Reynolds	Canceled July 8, 1965. Superseded by 8101											
8101 ⑥	....	Reynolds	0.30-0.7	0.50	0.10	0.03	0.30-0.8	0.03		0.10		0.03 ⑥	0.10	Remainder
8201 ⑥	....	Revere												
8003 ⑥	....	Kaiser	0.30-0.8	0.50	0.10	0.03	0.8-0.9	0.03		0.10		0.03 ⑥	0.10	Remainder
8003 ⑥	8000, K162	....	0.30-1.0	0.8	0.10	0.8	0.8-1.3	0.20		0.30	0.10	0.05	0.15	Remainder
8011	8011	....	0.6-1.2	1.0	0.40-0.8	0.8	0.6-1.3	0.30	0.30	1.5	0.30	0.05	0.15	Remainder
8081	818	....	0.6-1.2	1.0	0.15	0.30	0.40-0.8			0.25		0.05	0.15	Remainder
81151	A818	....	0.6-1.2	1.0	0.35	0.30	0.40-0.8	0.15-0.35		0.25	0.15	0.05	0.15	Remainder
82081	28818	....	0.6-1.2	0.20	0.05	0.30	0.40-0.8	0.15-0.35		0.25	0.15	0.05	0.15	Remainder
8281	....	Kaiser	0.7-1.3	0.30	0.10	0.40-0.8	0.40-0.8				0.20	0.05	0.15	Remainder
8081	J818, K160	....	0.30-0.50	0.8	0.15-0.40	0.10	0.40-0.8			0.50		0.05	0.15	Remainder
8083	820	....	....	0.35	0.10	....	1.1-1.4	0.15-0.35		0.10	....	0.05	0.15	Remainder
82083 ⑥	2820	....	....	0.50	0.10	....	1.0-1.5	0.15-0.35		1.0-2.4	....	0.05	0.15	Remainder
82853	C820	....	Canceled September 22, 1960											
82853	K820	....	Canceled September 22, 1960											
8853	2820	....	Canceled September 22, 1960											
8081	612	....	0.40-0.8	0.7	0.15-0.40	0.15	0.8-1.2	0.15-0.35	....	0.25	0.15	0.05	0.15	Remainder
82085	620	Kaiser	0.40-0.8	0.10	0.15-0.40	0.15	0.8-1.2	0.15-0.35	....	0.25	0.15	0.05	0.15	Remainder
82183	....	....	0.40-0.8	0.7	0.15-0.40	0.15	0.8-1.2	0.04-0.14	....	0.25	0.15	0.05	0.15	Remainder
2 6283	....	Reynolds	....	....	....	....	....	....	....	....	....	....	....	....
8483	630	Alcoa	0.40-0.8	0.7	0.15-0.40	0.15	0.8-1.2	0.04-0.14	....	0.25	0.15	0.05 ⑥	0.15	Remainder
			0.30-0.8	0.35	0.10	0.10	0.45-0.9	0.10	....	0.10	0.06	0.05	0.15	Remainder
28182	....	Alcoa	0.30-0.50	0.03	0.01	0.01	0.50-0.8	0.005	0.001	0.01	....	0.002 ⑥	....	Remainder
82085 ⑥	....	Revere	Canceled July 12, 1965. Superseded by 8101											
8283	....	Alcoa	0.30-0.6	0.35	0.05	0.01	0.45-0.9	0.10	....	0.10	0.10	0.05	0.15	Remainder
8483	....	Alcoa	0.30-0.6	0.35	0.30	0.01	0.45-0.9		....			0.05	0.15	Remainder
2 8883	....	Alcoa	0.30-0.45	0.15	0.15	0.05	0.35-0.7		....			0.05	0.15	Remainder
28084	2840	....	0.40-0.8	0.50	0.15-0.40	0.05	0.8-1.2	0.05	....	0.10	....	0.05 ⑥	0.10	Remainder
82183	K2640	....	Canceled September 22,1960											
6384	2640	....	Canceled September 22, 1960											
8088	648	....	0.8-1.8	0.50	0.7-1.2	0.6-1.1	0.8 1.4	0.40	....	0.25	0.20	0.05	0.15	Remainder
7071	HK100	....	0.25	0.40	1.6-2.6	0.30	2.0-3.4	0.10-0.40	....	0.8-8.0	0.20	0.05	0.15	Remainder
7070	708	....	Canceled September 22, 1960											
27270	2C708	....	Canceled September 22, 1960											
7072 ⑥	728	....	0.7 Si + Fe		0.10	0.10	0.10	....	....	0.8-1.3	....	0.05	0.15	Remainder
27272	2C728	....	0.7 Si + Fe		0.10	0.10	0.10	....	....	2.5-3.8	....	0.05	0.15	Remainder
7272	....	Alcoa	....	....	....	....	....	....	....	....	....	....	....	....
7 7472	....	Alcoa	0.25	0.6	0.05	0.05	0.9-1.5	....	....	1.5-1.9	....	0.05	0.15	Remainder
27072	2728	Canceled September 22, 1960												
7075	758	....	0.50	0.7	1.2-2.0	0.30	2.1-2.9	0.18-0.40	....	5.1-6.1	0.20	0.05	0.15	Remainder
7178	....	Alcoa	0.15	0.30	1.2-2.0	0.10	2.1-2.9	0.18-0.30	....	5.1-6.1	0.10	0.05	0.15	Remainder
27275	....	Kaiser	0.10 Si + Fe		1.2-2.0	0.30	2.1-2.9	0.18-0.40	....	5.1-6.1	0.10	0.05	0.10	Remainder
27375	2C75J	Canceled September 22, 1960												
7078	768	....	0.40	0.5	0.30-1.0	0.30-0.8	1.3-2.0			7.0-8.0	0.20	0.05	0.15	Remainder
7277	B778	....	0.50	0.7	0.8-1.7	....	1.7-2.3	0.18-0.35	....	3.7-4.3	0.10	0.05	0.15	Remainder
7178	1A788	....	0.50	0.7	1.6-2.4	0.30	2.4-3.1	0.18-0.40	....	6.3-7.3	0.20	0.05	0.15	Remainder
7079	1798	....	0.30	0.40	0.40-0.8	0.10-0.30	2.9-3.7	0.10-0.35	....	3.8-4.8	0.10	0.05	0.15	Remainder
7179	....	Alcoa	0.15	0.20	0.40-0.8	0.10-0.30	2.9-3.7	0.10-0.35	....	3.8-4.8	0.10	0.05	0.15	Remainder
27279	....	Kaiser	0.10 Si + Fe		0.40-0.8	0.10-0.30	2.9-3.7	0.10-0.35	....	3.8-4.8	0.10	0.05	0.15	Remainder
28001	....	Alcoa	0.17	0.45-0.7	0.15	....	....	....	0.9-1.3	3.9-4.8	0.10	0.02	0.10	Remainder
28002	....	Alcoa	0.25	1.2-1.8	0.05	....	....	....	1.3-1.8	....	....	0.05 ⑥	0.15	Remainder
28003	....	Alcoa	0.05	1.2-1.8	....	....	....	....	1.3-1.8	....	....	0.05 ⑥	0.15	Remainder
8112	K112	....	1.0	1.0	0.40	0.8	0.7	0.20	....	....	....	....	0.03	Remainder
8212	....	Kaiser	1.0	1.0	0.10-0.40	0.15-0.50	0.05-0.35	0.20	....	1.0	....	0.05	0.15	Remainder
8013	....	Kaiser	0.25 Si + Fe		....	....	....	....	....	1.0	....	0.05	0.15	Remainder
28280	2H808	....	1.0-1.0	0.7	0.7-1.3	0.10	....	0.30-0.50	0.30-0.7	....	0.10	0.05	0.10	Remainder
28380	2C808	....	0.40	0.7	1.7-2.3	0.10	0.8-0.9	....	0.9-1.5	....	0.10	0.05 ⑥	0.15	Remainder
28480	2C808	....	0.7	0.7	0.7-1.3	0.16	....	....	0.7-1.3	....	0.20	....	0.20	Remainder
8099	K399	....	....	....	....	....	....	....	....	....	0.20	....	0.20	Remainder
														98 7 ⑤

For Footnotes see Page 3

[fol. 6587]

THE ALUMINUM ASSOCIATION
420 LEXINGTON AVENUE
NEW YORK 17, NEW YORK

Revised: May 1, 1961
Supersedes: November 15, 1960

Footnotes to Table of Chemical Composition Limits on Pages 1 and 2

(1) Composition in percent maximum unless shown as a range, a minimum or a nominal value.

Standard limits for alloying elements and impurities are expressed to the following places:

Less than 1/1000 percent	.0.000X
1/1000 to 1/100 percent	.0.00X
1/100 to 1/10 percent	
Unalloyed aluminum made by a refining process	.0.0XX
Alloys and unalloyed aluminum not made by a refining process	.0.0X
1/10 through 1/2 percent	.0.XX
Over 1/2 percent	.0.X, X.X, etc.

(2) For purposes of determining conformance to these limits, an observed value or a calculated value obtained from analysis is rounded off to the nearest unit in the last right-hand place of figures used in expressing the specified limit, in accordance with the following:

American Standard Rules for Rounding Off Numerical Values (ASA Z25.1)

When the figure next beyond the last figure or place to be retained is less than 5, the figure in the last place retained should be kept unchanged.

When the figure next beyond the last figure or place to be retained is greater than 5, the figure in the last place retained should be increased by 1.

When the figure next beyond the last figure or place to be retained is 5 and

(a) there are no figures, or only zeros, beyond this 5, if the figure in the last place to be retained is odd, it should be increased by 1; if even, it should be kept unchanged.

(b) if the 5 next beyond the figure in the last place to be retained is followed by any figures other than zero, the figure in the last place retained should be increased by 1, whether odd or even.

(3) Analysis is regularly made only for the elements for which specific limits are shown, except for unalloyed aluminum. If, however, the presence of other elements is suspected, or indicated in the course of routine analysis, further analysis is made to determine that these other elements are not in excess of the amount specified.

(4) The aluminum content for unalloyed aluminum made by a refining process is the difference between 100.000 percent and the sum of all other metallic elements present in amounts of 0.001 percent or more each, expressed to the third decimal.

(5) The aluminum content for unalloyed aluminum not made by a refining process is the difference between 100.00 percent and the sum of all other metallic elements present in amounts of 0.010 percent or more each, expressed to the second decimal.

(6) Electric conductor

(7) Reflector sheet.

(8) Foil.

(9) Cladding on clad 1100 and clad 3003 reflector sheet.

(10) Capacitor alloy.

(11) Cladding on alclad 2024.

(12) Silicon, max., 50 percent of iron.

(13) Bismuth, lead, tin, 0.01 max. each; lithium, 0.008 max.; cadmium, 0.003 max.; boron, cobalt 0.001 max. each.

(14) Titanium plus vanadium, 0.02 max.

(15) Silicon plus iron, 0.14 max.

(16) Lead, bismuth, 0.20-0.6 each.

(17) Vanadium, 0.05-0.15; zirconium, 0.10-0.25.

(18) Nominal percentage.

(19) Brazing alloy.

(20) Bus conductor.

(21) Cladding on alclad 2014.

(22) Silicon, 45-65 percent of magnesium.

(23) Boron, 0.06 max.

(24) Boron, cobalt, 0.001 max. each; cadmium, 0.003 max.; lithium, 0.008 max.

(25) Tin, 5.5-7.0.

(26) Beryllium 0.0008 maximum for welding electrode and filler wire only.

(27) Welding electrode

(28) Mechanical wire.

(29) Gallium 0.02 max.

(30) Cadmium 0.10-0.35; lithium 0.9-1.7.

(31) Cladding on alclad 5056.

(32) Cladding on alclad 3003, alclad 3004, alclad 5050, alclad 5155, alclad 6061, alclad 7075, and alclad 7178.

(33) Total copper + manganese + magnesium at least 0.7.

(34) Lead 0.30 max.

(35) Tin 0.005 max; sodium 0.005 max.

(36) Conductor alloy.

(37) Lead, bismuth 0.40-0.7 each.

* Aluminum Association Technical Committee.

† AA number registered since previous issue.

‡ Composition limits registered since previous issue.

¶ Composition limits revised since previous issue.

"X" removed from AA number since previous issue.

○ Canceled since previous issue.

3422

[fol. 6588]

THE ALUMINUM ASSOCIATION
420 LEXINGTON AVENUE
NEW YORK 17, NEW YORK

Revised: May 1, 1961
Supersedes: November 15,

Components of Clad Products

DESIGNATION	COMPONENT ALLOYS ①		TOTAL THICKNESS OF COMPOSITE PRODUCT Inches	SIDES CLAD	NOMINAL CLADDING THICKNESS PER SIDE ② Percent of Composite Thickness
	CORE	CLADDING			
Alclad 2014 sheet and plate	2014	6003	Under 0.025 0.025-0.039 0.040-0.099 0.100 and over	Both Both Both Both	10 7 1/2 5 2 1/2
Alclad 2024 sheet and plate	2024	1230	Under 0.063 0.063-0.187 0.188 and over	Both Both Both	5 2 1/2 1 1/2, 2 1/2 ④⑤
Alclad 3003 sheet and plate	3003	7072	All Under 0.065 0.065 and over	Both One One	10 15 7 1/2
Alclad 3003 tube	3003	7072	All All	Inside Outside	10 7
Alclad 3004 sheet and plate	3004	7072	All	Both	5
Alclad 5050 sheet and plate	5050	7072	All	Both	5
Alclad 5154 sheet and plate	5154	7072	All	Both	5
Alclad 5056 rod and wire	5056	6253	All	Outside	20% of total cross-sectional area
Alclad 6061 sheet and plate	6061	7072	All	Both	5
Alclad 7075 sheet and plate	7075	7072	Under 0.063 0.063-0.187 0.188 and over	Both Both Both	4 2 1/2, 4 ③ 1 1/2, 4 ③⑤
Alclad 7178 sheet and plate	7178	7072	All	Both	4
No. 11 brazing sheet	3003	4343	Under 0.064 0.064 and over	One One	10 5
No. 13 brazing sheet	3003	4343	Under 0.064 0.064 and over	Both Both	10 5
No. 21 brazing sheet	6951	4343	Under 0.091 0.091 and over	One One	10 5
No. 23 brazing sheet	6951	4343	Under 0.091 0.091 and over	Both Both	10 5
Clad 1100 reflector sheet	1100	1175	Under 0.065 0.065 and over	One or Both	15 7 1/2
Clad 3003 reflector sheet	3003	1175	Under 0.065 0.065 and over	One or Both	15 7 1/2

① Cladding composition is applicable only to the aluminum or aluminum alloy which is bonded to the alloy ingot or slab preparatory to rolling to the specified composite product. (The composition of the cladding may be subsequently altered by diffusion between the core and cladding due to thermal treatment.)

② Average minimum thickness of cladding of sheet and plate after rolling to the specified thickness of the composite product will be 80 percent of the nominal as determined by averaging cladding thickness measurements taken at a magnification of 100 diameters on the cross section of samples polished and etched for microscopic examination.

③ Nominal cladding thickness of 4 percent is now obsolete for alclad 7075 sheet and plate in these thickness ranges and is shown for information only.

④ Alclad 2024 sheet and plate in thicknesses of 0.1 inch and over are furnished with a nominal cladding thickness of 2 1/2 percent unless the thinner cladd is specifically designated.

⑤ For thicknesses of 0.500 inch and over with 1 1/2 percent nominal cladding thickness, the average mini mum thickness of cladding after rolling to the specified thickness of composite plate will be 3 percent the composite thickness, as determined by averaging cladding thickness measurements taken at a magnifica tion of 100 diameters on the cross section of sample polished and etched for microscopic examination.

[fol. 6589] IN UNITED STAT[illegible]CT COURT

DEFENDANTS' EXHIBIT 70

United States Department of Commerce
Luther H. Hodges, Secretary
Washington 25, D. C.

Business and Defense Services Administration

Fox: WO-7-4604 BD-61-63

For Immediate Release
Tuesday, April 11, 1961

Primary Aluminum Output Gains Strongly

Primary aluminum production in the United States went from 1.4 billion pounds in 1950 to 4 billion pounds in 1960, an increase of 180 percent, while the number of producing companise doubled—3 to 6—in the same period, the Aluminum and Magnesium Division, Business and Defense Services Administration, U.S. Department of Commerce, reported today.

Detailing industry operations over the decade, the Division said that the greatest growth was in companies producing extruded shapes and drawn tube, whose number went from 39 in 1950 to 133 in 1960. The 1960 shipments were 921 million pounds, 210 percent above 1950. Foil producers numbered 16 in 1960, compared with 9 in 1950, and 1960 shipments were 252 million pounds, 145 percent above 1950.

Secondary ingot producers, producing ingot from scrap, numbered 84 in 1960 compared with 63 ten years earlier, and shipments increased 82 percent during the period to 652 million pounds.

Although sheet producers grew in number from 9 to 34 in the 10-year period, shipments increased by only about 48 percent to 1.5 billion pounds.

Further details are given in the appended table:

USCOMM-DC-7523

[fol. 6590] Number of Aluminum Producers and Shipments 1950, 1955, 1960

Product	Number of producers			Shipments [1] Millions of pounds			Percent change
	1950 [2]	1955	1960	1950 [2]	1955	1960	1950–1960
Primary metal	3	4	6	1,437	3,131	4,029	+180
Secondary ingot	63	77	84	358	599	652	+ 82
Sheet and plate	9	24	34	1,028	1,466	1,525	+ 48
Foil	9	12	16	103	300	252	+145
Extruded shapes & drawn tube	39	110	133	297	767	921	+210
ACSR (aluminum conductor steel reinforced)	12	12	11	133	157	184	+38
Wire and insulated or covered wire and cable	NA	48	47	NA	103	121	NA
Powder and paste	7	9	9	22	37	33	+ 50
Forgings	NA	45	41	NA	70	50	NA

[1] Primary and secondary ingot figures are production as reported by the Bureau of Mines. Other data are gross shipments as reported by the Bureau of the Census and differ from published net shipments, in that gross shipments include shipments between companies in the industry, while net shipments do not.

[2] Captive plants, i.e. plants producing solely for their own further use, are included in 1955 and 1960 but not in 1950; there were very few in that year.

NA—Not available.

[fol. 6591] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 71

List of Companies and Plants Producing Copper Wire and Cable

The kind of wire products and type of covering or insulation are indicated by the letter symbols below:

Insulated wire and cable:	
Rubber & thermosetting synthetics	A
Thermoplastic	B
Varnished cambric	C
Asbestos	D
Paper insulated power cable	E
Submarine cables (incl. armored)	F
Telephone cables:	
Pulp and paper insulated	G
Textile insulated	H
Plastic insulated	I
Magnet wire:	
Enameled and synthetic	J
Glass	K
Covered, other than glass	L
Special military items:	
Field wire	M
Spiral 4	N
Floating cable	O
Shipboard cable (armored)	P
Aircraft wire and cable	Q
Other	R
Coaxial types (high frequency only)	S
Tinned and lead alloy (hot dipped) coated wire:	
Round—solid	T
Stranded—all types	U
Weatherproof (Textile covered):	
Solid	V
Stranded	W
Other	X

Source: Form BDSAF-285, Copper Wire Mill Facility Survey.

U.S. Department of Commerce.
July 10, 1958.

Copper Division
Business and Defense Services Administration

[fol. 6592]

List of Companies and Plants Producing Copper Wire and Cable

Company and Plant	Insulated Electrical Wire and Cable	Telephone Cables	Magnet Wire	Special Military Items	Coaxial	Tinned and lead alloy coated wire	Weather-proof (textile covered)	Other
Accurate Insulated Wire Co. New Haven, Conn.	AB			M				
Ace Wire Mills, Paterson, N. J.			J					
Acme Wire Co., Hamden, Conn.			JKL					
Advance Insulated Wire Co. Metuchen, N. J.	B							
Alden Wire Corp., Oceanside, N. Y.		I						
A-K Mfg. Co., Barrington, Ill.	B			MNQ	S			
Alphaduct Wire & Cable Co. New Brunswick, N. J. (See General Cable)								
American Brass Co., Ansonia, Conn.						T		
American Electric Cable Co. Holyoke, Mass.	BC	HI		MQ				X
American Insulated Wire Corp. Pawtucket, R. I.	ABD	HI				TU	VW	
American Metal Moulding Co., Irvington, N. J.								X
Amphenol Electronics Corp. Chicago, Ill.	B			Q	S			
Ampere Wire & Cable Corp. Yonkers, N. Y.	AB	HI						
Anaconda Wire & Cable Co. Total	ABCEG	IJ	KL	O	S		VW	X
Hastings-on-Hudson, N. Y.	ABCEG	I		O	S		W	
Black Eagle, Mont.								X
Anderson, Indiana			JKL					
Marion, Indiana	AB							
Muskegon, Michigan			JKL					

List of Companies and Plants Producing Copper Wire and Cable

Company and Plant	Insulated Electrical Wire and Cable	Telephone Cables	Magnet Wire	Special Military Items	Coaxial	Tinned and lead alloy coated wire	Weather-proof (textile covered)	Other
Orange, California	AB		JKL				VW	
Sycamore, Illinois	AB		JKL				VW	
Anchor Wire Corp., Jamaica, N. Y.								X
Andrew Corp., Orlando Park, Ill.					S			
Ansonia Wire & Cable Co., Ashton, R. I.	BF	HI		P				
[fol. 6503]								
Apex Wire & Cable Corp. Brooklyn, New York	B							
Atlantic Wire & Cable Co. College Point, N. Y.	B							
Automatic Electric Co. Chicago, Illinois		H	JL					
Belden Mfg. Co. Total	AB		JKL					
Chicago Plant			JKL					
Richmond, Ind. Plant	AB							
Bergen Wire Rope Co. Lodi, N. J.				MQ				
Berkshire Electric Cable Co. Leeds, Mass.	B	I		Q	S			
Boston Insulated Wire & Cable Dorchester, Mass.	AB			PQ	S			
Bradford Kyle & Co. Plymouth, Mass.			L					
Brand, Wm. & Co., Inc. Willimantic, Conn.	B			MQ	S			
Bridgeport Brass Co. Housatonic Plant Bridgeport, Conn.								X

List of Companies and Plants Producing Copper Wire and Cable

Company and Plant	Insulated Electrical Wire and Cable	Telephone Cables	Magnet Wire	Special Military Items	Coaxial	Tinned and lead alloy coated wire	Weather-proof (textile covered)	Other
Bridgeport Insulated Wire Total			JKL					
Bridgeport Insulated Wire Co., Bridgeport, Conn.			KL					
Bridgeport Enameled Wire Co., Stratford, Conn.			J					
C & W Insulated Wire Co. Ft. Wayne, Ind.			L					
Calcon Mfg. Co., Washington, Pa.	A							
Camden Wire Co., Camden, N. Y.				M		TU		
Central Cable Corp., Jersey Shore, Pa. Total	AB						VW	
Jersey Shore, Pa.	AB						VW	
Freeport, Ill.	B						VW	

[fol. 6394]

Chester Cable Corp., Chester, N. Y.	B							
Circle Wire & Cable Corp. Maspeth, New York	ABC			M		T		
Cleveland Insulated Wire Co. Cleveland, Ohio	D			M				
Coast Cable Co., Los Angeles, Cal.	B							
Collyer Insulated Wire Co. Pawtucket, R. I.	ABCD			Q				
Colonial Wire & Cable Co., Locust Valley, New York	B							X
Columbia Cable & Electric Corp. Brooklyn, N. Y.	B							
Continental Copper & Steel Ind., Inc. Total								
Hatfield Wire & Cable Div. Hillside, N. J.	AB							

List of Companies and Plants Producing Copper Wire and Cable

Company and Plant	Insulated Electrical Wire and Cable	Telephone Cables	Magnet Wire	Special Military Items	Coaxial	Tinned and lead alloy coated wire	Weather-proof (textile covered)	Other
National Wire Corp., Union, N. J.								
Continental Wire Corp. Wallingford, Conn.	B	G		Q	S			X
Copperweld Steel Co. Total				MQ		TU		
Copperweld Steel Co., Glassport, Pa.						T		
Flexo Wire Co., Inc. Oswego, N. Y.				MQ		TU		
Cornish Wire Co., Inc. Williamstown, Mass.	AB	HI		M	S	TU		
Corona Insulated Wire Co., Brooklyn, N. Y.	A							
Crescent Co., Pawtucket, R. I.	AB					TU	W	
Crescent Insulated Wire & Cable Co., Trenton, N. J.	ABC							
[fol. 6595]								
Dielectric Materials Co., Chicago, Illinois	B			Q	S			X
Eastern Insulated Wire Corp. Wallingford, Conn.	ABD							
Electric Auto-Lite Co., Toledo, Ohio	BC		JL	Q		TU		
Electric Parts Corp., Chicago, Illinois	B				S			X
Essex Wire Corp., Ft. Wayne, Ind. Total	ABC	I	JKL	Q		TU	VW	
Carolina Industrial Plastics Corp., Mt. Airy, N. C.	B							

List of Companies and Plants Producing Copper Wire and Cable

Company and Plant	Insulated Electrical Wire and Cable	Telephone Cables	Magnet Wire	Special Military Items	Coaxial	Tinned and lead alloy coated wire	Weather-proof (textile covered)	Other
Cuthman, Edwin I., Co., Chicago, Ill.								
Diamond Wire & Cable Co. Sycamore, Ill.	AB	I	L					
Paranite Wire & Cable Co. Tiffin, Ohio						TU		
Paranite Wire & Cable Co. North Birmingham, Ala.	AB						VW	
Essex Wire Corp., Ft. Wayne, Ind.			J					
Essex Wire Corp., Detroit, Mich.			JKL					
Essex Wire Corp., Anaheim, Calif.	ABC		JL	Q		TU		
Etteo Wire & Cable Corp. Brooklyn, N. Y.	B		JKL				VW	
Gavitt Mfg. Co., Brookfield, Mass.	B							
[fol. 6596]	AB			Q				
General Cable Corp., New York, N. Y. Total	ABCDEF	GHI	JKL	MN PQ	S	TU	VW	X
General Cable Corp. Bayonne, N. J.	CDEF	I		P				
General Cable Corp. Emeryville, Cal.	BCE	GI						
General Cable Corp. Los Angeles, Cal.	A							
General Cable Corp. Perth Amboy, N. J.	ABF	GHI		NPQ	S	TU	VW	X
General Cable Corp. Rome, N. Y.	AB		JKL			TU		X

List of Companies and Plants Producing Copper Wire and Cable

Company and Plant	Insulated Electrical Wire and Cable	Telephone Cables	Magnet Wire	Special Military Items	Coaxial	Tinned and lead alloy coated wire	Weather-proof (textile covered)	Other
General Cable Corp. St. Louis, Mo.	ABE		JKL				VW	
General Cable Corp. Monticello, Ill.		G						
General Cable Corp. Tampa, Fla.	AB	G						
Alphaduct Wire & Cable Co. New Brunswick, N. J.	AB							
General Insulated Wire Works Providence, R. I.	AB	I		M				
Clifton Conduit Co. Memphis, Tenn.	B							
Clifton Conduit Co. Baltimore, Md.	B							
New England Cable Co. Concord, N. H.	AD							
[fol. 6597]								
General Electric Co., Schenectady, N. Y. Total	ABCDEF		JKL	PQ				X
Bridgeport, Conn.	ABCDEF			P				X
Lowell, Mass.	ABD		JKL	PQ				
Oakland, Calif.	B		JL					
Schenectady, N. Y.			JKL					
Pittsfield, Mass.			JKL					
Hickory, N. C.			J					
Ft. Wayne, Ind.			JKL					X
Rome, Ga.			JL					
General Motors Corp. Packard Elec. Div. Warren, Ohio	AB		JL	Q				

List of Companies and Plants Producing Copper Wire and Cable

Company and Plant	Insulated Electrical Wire and Cable	Telephone Cables	Magnet Wire	Special Military Items	Coaxial	Tinned and lead alloy coated wire	Weather-proof (textile covered)	Other
Goodline Corp.								
Don Good, Inc., Alhambra, Cal.	B							
Good-Lite Elec. Mfg. Co.								
Bridgeport, Conn.	B							
Gordon, Claud S., Co.								
Richmond, Ill.	D							
Guthman, Edwin I. Co.								
Chicago, Ill. (See Essex Wire)								
Harden, Frank S. Co.								
McConnellsville, N. Y.				M				
Hi-Temp Wires, Inc.								
Mineola, N. Y.			J	Q	S			
Holyoke Wire & Cable Corp.								
Holyoke, Mass.	B							
Hudson Wire Co. Total			JL					
Winsted Div., Winsted, Conn.			JL					
Cassopolis, Mich.			J					
Imperial Wire Co., Inc.								
New Haven, Ind.			J					
[fol. 6598]								
International Tel. & Tel.								
Federal Tel. & Radio Corp.								
Clifton, N. J.	B				S			
International Wire Prod. Corp.								
Midland Park, N. J.				MN		U		X
Jersey Specialty Co.								
Mountainview, N. J.								X
Jordan Wire & Cable Co.								
Jordan, N. Y.						TU		
Judd Wire Mfg. Co.								
Turner's Falls, Mass.	B	I				TU		
Kellogg Switchboard & Supply Co.								
Chicago, Ill.			J					
Kennecott Wire & Cable Co.								
Phillipsdale, Rumford, R. I.	CE	G	JKL			TU	VW	
Kerite Co., Seymour, Conn.	AB							

List of Companies and Plants Producing Copper Wire and Cable

Company and Plant	Insulated Electrical Wire and Cable	Telephone Cables	Magnet Wire	Special Military Items	Coaxial	Tinned and lead alloy coated wire	Weather-proof (textile covered)	Other
Kerrigan-Lewis Mfg. Co., Chicago, Ill.			L					
Laribee Wire & Equip. Corp. Camden, N. Y.						TU		
Lenz Electric Mfg. Co. Chicago, Ill.	B	HI			S			X
Lewis Engineering Co. Naugatuck, Conn.	BD			Q				X
Magnet Wire Co. Chicago, Ill.			J					
Miller Electric Co., Pawtucket, R. I.	BD							
Montrose Products Co. Worcester, Mass.	B							
[fol. 6599]								
Narragansett Wire Co. Pawtucket, R. I.	AB					TU		
National Electric Coil Co. Columbus, Ohio			KL					
National Electric Products Corp., Ambridge, Pa.	ABCD			P				
National Standard Co., Niles, Mich.								X
National Tinsel Mfg. Co. Manitowoc, Wisc.								X
Nesor Alloy Product Co. Newark 2, N. J.						T		
New England Cable Co., Concord, N. H. (See Gen. Cable)								
New England Electric Works, Inc. Lisbon, N. H.			L			U		
Nomotuck Mfg. Co., Holyoke, Mass.						TU		X
Northern Engineering and Designing Co., Cicero, Ill.						T		
Okonite Co., Passaic, N. J. Total	ABCEF	I		MOPR	S			
Plant #1, Passaic, N. J.	ABCF			P	S			

List of Companies and Plants Producing Copper Wire and Cable

Company and Plant	Insulated Electrical Wire and Cable	Telephone Cables	Magnet Wire	Special Military Items	Coaxial	Tinned and lead alloy coated wire	Weather-proof (textile covered)	Other
Plant #2, Paterson, N. J.	ABEF	I		MO				
Plant #3, Wilkes-Barre, Pa.	AB							
Overlakes Corp. Total								
Garfield Wire Div.								
Garfield, N. J.								
Lowell Insulated Wire Corp.								
Lowell, Mass.	AB	I		M				
Paragon Wire & Cable Corp.								
Buffalo, N. Y.	AB	H			S			
Phalo Plastics Corp.								
Worcester, Mass.	B			M				
[fol. 6600]								
Phelps Dodge Copper Prod. Total	ABCDEF	GI	JKL	MP	S	TU	VW	X
American Copper Prod. Div.								
Bayway, N. J.						TU	VW	
Habirshaw Cable & Wire Co.								
Yonkers, N. Y.	ABCDEF	GI		MP	S			X
Inca Mfg. Div., Ft. Wayne, Ind.			JKL					
Indiana Rod & Wire Div.								
Ft. Wayne, Ind.							VW	
Philadelphia Insulated Wire Co.								
Philadelphia, Pa.	AB		JL					
Plastic Wire & Cable Corp.								
Jewett City, Conn.	B	I		M		T		
Plastoid Corp., Hamburg, N. J.	B	I		MPQ	S	T		
Radio Wire Mfg. Corp.								
New Augusta, Ind.	BCD		L					
Radix Wire Co., Cleveland, Ohio								
Rea Magnet Wire Co., Inc.								
Ft. Wayne, Ind.	B		JL					
Rego Electric Co., Hoboken, N. J.								
Revere Corp. of America	B							
Wallingford, Conn.	B	I				U		
Rex Corp., West Acton, Mass.								
Rhode Island Insulated Wire Co.	ABD							
Cranston, R. I.								

Rhode Island Insulated Wire Co. Cranston, R. I.	ABD

List of Companies and Plants Producing Copper Wire and Cable

Company and Plant	Insulated Electrical Wire and Cable	Telephone Cables	Magnet Wire	Special Military Items	Coaxial	Tinned and lead alloy coated wire	Weather-proof (textile covered)	Other
Roebling's, John A. Sons Co.								
Total	ABCE	GI	JKL			TU		
Insulated Wire & Cable Plant Trenton, N. J.	ABCE	GI	JKL					
Kinkora Works, Roebling, N. J.						TU		
Rockbestos Products Corp., New Haven, Conn.	BCD		L	PQ	S			
Rome Cable Corp., Rome, N. Y.	AB		KL	N		TU	VW	
[Fol. 6601]								
Royal Electric Co., Inc. Pawtucket, R. I.	ABD							
Runsel Cord and Wire Co. Chicago, Illinois	AB	H		Q				
Sequoia Process Corp. Redwood City, Calif.	B	I		Q		TU		
Service Steel Prod. Co. Williamsport, Pa.				M				
Simplex Wire & Cable Corp.								
Total	ABCEF			N				X
Cambridge, Mass.	ABCEF			N				X
Newington, N. H.	F							
Slepian, Arthur & Co. Bridgeport, Conn.			L					
Southern Electrical Corp. Chattanooga, Tenn.	AB					TU		
Southwire Co. Carrollton, Ga.	AB							
Spargo Wire Co., Rome, N. Y.						TU		
Sprague Electric Co. Bennington, Vt.			J			T		
Springfield Wire & Tinsel Co. Springfield, Mass.								X*
Standard Wire Co., Cranston, R. I.	D							

List of Companies and Plants Producing Copper Wire and Cable

Company and Plant	Insulated Electrical Wire and Cable	Telephone Cables	Magnet Wire	Special Military Items	Coaxial	Tinned and lead alloy coated wire	Weather-proof (textile covered)	Other
Starring & Co., Inc. Bridgeport, Conn.			J					
State Wire & Cable Corp. Coxsackie, N. Y.	B	I		MPQ	S		VW	
Stromberg Carlson Tel. Mfg. Co. Rochester, N. Y.		H						X
[fol. 6602]								
Suflex Corp., Woodside, N. Y. Total	B							
Electra Insulation Corp. Woodside, N. Y.	B							
Suflex Corp., Woodside, N. Y.	B							
Superior Cable Corp. Hickory, N. C.		I						
Suprenant Mfg. Co. Clinton, Mass.	B	I		Q	S			
Sweeco Wire Co. Winsted, Conn.			J					
Tensolite Insulated Wire Co. Tarrytown, N. Y.	B		J	Q				
Teveo Insulated Wire Burbank, Calif.	B							
Texas Wire & Cable Co. Plane, Texas	B						VW	
Thermo Electric Co. Saddle Brook, N. J.	BD							X
Times Wire & Cable Co. Wallingford, Conn.	B			Q	S			X
Triangle Conduit & Cable Co. New Brunswick, N. J.	ABC					TU		
Trio Wire & Cable Corp. Brooklyn, N. Y.	B							
Union Plastics Corp. Secaucus, N. Y.	B			Q				
United States Rubber Co. Bristol, R. I.	AB			MNO			W	

List of Companies and Plants Producing Copper Wire and Cable

Company and Plant	Insulated Electrical Wire and Cable	Telephone Cables	Magnet Wire	Special Military Items	Coaxial	Tinned and lead alloy coated wire	Weather-proof (textile covered)	Other
United States Steel Corp.								
Amer. Steel & Wire Div.								
Worcester, Mass.	ABCDEF		JKL	P		T	VW	
U. S. Wire & Cable Co.								
Union, N. J.	B			M	S			
Up State Wire Co.								
Williamstown, N. Y.						T		
Utica Wire Corp., Derby, Conn.						T		
[fol. 6603]								
Vector Mfg. Co.								
Houston, Texas	AB							
Victor Electric Wire & Cable								X
West Warwich, R. I.	B	I		Q	S			
Viking Wire Co.								
Danbury, Conn.			J					
Walker Bros., Conshohocken, Pa.	AB			P				
Warren Wire Co., Pownal, Vt.	D		JL	Q		TU		
Western Electric Co. Total	AB	GHI	J			T		X
Point Breeze Works, Balto., Md.	AB	GI						
Kearny Works, Kearny, N. J.		GI						
Hawthorne Works, Chicago, Ill.		GI						
Tonawanda Plant, Buffalo, N. Y.		HI	J			T		X
Western Insulated Wire Co.								
Los Angeles, Calif.	AD							
Westinghouse Electric Corp.								
Cheektowaga, N. Y.			JKL					
Wheeler Insulated Wire Co., Inc.								
Waterbury, Conn.			JL					
Whitaker Cable Corp.								
North Kansas City, Mo.	B							
Whitney-Blake Co., Hamden, Conn.	AB	I		M				

USCOMM—DC—

Defendants' Exhibit 73

WIRE AND WIRE PRODUCTS BUYERS' GUIDE

1961 EDITION

AND YEARBOOK OF THE WIRE ASSOCIATION

INTRODUCTION

THE annual WIRE AND WIRE PRODUCTS BUYERS' GUIDE AND YEAR BOOK OF THE WIRE ASSOCIATION, of which this is the thirty fourth edition, aims to present complete and comprehensive lists of manufacturers of bare and covered wire, of fabricators of wire, and of supplies and equipment used by both.

This edition has been greatly improved and has combined with it the thirtieth YEAR BOOK OF THE WIRE ASSOCIATION.

Lists were made up as the result of direct circularization of the industries represented. As in any annual reference work, a certain percentage of errors and omissions are unavoidable, but every effort has been made to keep these down to a negligible minimum up to the time of going to press.

In this connection, users of the book are asked to remember the willingness of the publishers to supplement the information contained in this directory with prompt acknowledgment of any inquiries for information about sources of supply for wire, wire products, and the machinery, supplies and equipment entailed in their manufacture.

The BUYERS' GUIDE is not only a guide to products and manufacturers but also a subject matter index to the 1960 volume of WIRE AND WIRE PRODUCTS, the only publication serving this industry.

In communicating with any firm herein listed you will confer a favor on both the publisher and manufacturer by referring to the fact that the name or information was found in this BUYERS' GUIDE.

The price of the BUYERS' GUIDE is $5.00 per copy. Subscribers to WIRE AND WIRE PRODUCTS receive a 40% discount. Members of THE WIRE ASSOCIATION receive a copy without additional cost.

The Publishers.

WIRE
AND WIRE PRODUCTS

483 Main Street — Stamford, Conn.

A monthly publication devoted to the interests of rod, wire and strip mills, insulated wire and cable manufacturers, wire formers and fabricators and manufacturers of wire mill equipment.

DESIGNATED AS
"OFFICIAL PUBLICATION" BY THE WIRE ASSOCIATION

Issued Monthly
75 Cents a Copy in U. S. — Per year, United States, $6.00
75 Cents a Copy in Canada — Per year, Canada, $6.50
90 Cents a Copy in Foreign Countries — Per year, Foreign, $10.50
October Convention Issue $1.25 a Copy
January Convention Proceedings Issue $1.25 a Copy

WIRE—Drop Wires, Steel (Automatic Loom Stop Motion)
BEKAERT STEEL WIRE CORP., 485 Madison Ave., New York 22, N. Y.
HOOSIERS FERROUS STEEL CORP., Anderson.
WICKWIRE SPENCER STEEL DIV., COLORADO FUEL & IRON CORP., 485 Madison Ave., N. Y. 22, N. Y.

WIRE—Electrical Measuring Instrument
Driver-Harris Co., Harrison, N. J.
Driver, Wilbur B., Co., 1615 McCarter Highway, Newark 4, N. J.

WIRE—Electrical (Aluminum)
ALABAMA WIRE CO., INC., P. O. Box 648, Florence, Ala.
Hudson Wire Co., 62 Water St., Ossining, N. Y.

WIRE: ELECTRIC WIRE AND CABLE

A list of plants producing insulated Electric Wire and Cable. For bare electric wires, such as Battery Cable, ACSR, Resistance, Exterior Telephone, Trolley, Tinsel, etc., look under appropriate wire headings for names of manufacturers. Letter and number symbols are used below to indicate the general categories under which the insulated wires are classified.

POWER CABLES
A Armored
B High Tension
C Low Voltage
D Buried

CODE & CORD WIRES
E Building
F Fixture
G Heater
H Lamp
I Portable Power

J Service Entrance
K Sign
L Show Burning
M Telephone & Signal
N Thermocouple Lead-in
O Weatherproof

MAGNET WIRES
P Enameled
Q Synthetic Coated
R High Temperature
S Litz
T Textile Covered

MISCELLANEOUS
U Automotive & Aircraft
V Ignition
W Control
X Resistance (Insul.)
Y Instrument
Z Submarine
1 Shipboard
2 Radio & TV Hook-up
3 Coaxial
4 Geophysical

AC Spark Plug Div.,
General Motors Corp.,
Flint, Mich. — A

Accurate Insulated Wire Corp.,
49 Fox St.,
New Haven 1, Conn. — BCQ23

Ace Wire Mills, Inc.,
26 Fifth Ave.,
Paterson, N. J. — CGHIPW1

Acme Wire Company,
1308 Dixwell Avenue,
New Haven 14, Conn. — PR

Acorn Insulated Wire Co.
Div. of Amer. Insulated Wire Corp.,
30 Freeman St.,
Pawtucket, R. I. — CFGHIV2

Advance Insulated Wire & Cable
Co., 216 Tingley Lane,
Moorehead, N. J. — CFGHI

Aero-Tech Products Co.,
260 Main St.,
Chatham, N. J. — CFGJMNOPUVY123

Aircraft Marine Communication
Wire Industries, Inc., 115th St.,
Gr. Northern Blvd.,
East Elmhurst 69, N. Y. — FMNTUV23

A-K Mfg. Co., Inc.,
115 S. Northwest Highway,
Barrington, Ill. — Y23

Alfred Covered Wire Co.,
532 Broadway,
New York, N. Y. — FGH2

Alpha Wire Corp.,
Div. of Laurel Electronics Corp.,
200 Varick St.,
New York 14, N. Y. — HIPUY2

Alphadet Wire & Cable Co.,
25 Van Dyke Ave.,
New Brunswick, N. J. — M Y

Aluminum Co. of America,
Alcoa Bldg.,
Pittsburgh 19, Pa. — O

American Electric Cable Co. 181 Appleton Street, Holyoke, Mass.	A B C F G H M N U V 2 3
American Electric Heater Co. 6110 Cass Ave., Detroit 2, Mich.	G
American Flexible Conduit Co., Inc. 982 Shawmut Ave., New Bedford, Mass.	A
American Insulated Wire Corp. 36 Freeman St., Pawtucket, R. I.	B C F G H I J L O V W 2 3
American Leasie Mfg. Co. Westinghouse Bldg., 2001 Walnut St., Philadelphia 4, Pa.	X
American Metal Molding Co. 140 Cleft St., Irvington, N. J.	A C E
American Steel & Wire Div., U. S. Steel Corp., Rockefeller Bldg., Cleveland 13, Ohio.	A B C D E I J L M N O P T Z 1 3 4
American Super-Temperature Wires, Inc. Sub. of Haveg Industries, Inc., 112 W. Canal St., Winooski, Vt.	P U V Y Z 1 2 3
Ampere Wire & Cable Corp., 4 Bashford Ave., Yonkers, N. Y.	A B C O
Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L. I., N. Y.	N
Amphenol Cable & Wire Div., Amphenol-Borg Electronics Corp., 1830 S. 54th Ave., Chicago, Cicero 50, Ill.	U Y Z 1 2 3
Anaconda Wire & Cable Co., Hastings-on-Hudson, N. Y.	A B C D E F I J M O P T U V Y Z 1 2 3 4
Anchor Plastics Co., 45-55 50th St., Long Island City 6, N. Y.	I
Andrew Corp., 363 E. 75 St., Chicago 19, Ill.	2 3
Annesley Wire & Cable Co., 111 Martin St., Ashton, R. I.	A C D N Z 1 2 3
Apex Wire & Cable Corp., 207 57th St., Brooklyn 32, N. Y.	F G H I U 2
Arens Controls, Inc., 2917 Greenleaf St., Evanston, Ill.	F G H
Aero Wire & Cable Co., 1120 Stratford Rd., Stratford, Conn.	P Q S
Atlantic Wire & Cable Co., 119-14 14th Rd., College Point, 56, N. Y.	E F H I K M N O U V 1 2 3 4
Auburn Plastics, Inc., 40 Canoga Rd., Auburn, N. Y.	F H
Austin Wire & Cable Co., 623 W. Jackson Blvd., Chicago, Ill.	B E F J Y 2 3 4
Belden Mfg. Company, 415 So. Kilpatrick Ave., Chicago 44, Ill.	B C I K P S T U V Y 2 3 4
Bell Telephone Laboratories, Murray Hill, N. J.	M
Berkshire Electric Cable Co., Leeds, Mass.	U V Y 2 3 4
Boston Ins. Wire & Cable Co., 65 Bay Street, Dorchester 25, Mass.	U V Y 1 2 3 4
Bradford, Kyle & Co. Box 38, Plymouth, Mass.	S T

William Brand — Rex Div., American Hake Corp., Willimantic, Conn.	MY1234
William Brand — Rex Div., American Hake Corp., Hayward Rd., W. Acton, Mass.	CFGHINRU2
Bridgeport Enamel Wire Co., 344 Surf Ave., Stratford, Conn.	PQT
Bridgeport Insulated Wire Co., 51 Brookfield Ave., Bridgeport 10, Conn.	PST
Bryant Wire & Cable Co., 320 S. Hamilton St., High Point, N. C.	Q
C & W Insulated Wire Co., 1600 Sheep Ave., Fort Wayne, Ind.	FH
Cable Wire Co., 200 King St., Littleton, Mass.	FHOUV23
Calnan Mfg. Co., 320 Gobbind Ave., Washington, Pa.	CFGHIUV
Capitol Cable Co., Div., The Cranston Co., 200 Middle St., Pawtucket, R. I.	CV23
Carolina Industrial Plastics Div., Beaver Wire Corp., Mt. Airy, North Carolina.	FCPQX
Casco Products Corp., 312 Hancock Ave., Bridgeport, Conn.	FH
Casco Mfg. Co., Franklin & Poplar Sts., Dowagiac, Mich.	CDO
Central Cable Corp., 320 Washington Ave., Jersey Shore, Pa.	ABCGN
Champion Wire & Cable Co., 105 Central Ave., Rochelle Park, N. J.	UVWZ13
Champion, Inc., 1 Central Ave., E. Newark, N. J.	EFHKMOUVY1234
Chester Cable Corp., Sub. of Tennessee Corp., Chester, N. Y.	P
Chicago Magnet Wire, Inc., Sub. of Advance Transformer Co., 340 No. Francisco Ave., Chicago 12, Ill.	C24
Cinco Wire & Cable Co., 322 W. Cresent Ave., Allendale, N. J.	ABCDEFHIJO1
Circle Wire & Cable Corp., Sub. of Cerro Corp., 8600 Sixteenth Ave., Bayonne, L. I., N. Y.	VW12
Clark Cable Corp., 3146 W. 32nd St., Cleveland, Ohio.	CX
Clarostat Mfg. Co., Inc., Dover, N. H.	CFGHI
Cleveland Insulated Wire Co., 12201 Chatfield St., Cleveland, Ohio.	BCFHIPQ
Clifton Conduit Co., 3100 Southbourne Ave., Baltimore 34, Md.	CFHI
Coast Cable, Inc., 2215 Napoleon Place, Los Angeles 16, Calif.	ABCDEFIJMOW1
Colfyer Insulated Wire Co., 240 Roosevelt Ave., Pawtucket, R. I.	EFJMY23
Colonial Wire & Cable Co., 400 Forest Ave., Locust Valley, N. Y.	AEJ
Columbia Cable & Wire Co., 255 Chestnut St., Brooklyn 8, N. Y.	EFGHIM
Commercial Cord Co., Inc., 26 E. Main St., Clifton Springs, N. Y.	

Connecticut Cord & Cable Co. P. O. Box 185, Guilford, Conn.	MUVWY33
Connir, H. R., Electrical Insulations, Inc., 1420 N. James St., Rome, N. Y.	TUY2
Continental Wire Corp., 340 Maryland Ave., York, Pa.	CFK
Continental Wire Corp. of Conn., 322 No. Cherry St., Wallingford 2, Conn.	WY234
Cordomatic Mfg., Vacuum Cleaner Corp. of Amer., 1726 W. Indiana Ave., Philadelphia, Pa.	I
Cornish Wire Co., Div. of General Cable Corp., 101 Water St., Williamstown, Mass.	FGHIKMTUVY234
Corona Insulated Wire Co., 719 E. 43rd St., Brooklyn 10, N. Y.	FGHI
Cox & Company, Inc., 115 E. 23rd St., New York 10, N. Y.	N
Crescent Co., The 20 Central Ave., Pawtucket, R. I.	CFGHIOVW3
Crescent Insul. Wire & Cable Co., N. Olden Ave., & Taylor St., Trenton 8, N. J.	ABCDEFHIJ1
Custom Systems Corp., 2009 W. Dehli Rd., Santa Ana, Calif.	ABCY3
Diamond Wire & Cable Co., 400 Park Ave., Seymour, Ill.	AEFGHIJKMO
Dielectric Materials Co., 3215 No. Ravenswood Ave., Chicago 40, Ill.	BCEFLMTUY234
Dover Wire Co., 1 Trenton Ave., Clifton, N. J.	
Driver-Harris Company, Middlesex St., Harrison, N. J.	NX
Driver, Wilbur B., Co., 1875 McCarter Highway, Newark 4, N. J.	XY
du Pont, E. I., de Nemours & Co., Pompton Lakes, N. J.	I
Eastern Insulated Wire Corp., Div. of Circle F Mfg. Co., No. Cherry St., Wallingford, Conn.	EFHI
Electra Insulation Corp., 33-18 97th St., Woodside 77, N. Y.	CFHIT3
Electric Autolite Co., Wire & Instrument Div., P. O. Box 852, Toledo 1, Ohio.	EFHIPQTUV3
Electric Parts Corp., P. O. Box 324, Georgetown, Ky.	I3
Electro Wire Corp., Box 370, Danbury, Conn.	F
Electronic Prod. & Devel., 130 Nevada St., El Segundo, Calif.	
Empire Wire & Cable Co., Penn Yan, N. Y.	CEFGH
Engineered Wire & Cable, Inc., No. Main St., Winsted, Conn.	ACIMNY4
Essex Wire Corp., 1601 Wall St., Fort Wayne 4, Ind.	A through P, R through 4
Essex Wire Corp., Paramite Wire & Cable Div., 6200 Conners, Detroit 2, Mich.	ACIPQTV3
Essex Wire Corp. of Calif., P. O. Box 30, Anaheim, Calif.	A through K, MOPTUV234

Bliss Wire & Cable Corp. 70 Cumberland Ave., Brooklyn 27, N. Y.	ACEFJ
Gavitt Wire & Cable Co., Div. of American Corp., Brookfield, Mass.	FMNUY23
General Cable Corp., 420 Lexington Ave., New York 17, N. Y.	A through 4
General Electric Co., 1285 Boston Ave., Bridgeport 2, Conn.	ABCDFGHIJKNOPSTUYZ123
General Electric Co., Motor & Generator Div., 1 River Rd., Schenectady 5, N. Y.	PQT
General Insulated Wire Works, Div. of General Cable Corp., 49 Gordon Ave., Providence 5, R. I.	FGHIKM23
General Wire Products Co., 8 Hygeia St., Worcester 5, Mass.	CEFHMTUVY23
Good-Lite Elec. Mfg. Co., 1401 Stratford Ave., Bridgeport, Conn.	FGHI
Gordon, Chas S., Co., McHenry Co., Richmond, Ill.	ABCGN
Gore, W. L., & Associates, Inc., 223 Papermill Rd., Newark, Del.	MORUY3
Gothman Div., Hazel Wire Corp., 3201 West Addison, Chicago, Ill.	FHIPQT3
Habirshaw Cable & Wire Corp., Div. Phelps Dodge Copper Prods. Corp., Yonkers, N. Y.	A through M, OW123
Hanes Laboratories, Inc., Hanes Div., 77 Olive St., New Haven, Conn.	N
Hatfield Wire & Cable Div., Continental Copper & Steel Industries, Inc., 497 Hillside Ave., Hillside, N. J.	ABCFGHIVW12
Haveg Industries, Inc., Elsinorbon Div., 900 Greenbank Rd., Wilmington 8, Del.	CFHI23
Hazard Insulated Wire Wks., Div. of Okonite Company, Sub. of Kennecott Copper Corp., Box 97, No. Brunswick, N. J.	ACDEFHIW1
Hendrix Wire & Cable Corp., Milford, N. H.	BCO
Hitemp Wires, Inc., Div., Simplex Wire & Cable Co., 1299 Shames Drive, Westbury, L. I., N. Y.	CGPQRU23
Holyoke Wire & Cable Corp., 770 Main St., Holyoke, Mass.	FMTY23
Hoskins Mfg. Co., 4445 Lawton Ave., Detroit 8, Mich.	NXY
Hudson Wire Co., Magnet Wire Div., 63 Water St., Ossining, N. Y.	PQRST
Ideal Wire Products, Inc., 870 Lawrence St., Lowell, Mass.	
Industrial Pyrometer & Supply Co., 2017 Holland St., Alton, Ill.	LNOY
Inco Electronic Products, Inc., Sub. of Adam Consol. Industries, Inc., 1200 Commerce Ave., Union, N. J.	Y234

International Standard Electric Corp., 67 Broad St., New York 4, N. Y.	B C
Jefferson Wire & Cable Corp., Pleasant Valley Rd., Sutton, Mass.	F K M U 2 3
Jelliff, C. O., Mfg. Corp., Southport, Conn.	X
Jemco Insulated Wire Co., 117 Republic Ave., Joliet, Ill.	F H I M 3
Jersey Specialty Co., Inc., Barrows Pl., Wayne, N. J.	F H 3
Johnson, E. F. Co., Waseca, Minn.	P 3
J P M Co., Lewisburg, Pa.	
Jordan Rogers Co., 200 So. Syracuse St., Orange, Calif.	E F O
Judd Wire Mfg. Co., Turner's Falls, Mass.	C I K M U V Y 2 3
Kaiser Aluminum & Chemical Corp., P. O. Box 871, Newark, Ohio	C V
Kaiser Aluminum & Chemical Corp., Electrical Conductor Div., Bristol, R. I.	A B C D E I J K M O Y Z 1 3 4
Kellogg Switchboard & Supply Co., 6650 So. Cicero Ave., Chicago 38, Illinois	A B C D E F H I O
Kennecott Wire & Cable Co., Phillipsdale, Rumford 16, R. I.	C P Q T
Kerite Co., 49 Day St., Seymour, Conn.	A B C D I Z
Kerrigan-Lewis Mfg. Co., 4421 W. Rice St., Chicago 51, Ill.	S T
Lambert Mfg. Co., Hamburg, Pa.	V
Lane Electric Mfg. Co., 1701 N. Western Ave., Chicago 47, Ill.	C M Y 2 3
Lewis Engineering Co., No. Spring St., Naugatuck, Conn.	C F N U 3
Liberty Copper & Wire Co., 6040 W. Illinois St., Chicago 39, Ill.	P 3
Malin & Co., The 3240 Ventry Ave., Cleveland 13, Ohio.	Y
Marcodet, Inc., Cable Div., 220 Pasadena Ave., South Pasadena, Calif.	M U Y 2 3
Miller Electric Co., 120 Main St., Pawtucket, R. I.	F G H I T
Miller, L. C., Co., 6000 S. Hoover Ave., Los Angeles 32, Calif.	3
Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44, Pa.	N
Mohawk Wire & Cable Co., 40 Summer St., Leominster, Mass.	M Y 2 3
Molert Wire Corp., Batchtown, Freehold Pike, Scotchville, N. J.	P Q R T
Montrose Products Co., Auburn Industrial Park, Auburn, Mass.	F Y 2 3
Munier Research Products, Inc., 220 Fifth Ave., New York 1, N. Y.	C
Narragansett Wire Co., 1180 Main St., Pawtucket, R. I.	B C D E I J M O W Z

National Electric Coil Co., 600 King St. Columbus 16, Ohio.	T
National Electric Div., H. K. Porter Co., 328-14th St. Ambridge, Pa.	A B C D E F I J M W Z 1
National Wire & Cable Corp., 130 San Fernando Rd., Los Angeles 31, Calif.	W Y
Nebring Electrical Works, DeKalb, Illinois.	A B C E O T
Nesor Alloy Products Co., 600 Passaic Ave., West Caldwell, N. J.	G M U V Y Z 1 4
New England Cable Co., 22 Bridge St. Concord, N. H.	F G H I U Y 2
New England Elec. Wire, Sub. of The Montgomery Co., 1600 Main St. Lisbon 1, N. H.	P Q R S T U Y
New Haven Wire & Cable Co., Box 128, New Haven, Ind.	P
Ohm Wire & Cable Corp., 251 Liberty Ave., Brooklyn 8, N. Y.	F H U X
Okonite Company, The Sub. of Kennecott Copper Corp., Canal St., Passaic, N. J.	A B C D E I J N O P T W Z 1 3
Organic Development Corp., 10822 Larson Ave., Garden Grove, Calif.	M N O P U Y 2 3
Pacific Automation Products, Inc., 1260 Airway, Glendale, Calif.	A B C O Y Z 1 3
Packard Electric Div., General Motors Corp., Warren, Ohio.	B C E F G H I K M O P T U V 2 3 4
Paragon Electric Co., Two Rivers, Wisconsin.	F H I
Paragon Wire & Cable Corp., 222 E. Genesee St., Buffalo 3, N. Y.	F H K M U Y 2 3
Parsonite Wire & Cable Div., Essex Wire Corp., Marion, Ind.	F H I
Parkside Wire Co., 2525 W. Armitage Ave., Chicago 47, Ill.	I U
Permalastor, Inc., 2012 Burbank Blvd., Burbank, Calif.	R U Y
Phalo Plastics Corp., 520 Boston Turnpike, Shrewsbury, Mass.	E F H I M Y 2 3
Phelps Dodge Copper Prods. Corp., 300 Park Ave., N. Y. 22, N. Y.	A through M, O W 1 2 3
Philadelphia Insul. Wire Co., 222 New Albany Rd., Moorestown, N. J.	C M N U Y 2 3 4
Plastic Wire & Cable Corp., Jewett City, Conn.	C E F H I K M O U V Y 2 3
Plastold Corp., Hamburg, N. J.	M U Y 1 2 3
Plated Wire & Electronics, Inc., 68 Main St., Ansonia, Conn.	P
Precision Tube Co., Inc., Church Rd. & Wissahickon Ave., No. Wales, Pa.	3
Pyrometer Corp. of Amer., Inc., 600 N. Lincoln H'way, Penndel, Pa.	C N P
Radio Wire Mfg. Corp., New Augusta, Ind.	T 2
Radix Wire Co., The 2900 Lakeland Blvd., Cleveland 14, Ohio.	C E F C N U V 2

Siebern Corp., Oakdale at Northside, Redwood City, Calif.	RU3
Rea Magnet Wire Co., Inc., Div. of Aluminum Co. of Amer., 3601 E. Pontiac Rd., Ft. Wayne, Ind.	PQRT
Rego Insulated Wire Co., 859 Monroe St., Hoboken, N. J.	FHIMUW23
Revere Corp. of America, North Colony Rd., Wallingford, Conn.	UVYZ
Reynolds Metals Co., 6601 W. Broad St., Richmond 18, Va.	BCEFLV
Richards, Ashley R., Co., Inc., 115 Winchester St., Newton Highlands 61, Mass.	N
Rochester Wire & Cable Co., Div. of Cerro Corp., 285 Nicoll St., New Haven 4, Conn.	ACFNU123
Rockland Insulated Wire & Cable Co., 36 Main St., Haverstraw, N. Y.	UY24
Rocky Mount Cord Co., 419 Gay St., Rocky Mount, N. C.	
Roebling's, John A., Sons Div., The Colorado Fuel & Iron Corp., 640 So. Broad St., Trenton 2, N. J.	ABCDEHIJLMOPQRTWZ1
Roesch, Imogene, Cable Div., Hall-Scott, Inc., 2950 N. Ontario St., Burbank, Calif.	NW123
Rome Cable Div., Aluminum Co. of Amer., Rome, N. Y.	ABCEFHIJMOPTUYZ12
Rose Mfg. Co., 800 Washington St., Burlington, Iowa.	U
Royal Electric Corp., 65 Grand Ave., Pawtucket, R. I.	ABCFGHIOVW1234
Russel Cord & Wire Co., 4729 W. Montrose Ave., Chicago 41, Ill.	ACDFHIT2
Saxton Wire & Cable Div., Saxton Products, Inc., 4320 Park Ave., Bronx 57, New York, N. Y.	PVW23
Saylor Electric Products Corp., 277 Pierce St., Birmingham, Mich.	CFIO
Seal Wire Co., 309 S. Lafayette St., Shelby, N. C.	CO
Seco Metals Corp., 7 Intervale St., White Plains, N. Y.	LNPRUY
Sequoia Wire & Cable Co., Sub. of Anaconda Wire & Cable Co., 2201 Bay Road, Redwood City, Calif.	FHIRU23
Serwell Products Co., 6541 Euclid Ave., Cleveland 3, Ohio.	CV
Sherman Insulated Wire Co., 170 Imlay St., Brooklyn 31, N. Y.	
Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass.	ABCDIYZ134
Slepian, Arthur, & Co., 1150 Stratford Rd., Stratford, Conn.	PQS
Southern Electrical Co., Div. of Olin Mathieson Chemical Corp., P. O. Box 850, Chattanooga, Tenn.	CJO

Southwire Company, 6 Fertilla St., Carrollton, Ga.	EFJO
Spectra-Strip Wire & Cable Corp., Box 615, Garden Grove, Calif.	MNPRUY23
Sprague Electric Co., 481 Marshall St., North Adams, Mass.	NPQR
Springfield Wire & Tinsel Co., 70 Lewis St., Springfield, Mass.	FGMY2
Standard Wire Co., 725 Branch Ave., Providence, R. I.	F
State Wire & Cable Corp., Cazenovia, N. Y.	CEFHMU
Stromberg-Carlson Co., Div. General Dynamics Corp., 100 Carlson Rd., Rochester 3, N. Y.	FLIOT
Suflex Corp., 59-40 49th St., Woodside 77, N. Y.	CFLI2
Superior Cable Corp., P. O. Box 69A, Hickory, N. C.	MZ23
Superior Insulated Wire Co., Washburn Lane, Stony Point, N. Y.	FHM2
Surprenant Mfg. Co., 172 Sterling St., Clinton, Mass.	ABCDFGIMNÓRUVYZ1234
Sweeny Wire Co., Winsted, Conn.	P
Sylvania Electric Products, Inc., Sub. of General Telephone & Telegraph Co., 1740 Broadway, New York 19, N. Y.	X
Tech Wire Associates, Inc., Commercial Ave., Mooresbie, N. J.	CFGHIKMNUVYZ1234
Tennessee Plastics, Inc., Box 3117, Carroll Sears Branch, Johnson City, Tenn.	X
Tensolite Insulated Wire Co., Sub. of Carlisle Corp., 108 Main St., Tarrytown, N. Y.	NPUY34
Tevro Insulated Wire 102 N. Prospect Ave., Burbank, Calif.	FHIKUVW23
Texas Wire & Cable Co., Sub. of Narragansett Wire Co., 10th & Texas Sts., Plano, Texas.	EFJO
Thermal Wire of America, Keeler's Bay, So. Hero, Vermont.	P3
Thermantic, Inc., Elm City, N. C.	UY123
Thermo-Electric Co., 100 Fifth St., Saddle Brook, N. J.	N
Thordarson-Meissner Mfg., Div. Maguire Industries, Inc., Mt. Carmel, Ill.	PQT
Times Wire & Cable Div., International Silver Co., 358 Hall Ave., Wallingford, Conn.	UYZ23
Triangle Conduit & Cable Co., Inc., P. O. Box 711, New Brunswick, N. J.	ACDEFJO
Trio Wire & Cable Corp., 200 Newtown Ave., Brooklyn 22, N. Y.	CFLI
Uniform Tubes, Level Road, Collegeville 2, Pa.	NV3
U. S. Wire & Cable Corp., Progress Ave., & Monroe Sts., Union, N. J.	EF23

Victor Mfg. Co., 5806 Lawndale, Houston 23, Tex.	Y Z 4
Victor Electric Wire & Cable Co., 616 Main St., W. Warwick, R. I.	F H I U Y 2 3
Viking Wire Co., Shelter Rock Rd., Danbury, Conn.	P
Walker Bros., Conshohocken, Pa.	B C D E F I J O U V
Warren Wire Co., Putnal, Vt.	P U Y 3
Washburn Wire Co., Inc., 211 Waterman St., Phillipsdale, R. I.	A U
Western Electric Co., 195 Broadway, New York 7, N. Y.	A B C D 2 3
Western Insulated Wire Co., 2425 E. 30th St., Los Angeles 58, Calif.	C F G H I M Y 3 4
Westinghouse Electric Corp., Genesee St., Buffalo 26, N. Y.	N Q R
Westwood Cable Corp., 3440 Overland Ave., Los Angeles 34, Calif.	I M N U 1 2 3
Whitaker Cable Corp., 1381 Burlington Ave., Kansas City 16, Mo.	U V Y 2
Whitney Blake Co., The, 1905 Dixwell Ave., New Haven 14, Conn.	F G H I 2
Winsted Division, Hudson Wire Co., Winsted, Conn.	P Q S T Y 2 4
Wire & Cable Co., P. O. Box 881, Maywood, N. J.	•
Wire Company of America, Sub. of Warren Wire Co., 400 David Lane Pl., Goleta, Calif.	U Y
Wirecraft Products, Inc., Route 9, W. Brookfield, Mass.	Y 3 4
Wirekraft, Inc., Rolling Prairie, Ind.	E F G H I K L M O U V Y 1 2
World Wide Wire, Inc., Florida St., Farmingdale, N. Y.	

WIRE—Electronic Shielding

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.

Alpha Wire Corp., 200 Varick St., New York 14, N. Y.

BROOKFIELD WIRE CO., Airport, Brookfield, Mass.

FORT WAYNE METALS, INC., 5021 Hendricks Dr., Fort Wayne 5, Ind.

Hudson Wire Co., 58 Water St., Ossining, N. Y.

INTERNATIONAL FINE WIRE CO., Greenwood Ave., Midland Park, N. J.

NEW ENGLAND ELECTRICAL WORKS, INC., Sub. of The Montgomery Co., 333 Main St., Lisbon 1, N. H.

Riverside-Alloy Metal Div., H. K. Porter Co., Prospect Park, Pa.

Sylvania Electric Products, Inc., Parts Div., Warren, Pa.

TORPEDO WIRE & STRIP, INC., Box 5, Pittsfield, Torpedo, Pa.

WIRE—Elevator, Electric Cable

American Steel & Wire Div., U. S. Steel Corp., Rockefeller Bldg., Cleveland 13, Ohio.

Brown-Harris Co., Hoboken, N. J.

General Cable Corp., 420 Lexington Ave., New York 17, N. Y.

Hazard Insulated Wire Works, Div. of Okonite Co.

Kaiser Aluminum & Chemical Corp., P. O. Box 671, Newark, Ohio.

Wilson-Sprin, Pa.

Knickerbocker Annunciator Co., 78 Murry St., New York, N. Y.

National Electric Prod. Corp., Chamber of Commerce Bldg., Pittsburgh 19, Pa.

Phelps Dodge Copper Products Corp., 300 Park Ave., New York 22, N. Y.

ROEBLING'S, JOHN A., SONS DIV., THE COLORADO FUEL & IRON CORP., 640 So. Broad St., Trenton 2, N. J.

Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass.

WIRE—Elevator Hoisting Cables

American Steel & Wire Div., U. S. Steel Corp., Rockefeller Bldg., Cleveland 13, Ohio.

BEKAERT STEEL WIRE WORKS, Zwevegem, Belgium.

BETHLEHEM STEEL CO., Bethlehem, Pa.

Bethlehem Steel Co., Pacific Coast Div., 25th & Illinois Sts., San Francisco 10, Calif.

Broderick & Bascom Rope Co., 6060 No. Union Blvd., St. Louis 15, Mo.

California Wire Cloth Corp., 1600 10th Ave., Oakland 4, Calif.

Columbia-Geneva Steel Div., United States Steel Corp., Rockefeller Bldg., San Francisco 4, Calif.

Hazard Wire Rope Co., Div. of American Chain & Cable Co., Wilkes-Barre, Pa.

Lehigh Wire Rope Div., H. K. Porter, Inc., 2950 Emmanuel Ave., St. Louis 15, Mo.

Macwhyte Wire Rope Co., 2952-16th Ave., Kenosha, Wis.

[fol. 6616] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 74

Executive Office of The President
Bureau of The Budget
Percival F. Brundage, Director

Standard Industrial Classification Manual

Prepared by
The Technical Committee on Industrial Classification
Office of Statistical Standards
1957

For sale by the Superintendent of Documents, U.S.
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Price $2.50

[fol. 6617] Introduction

The Standard Industrial Classification

Purpose of the Classification

The Standard Industrial Classification was developed for use in the classification of establishments by type of activity in which engaged; for purposes of facilitating the collection, tabulation, presentation, and analysis of data relating to establishments; and for promoting uniformity and comparability in the presentation of statistical data collected by various agencies of the United States Government, State agencies, trade associations, and private research organizations.

Scope of the Classification

The Classification is intended to cover the entire field of economic activities: agriculture, forestry, and fisheries; mining; construction; manufacturing; transportation, communication, electric, gas, and sanitary services; wholesale and retail trade; finance, insurance, and real estate; services; and government.

This Manual presents a revision of the 1945 edition of Manufacturing Industries and the 1949 edition of Nonmanufacturing Industries. In this revision a number of changes suggested by users of the classification and by consumers of industry data have been incorporated. Among the more important changes in the Classification are: (1) separate Major Groups for commercial and noncommercial farms; (2) the transfer of milk pasteurization plants; ready mixed concrete establishments; and apparel, knitting and leather jobbers or converters from trade to manufacturing; (3) a rearrangement of local transportation companies; (4) the transfer of radio and television broadcasting from services to a new Major Group covering communication facilities; and (5) a more detailed classification of government.

The format of the Manual also represents a change from previous editions. The separate volumes for manufacturing and nonmanufacturing industries have been eliminated by consolidating into a single volume the industry

titles and descriptions, as well as the alphabetic index of principal products, processes, and services.

Principles of the Classification

The Classification was prepared by the Technical Committee on Standard Industrial Classification, assisted by a number of special committees of experts in various fields of business. The work of the Technical Committee was carried on under the sponsorship and general supervision [fol. 6618] of the Office of Statistical Standards of the Bureau of the Budget, Executive Office of the President.

In preparing the Classification, the Technical Committee was guided by the following general principles:

(1) The Classification should conform to the existing structure of American industry.

(2) The reporting units to be classified are establishments, rather than legal entities or companies.

(3) Each establishment is to be classified according to its major activity.

(4) To be recognized as an industry, each group of establishments must have significance from the standpoint of the number of persons employed, volume of business, and other important economic features, such as the number of establishments.[1] The procedure followed as a guide in measuring the economic significance of manufacturing industries is outlined in the Appendix, page 429.

Definition of Establishment

An "establishment" is an economic unit which produces goods or services—for example, a farm, a mine, a factory, a store. In most instances, the establishment is at a single physical location; and it is engaged in only one, or predominately one, type of economic activity for which an industry code is applicable.

Where a single physical location encompasses two or

[1] An exception to this principle is found in the grouping of establishments into industries described as "not elsewhere classified."

more distinct and separate economic activities for which different industrial classification codes seem applicable, such activities should be treated as separate establishments and classified in separate industries, provided it is determined that: (1) such activities are not ordinarily associated with one another at common physical locations; (2) no one industry description in the Standard Industrial Classification includes such combined activities; (3) the employment in each such economic activity is significant;[2] and (4) reports can be prepared on the number of employees, their wages and salaries, and other establishment type data. An establishment is not necessarily identical with the business concern or firm, which may consist of one or more establishments. Also, it is to be distinguished from organizational subunits, departments, or divisions within an establishment. Supplemental interpretations of the definition of an establishment are included in the industry descriptions of the Standard Industrial Classification.

[fol. 6619] Auxiliary Units

In applying the Standard Industrial Classification to individual establishments, instances will be encountered where the activity of an establishment under consideration may have some, but not all, of the characteristics of individual industries as provided in this Manual. The activities of these establishments are subordinate to, and operated for the use of, some other establishment(s) of the same concern and are generally at locations separate from the establishment(s) served. Such establishments are called "auxiliary units." The more important types of such auxiliary units are illustrated below.

1. A separate research laboratory operated for manufacturing plants of the same concern.
2. A warehouse operated by another establishment primarily for its own use and not for public storage is auxiliary to the establishment for which it is op-

[2] Usually 100 or more employees in mining or manufacturing activity, and 50 or more employees in activities other than mining or manufacturing.

erated. Thus, warehouses may be auxiliary to manufacturing, wholesaling, or retailing operations.

3. An automotive repair shop or storage garage operated by a department store primarily for its own use and not for the public repair or storage of vehicles.
4. A separate repair shop serving various manufacturing plants of the same concern primarily for the maintenance and repair of plant machinery and equipment.

Mines and manufacturing plants operated primarily for the use of other establishments of the same firm are not considered auxiliary units, but are classified on the basis of their primary activity. Important types are:

1. A coal mine operated by a steel company for its own use is classified as a coal mine.
2. A tin can manufacturing plant operated by a canning company for its own use is classified as a tin can manufacturing plant.
3. A printing plant operated primarily for the use of another establishment(s) of the same company is classified as a printing plant.

Central and District Administrative Offices

A central or district administrative office is an establishment primarily engaged in general administrative, supervisory, purchasing, accounting and other management functions performed centrally for other establishments of the same company.

Industrial Classification of Auxiliary Units and Central and District Administrative Offices

Auxiliary units and central and district administrative offices, when separately reported, should be classified on the basis of the most appropriate Major Group representing the primary activity of the establishments served. All such units will be assigned a four digit code, the first two digits being the appropriate Major Group code (01 through 89); the third digit a zero code and the fourth digit to identify

[fol. 6620] the type of unit. The fourth digit code numbers for general use are as follows:

1—Central or district administrative offices
2—Research laboratories
3—Warehouses
9—Other auxiliary units

Thus, a central or district administrative office serving establishments primarily engaged in activities classified in Major Group 33.—Primary Metal Industries—would be 3301; a warehouse serving establishments primarily engaged in activities classified in Major Group 54.—Retail Trade—Food—would be 5403.

Agencies desiring to distinguish additional types of auxiliary units, other than those listed above, will so advise the Chairman of the Technical Committee on Standard Industrial Classification, Office of Statistical Standards, Bureau of the Budget, to assure comparability among agencies.

Basis of Establishment Classification—Code Assignment

Each establishment is assigned an industry code on the basis of its major activity, which is determined by the product or group of products produced or handled, or services rendered. Ideally, the principal product or service should be determined by reference to "value added." In practice, however, it is rarely possible to obtain this information for individual products or services, and it becomes necessary to adopt some other criteria which may be expected to give approximately the same results. It is recommended, therefore, that, as far as possible, the following characteristics be used for each of the major economic sections:

Economic Section	Characteristics
Agriculture, forestry, and fisheries (except agricultural services)	Value of production.
Mining	Value of production.
Construction	Value of work done.
Manufacturing	Value of production.
Wholesale and retail trade	Value of sales.

Economic Section	Characteristics
Finance, insurance, and real estate	Value of receipts.
Services (including agricultural services)	Value of receipts.
Government	Function.

Occasionally in cases of mixed businesses, the above characteristics cannot be determined or estimated for each product or service, and less frequently a classification based upon the recommended characteristics will not represent adequately the process or activity of the establishment. In such cases, if employment information is available, the major activity should be determined by the activity in which the greatest number of employees worked.

[fol. 6621] Structure of Classification

The structure of the Classification makes it possible to classify establishments by industry on either a two digit, a three digit, or a four digit basis, according to the degree of detail in information which may be needed. It permits an agency to select the level of detail considered most appropriate for presentation of its data. Also, it permits an agency to use additional subdivisions in adopting this Classification for its own use, while still retaining comparability with the classifications used by other agencies. Furthermore, comparability with the Classification may be maintained on a two digit basis by combining groups or industries within a Major Group; similarly, comparability may be maintained on a three digit basis by combining industries within a three digit group. All groupings or industry subdivisions should be clearly labeled.

Some agencies may wish to use the numbering system of the Classification; but other agencies will, no doubt, find it more convenient to adapt their present numbering system to this Classification.

Agencies which use the three digit code may use a zero temporarily on the third digit position for coding reports on which available information is inadequate for proper allocation to a specific three digit group. For example,

Major Group 25.—Furniture and Fixtures—is divided into the following groups:

251 Household Furniture
252 Office Furniture
253 Public Building and Related Furniture
254 Partitions, Shelving, Lockers, and Office and Store Fixtures
259 Miscellaneous Furniture and Fixtures

If an establishment is described as engaged in manufacturing furniture, the report should be coded as "250" until sufficient information is obtained to assign the establishment to the appropriate group.

An agency which uses the four digit code may use a zero temporarily, in the fourth position, to code reports for which the information available is inadequate for proper allocation to a specific industry.

It will be noted that whenever number nine has been used on the third or fourth digit position, it has been assigned to miscellaneous three digit groups or four digit industries covering establishments not elsewhere classified. The establishments grouped at the four digit level as "not elsewhere classified" may not constitute homogeneous groups but are treated as separate industries for purposes of this Classification.

Acknowledgments

In the preparation of this revised edition of the Standard Industrial Classification Manual, the Technical Committee wishes to acknowledge the valuable assistance received from the Advisory Council on Federal Reports, of which Mr. Merrill A. Watson, National Shoe Manufacturers Association, is Chairman. The review of the Manual by [fol. 6622] the Advisory Council was carried out under the general guidance of a Coordinating Committee consisting of:

P. K. Lawrence, E. I. duPont deNemours and Company, Chairman
Preston B. Bergin, National Association of Blueprint and Diazotype Coaters

A. J. Nesti, National Electrical Manufacturers Association
John H. Seaton, Pennsylvania Manufacturers Association
Earl L. Knight, Pennsylvania Manufacturers Association (alternate for Mr. Seaton)
Horace Stringfield, Iron and Steel Institute
J. V. Henlock, United States Steel Corporation (alternate for Mr. Stringfield)

Consultants

R. Buford Brandis, American Cotton Manufacturers Association
C. F. Graf, Jr., International Business Machines Corporation

Mr. Russell Schneider, Executive Secretary of the Advisory Council, was particularly helpful in the establishment of committees of industry representatives to review specific sections of the Manual. Twenty-six committees were established, each of which made many valuable suggestions on the Classification. The Technical Committee also wishes to express appreciation for many constructive criticisms and suggestions received from the American Marketing Association, Dun and Bradstreet, McGraw-Hill Publishing Company, the National Bureau of Economic Research, various trade unions, trade associations, and Federal and States agencies.

[fol. 6623]

Group No.	Industry No.	
334		Secondary Smelting and Refining of Nonferrous Metals and Alloys
	3341	Secondary smelting, refining, and alloying of nonferrous metals and alloys
		Establishments primarily engaged in recovering nonferrous metals and alloys from new and used scrap and dross, but which are not engaged in further fabrication. This industry includes establishments engaged in both the recovery and alloying of precious metals. Plants engaged in the recovery of tin through

Group No. Industry No.

secondary smelting and refining, as well as by chemical processes are included in this industry. Establishments primarily engaged in assembling, sorting, and breaking up scrap metal, without smelting and refining are classified in trade industries.

335 Rolling, Drawing and Extruding of Nonferrous Metals

3351 Rolling, drawing, and extruding of copper

Establishments primarily engaged in rolling, drawing, and extruding copper, brass, bronze, and other copper base alloy basic shapes, such as plate, sheet, strip, bar, and tubing. Establishments primarily engaged in recovering copper and its alloys from scrap or dross are classified in Industry 3341.

3352 Rolling, drawing, and extruding of aluminum

Establishments primarily engaged in rolling, drawing, and extruding aluminum and aluminum base alloy basic shapes, such as plate, sheet, strip, bar, tubing, and foil.

3356 Rolling, drawing, and extruding of nonferrous metals, except copper and aluminum

Establishments primarily engaged in rolling, drawing, and extruding nonferrous metals other than copper (Industry 3351), and aluminum (Industry 3352). The products of this industry are produced in the form of basic shapes, such as plate, sheet, strip, bar, and tubing. Establishments primarily engaged in recovering nonferrous metals and alloys from scrap or dross are classified in Industry 3341; in manufacturing gold, silver, tin, and other foils except aluminum in Industry 3497; and aluminum foil in Industry 3352.

3357 Drawing and insulating of nonferrous wire

Establishments primarily engaged in drawing, drawing and insulating, and insulating wire and cable of nonferrous metals from purchased wire bars, rods, or wire.

Group No.	Industry No.	
336		Nonferrous Foundries

This group includes establishments primarily engaged in manufacturing castings and die castings of aluminum, brass, bronze and other nonferrous metals and alloys. These establishments generally operate on a job or order basis manufacturing castings for sale to others or for interplant transfer. Establishments which produce nonferrous castings and which are also engaged in fabricating operations such as machining, assembling, etc., in manufacturing a specified product are classified in the industry of the specified product. Nonferrous castings are made to a considerable extent by establishments classified in other industries that operate foundry departments for the production of castings for incorporation, in the same establishment, into such products as machinery, motor vehicles, etc. Establishments primarily engaged in manufacturing iron and steel castings are classified in Group 332.

[fol. 6624] Appendix

Criteria for Recognizing Manufacturing Industries in the Standard Industrial Classification

General Comments:

The Standard Industrial Classification defines industries in accordance with the existing structure of the American economy. An industry is a grouping of establishments primarily engaged in the same or similar lines of economic activity. In the manufacturing division, the line of activity is generally defined in terms of the product made, materials consumed, or process of manufacture used.

Sometimes a common process of manufacture may result in an industry of considerable size and a wide variety of products; e.g., meat packing, and blast furnaces, steel works and rolling mills. In other instances, the production of an industry may be limited to a single product, such as chewing gum or wallpaper. To be recognized as an industry each group of establishments must have significance from the standpoint of number of production workers, value added by manufacture, value of shipments, and number of establishments. Size of an industry is not the sole criterion for its recognition; it is also important that an industry comprise a group of establishments of which the output of products or processes defining the industry (primary products of the industry) account for a relatively high proportion of (a) the total shipments or receipts of the industry (specialization ratio), and (b) the total output by all industries of the products or processes which are primary to the industry (coverage ratio).

The quantitiative standards for size, specialization and coverage for manufacturing industries that have been established are described in subsequent paragraphs. There may be a few instances where other important considerations will warrant the establishment or retention of an industry which does not satisfy size, specialization and coverage criteria.

As a result of the application of these criteria, there will be "leftover" segments of American industry. Lines of business activity which do not satisfy the criteria for

the recognition of an industry, if they are very closely associated with the activities of another industry, may be included with that industry. This may have the effect of reducing the specialization ratio of the industry with which this line of activity is combined, but such a procedure may be preferable to including the line of activity in a "miscellaneous" or "not elsewhere classified" category for that particular three digit group. Each case must be evaluated on its own merits. It may be better to allow a small element of impurity to be introduced into a [fol. 6625] given four digit industry by associating it with line of activity which is quite closely related rather than to increase the size of the "miscellaneous" category for the three digit group by adding another line of activity, since the "miscellaneous" categories are heterogeneous and are primary to the industry (coverage ratio).

Standards for Criteria:

As a result of the Census of Manufactures, data (number of establishments, employment, value added, etc.) are available for manufacturing as a whole. Knowing the number of industries, values for each desired item have been calculated for an "average" industry. These values for the "average" industry were used as the basis for measuring size. For each desired item, a number of points were awarded an industry, depending on the industry's relationship to the size of the "average" industry. The points awarded were equal to the percent of the "average" industry. The points for the various items were averaged with a system of weights to secure the final score for an industry. The score determines whether the industry is to be considered sizable or not.

Size Criteria:

Size was measured by a comparison of four items as follows:

1. Number of employees
2. Value added by manufacture
3. Value of shipments
4. Number of establishments

Number of employees and value added are recognized as being more significant and reliable measures of industry size than are value of shipments and number of establishments. Value of shipments includes the value created in other industreis or other economic divisions such as Agriculture, etc., and does not measure value of income produced in the specific manufacturing industry. In some instances, the large duplication of value of shipments within an industry makes publication of the figure meaningless. A count of establishments in each industry is of limited significance as it treats both large and small establishments as of equal importance. In addition, the derivation of an "average" number of establishments per industry reflects, to a large extent, the very numerous plants in a relatively few industries. For example, five industries (Bakeries, Sawmills, Newspapers, Commercial Printing, and Concrete Products) account for approximately 22 percent of the number of establishments, but only 8 percent of the number of employees and value added by manufacture.

Generally speaking, an existing Standard Industrial Classification industry is considered as sizable if it attains a point score of 10 or higher. The point score for a new industry is 20 or higher. In deriving the final score based on the four items included in the determination, double weight is given to the "number of employees" and to "value added." The final score is a measure in percent of the size of an industry in relation to an "average" industry.

[fol. 6626] Industries should not be eliminated because they fail to attain the recommended size scores, without giving due attention to the comments contained in the section dealing with the application of criteria.

Specialization Ratio and Coverage Criteria:

The minimum ratio for industry specialization is 80. When applying the specialization test, it is well to remember that an industry may sometimes specialize in only one product (malt or beet sugar). In other instances, establishments in an industry may typically produce and thus specialize in a wide variety of products (Meat Packing

Plants; Blast Furnaces, Steel Works, and Rolling Mills; and Radio and Television Transmitting, Signalling, and Detection Equipment and Apparatus). For varying reasons, industries have through the years developed in a diverse manner. It is important, therefore, that the specialization ratios not be applied rigidly, but that they be interpreted in the light of the nature of the particular industry.

In applying coverage ratio factors, separate criteria are established for industries with "captive" output within and outside the industry as distinguished from industries primarily producing for commercial sale. The minimum coverage ratio for industries described in the Standard Industrial Classification as producing for commercial sale is 70; the coverage ratio for all other industries is 50, except for industries producing from purchased materials (stage of process classification). The minimum coverage ratio for this latter group of industries (Blended and Prepared Flour, etc.) is 33. The coverage ratio for industries with significant "captive" counterparts (minimum coverage of 50 percent) should be computed on the basis of the proportion of total output accounted for by the given industry (shipments for sale, interplant transfer, and production for use within the same establishment) compared with total output in all industries (shipments for sale, interplant transfer, as well as production for use within the same establishment). Examples of such industries are Gray Iron Foundries, Metal Stampings, and Iron and Steel Forgings.

Application of Criteria:

The application of the size, specialization and coverage criteria to a particular industry is subject to other considerations. Industries which appear to qualify because of special or unique factors not included in the formula described above may be retained. Examples of such factors are defense mobilization; very large industries with specialization slightly below 80 percent; and industries of special significance in economic fluctuations which are also near the lower specialization limit, such as Machine Tools.

Separate industries for plants in an area that is

rapidly expanding but which does not meet the quantitative measures in the usual reference statistics also may be retained. Such retention is based on substantial statistical evidence of current size, or conclusive evidence of growth by a specified time, and on the industries meeting the customary requirements, other than size, for establishing an industry.

[fol. 6627] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 75

Mineral Industry Surveys

United States Department of the Interior, Bureau of Mines

Stewart L. Udall, Secretary
Marling J. Ankeny, Director

Mineral Market Report
Mineral Market Survey No. 3349

Aluminum and Bauxite in 1961
(Preliminary Annual Data)

Aluminum: Domestic primary aluminum production in 1961 was approximately 1,880,000 short tons, a drop of 6 percent from the record year of 1960, according to the Bureau of Mines, U.S. Department of the Interior. Shipments of primary metal ingot increased slightly during 1961 in comparison to 1960, and exceeded the quantity produced with a resulting decline in stocks at reduction plants.

Rated annual aluminum production capacity of United States plants increased 15,000 tons during the year to 2,483,750 tons when Harvey Aluminum, Inc. announced the completion of 60 new electrolytic cells at its reduction plant at Dallas, Oregon. A further increase in domestic aluminum production capacity was forecast. Cerro Corporation was considering building a production plant along the Columbia River at Wauna, Oregon. Cerro, as a result of its acquisition of the United Pacific Aluminum Corp., had a contract with Bonneville Power Administration to receive 90,000 kw of electrical power for the plant, with the delivery to start September 1, 1963. This amount of power

would permit operation of a plant rated at about 55,000 ton capacity. Consolidated Aluminum Corp. announced that a $27 million basic aluminum plant would be built near New Johnsonville, Tennessee. Howe Sound Co. was considering three sites for a new $45 million aluminum plant. Harvey also announced possible construction of a new 75,000 ton plant in the Pacific Northwest.

Several firms announced a potential increase in aluminum production capacity through utilization of new refractory materials in the cathode electrode assembly. Several standard sized cells have been converted to determine the conditions likely to be encountered in the plant when the new materials are utilized extensively.

Domestic capacity to produce super pure aluminum was increased to nearly 4,800 tons per year when Kaiser Aluminum & Chemical Corp. activated five new cells to produce the 99.99 plus percent metal. Each cell has an annual capacity of 380,000 pounds which increased Kaiser's total capacity to more than 2,650 tons per year. As a result of a new process developed during the year, Aluminum Company of America announced it too would market super pure alumnium. No capacity figure was released.

During September the price of primary aluminum ingot dropped 2 cents to 24 cents a pound. A decrease in the price of aluminum to U.S. customers was first announced by Aluminum Limited. The U.S. producers then announced the reduction to meet the new price. Earlier in the year Kaiser had reduced the price of super pure aluminum from 47½ cents per pound to 45½ cents per pound.

Prepared December 19, 1961, by K. B. Higbie, C. I. Wampler, and Mary E. Trought, under the supervision of P. F. Yopes, Chief, Branch of Nonferrous Metals, Division of Minerals.

[fol. 6628] The major outlet for aluminum in the United States continued to be the building and construction industry according to preliminary data released by the Aluminum Association. Transportation, electrical and container applications were the next most significant consuming areas.

Exports of primary aluminum metal decreased over 50 percent during 1961. For the first none months of the year less than 100 thousand tons of crude and alloyed aluminum

was exported in comparison with over 225 thousand tons in the same period of 1960.

Bauxite: Domestic production of bauxite in 1961 was 1.22 million long tons or 61 percent of that produced during 1960. Total imports of bauxite were approximately 8.7 million tons, equal to the 1960 imports. Jamaica supplied over 50 percent of the imports, Surinam approximately 25 percent, and the Dominican Republic, Haiti, and British Guiana most of the remainder.

The U.S. Government signed barter agreements providing for the delivery of 1.2 million long dry tons of Jamaican-type bauxite, and 1.0 million long dry tons of Surinam-type bauxite.

Research activities aimed at extracting aluminum from new ore sources continued at a high pace. Technological investigations have centered around extracting alumina from raw materials other than bauxite. Olin Mathieson Corp. has piloted a process for producing high-quality aluminum sulfate from domestic clay. North American Coal Co. continued to study the recovery of alumina from coal-mine shale.

Secondary Aluminum: Preliminary data for 1961 showed that in comparison with 1960 the consumption of aluminum-base scrap by industrial users and production of finished aluminum alloys by the independent producers declined. This was the second consecutive year in which the volume dropped. Based on 9 months' figures scrap consumption for 1961 totaled 385,000 short tons, down 56,000 tons or 13 percent from the previous year. The estimated metallic recovery was 323,000 tons and the estimated aluminum content was 300,000 tons. New scrap accounted for 73 percent of the total scrap consumed. The remaining 27 percent was obsolete scrap and sweated pig. Ingot production in 1961 is estimated at 269,000 tons compared with 282,000 tons in 1960. Estimated shipments of finished alloys by the independent producers totaled 271,000 tons, about 9,000 tons less than in 1960. Imports of scrap, an estimated 5,400 tons in 1961 was an increase of about 400 tons compared with the previous year and scrap exports showed an increase of 3,500 tons to approximatley 83,000 tons.

World Review: Bauxite world production, estimated at

24,935 long tons, was 8 percent less than in 1960. Total production of the three principal producers; the United States, Jamaica, and British Guiana showed a decrease of 26 percent. France showed an increase of 15 percent.

Aluminum production in the free world is estimated at 4 million short tons which was approximately equal to the '60 production. France and Japan were the only countries showing production increases in excess of 10 percent. Several new reduction facilities in the United States, Norway, France, Taiwan, and India were completed during 1961, raising the world aluminum production capacity to over 6 million tons.

Several United States firms, in conjunction with various foreign corporations, announced further plans for expansion of aluminum interests throughout the world. Alcoa began development of an integrated aluminum production complex in Australis, and also made plans for the construction of a 20,000 ton per year smelter in Mexico. Kaiser planned a complete aluminum production complex in Australia and New Zealand, and also formulated plans to build reduction and rolling and fabrication facility in Japan. [fol. 6629] Formal approval by the U.S. Government for financial assistance to the Republic of Ghana for construction of a hydroelectric dam and aluminum refinery was given. The $196 million dam will be financed with $98 million from Ghana, $27 million from the U.S. Development Loan Fund, $10 million from the Export-Import Bank, $47 million from the World Bank, and $14 million from Great Britain. The dam will provide power for an aluminum refinery to be built by a consortium composed of Kaiser and Reynolds.

Several announcements were made concerning possible new aluminum plants in other areas. Kaiser Aluminum & Chemical Corp. was awarded permission to proceed with plans for a plant with minimum capacity of 22,000 tons in Argentina. Kaiser also negotiated with the Dutch Government for construction of a new primary aluminum plant in the Netherlands. Reynolds considered building aluminum plants in the Philippines, Turkey, and Kuwait. Harvey participated with the Nova Scotian Government in a survey and study to determine the feasibility of an integrated aluminum facility there.

[fol. 6630] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 76

Economic Study

Use of Aluminum and Copper Conductors on Consolidated Edison System

[fol. 6631] February 9, 1959.

Re: Use of Aluminum and Copper Conductors on Consolidated Edison System

Mr. F. Van Olinda
Outside Plant Engineer

The attached economic study, dated February 5, 1959, on the above subject covers three major applications of aluminum on our distribution system, namely:

1. Aluminum for network bus.
2. Aluminum for underground secondary mains.
3. Aluminum for overhead conductors.

Economic comparisons are given in the study to cover costs involved in the use of aluminum or copper for each application. The report also incorporates technical reasons for the various operations involved, and a number of pertinent drawings and procedures are included. All cost data are based on figures applicable to the Brooklyn, Queens and Bronx areas.

Conclusions and recommendations based on the findings in this report are as follows:

1. Aluminum has been used on buses in network vaults since 1953 and our field experience to date and as determined by three separate inspections of these installations has been completely satisfactory. The use of the aluminum integral web bus with premanufactured snap on insulation is very popular with the field forces because of the lightness of the bus and simplified insulation. The cost of this type of bus is 53 per cent of the cost of insulated copper bus. The continuation of the practice of using this aluminum bus is justified and there appears to be no foreseeable reason for a change in this practice.

2. A trial installation of 2,200,000 feet of aluminum mains on the underground network system has been completed and we have developed methods and equipment which were put into effect and which would enable us to use aluminum if the time arrives

again when copper is unavailable or when this change could be justified. However, the cost of [fol. 6632] aluminum mains in comparison with copper mains is very much higher. Our estimates indicate that the installed costs for aluminum mains are 50 per cent higher than for copper mains. The main reasons for these higher costs are: (a) more labor and materials needed in splicing; (b) need for larger service boxes; (c) increase in costs due to the need of connections between copper and aluminum which are continually encountered on our system; (d) additional tools, etc.

There appears to be no justification for the use of aluminum on underground mains on the basis of current and foreseeable cable and installation costs. In cases of emergency, when copper is unavailable enough development work has been done so that we could then go to the use of aluminum.

3. Work on our overhead distribution system consists mainly of relatively short extensions to the existing copper overhead primary and secondary mains and, of course, the addition of services. Under these conditions, there appears to be little, if any, difference between the costs of aluminum extensions and copper extensions at the current cable prices and with available splicing techniques.

Our experience reveals that where aluminum has been used, as described above, we have more trouble calls. The reason for the inferior operating record for aluminum is galvanic corrosion between copper and aluminum where these two metals come together and also due to the fact that aluminum to aluminum connections and aluminum to copper connections are not as satisfactory as copper to copper connections. Where aluminum is involved greater care is required in making these connections and the application of inhibitors is required. The use of aluminum in conjunction with the existing copper introduces the need for additional tools, and the field forces strongly object to the use of aluminum because of this and other practical difficulties.

[fol. 6633] On the basis of current cable prices and the type of connections available in splicing aluminum there appears to be no economic or operating advantage in its use on our system. This situation, however, should be reviewed annually on the basis of cable costs and any improvements which may occur in the connection devices. We should also continue to follow developments on aluminum connectors since their performance is pertinent to this problem.

——, ——, Division Engineer, Equipment Division.

attach.
cox.m

[fol. 6634] Introduction

This is a report of studies made to determine the economics of the use of aluminum in place of copper as an electrical conductor on our System. It is presented in three parts, viz. overhead, underground and network buses.

The material used in each of these three fields of application, the construction methods required, and personnel involved make for a natural division into the three groups. Thus if it is decided to use aluminum in one port and copper in another, no conflict of material, accessories, or personnel will result.

In adition to the studies noted above a section is included of source information of cable prices, and some EC specifications for overhead construction.

[fol. 6635]

Part I.

Aluminum for Network Bus

[fol. 6636] ### Comparative Costs of Aluminum vs Copper For Network Bus Construction

Aluminum has a fundamental advantage over copper in bus construction for two reasons; it weighs about half as much as an equivalent copper conductor of same conductivity, and manufacturing costs are substantially less because aluminum shape is extruded whereas the copper is not but must be shaped by much more costly methods. In the case of our standard aluminum bus (6′ x 5″ x ⅜″ integral web channel) the weight is just 42% the weight of equivalent copper (6″ x 6″ x ¼″ square tube).

At recent metal prices (aluminum at 25.2¢ and copper at 26.5¢/lb.) the purchase prices of aluminum and copper bus were quoted as follows:

	Costs Per Circuit Foot	
	Bare Conductor	Insulated Conductor
Copper	$39.60	$55.12*
Aluminum	14.43	25.97
Difference in favor of aluminum	$25.17	$29.15

The 33% additional cost to insulate copper results from the larger surface to be covered and the need for clips to hold in place which are not needed in the case of the aluminum channel, the shape of which is more suitable for "snap-on" insulation.

Since shop fabrication and installation costs are about the same for aluminum and copper, a reversal in this economic comparison is not likely.

Because of its lighter weight, the field forces prefer to use the aluminum bus.

Experience with the use of aluminum bus over a period of six years has been satisfactory in that the field inspections have revealed no faulty connections.

In the case of a 6 bank (460 V) job the saving in using aluminum as compared with copper is

120′ at $29.15 = $3,500 approx.

This is a saving of 53% over the purchase price of copper tube with insulation.

On the basis of present usage, there is an annual saving of approx. $39,000 realized by the use of aluminum bus.

Prepared by: L. F. Porter
1-6-59

[fol. 6637] Part II.

Aluminum for Underground Secondary Mains

[fol. 6638] Aluminum Underground Secondary Mains

Some 2,200,000 feet of aluminum 350 MCM mains cable have been installed on the underground network. This consists of a trial installation of 67,000 feet in 1952-53 and approximately 2,140,000 feet purchased in 1955 when a considerable price differential occurred favoring aluminum over copper. While operating experience with aluminum cable has been good, in that we have no record of failures, the installation cost is substantially higher than for copper and greater care is necessary to make good electrical connections. Since larger service boxes are required for splicing, the box enlargements necessary to accommodate aluminum make its general use for reinforcing existing systems excessively high in cost.

The aluminum mains were installed only in Brooklyn and Queens because much of the conduits in Manhattan and Bronx are less than 4", the minimum size required for aluminum. Also, this cable was pulled only at those locations where its use would not entail service box enlargements. Most of the cable was spliced using copper joints and copper-to-aluminum adapters since aluminum accessories were not available. However, aluminum designs have been developed for both crab and joints and individual cable limiters, and trial installations have been made of both. While aluminum limitered crab joints have not been developed because of the time and expense involved for dies, molds, etc., they could be developed if required. No satisfactory design has yet been worked out for adapters to connect aluminum services (smaller than 350 MCM) in an alumi-

*Insulation cost estimated

num mains connector. These would be required if small aluminum services were to be used. The installation of the aluminum cable has been handicapped for a lack of a tool suitable for both copper and aluminum joints. A manufacturer is now developing such a tool, similar to the one used on copper, which is expected to be satisfactory for use on existing copper crab joints in addition to making aluminum joints.

Aluminum has certain characteristics which make it less attractive than copper, particularly for underground use: (1) the oxide layer on aluminum makes it more difficult to make an electrical connection because of the need for cleaning strands, using an oxide inhibitor in each joint and the requirement for a larger compression joint; (2) it is very susceptible to a-c corrosion; a defect in the insulation admitting a slight amount of water may lead to cable failure; (3) the cable, which has approximately 25 per cent larger outside diameter than equivalent copper, requires a minimum size 4-inch duct and the substantially larger joints require larger service boxes than would be required for the same number of copper circuits. This means that bringing a set of aluminum mains into an existing service box or replacing a set of copper mains with aluminum will frequently require a box enlargement which would not be necessary if copper were used for the new circuit.

Labor to splice aluminum is high because: (1) since we have an existing copper system, many of the aluminum connections will be made to existing copper joints, by means of adapters, at a labor cost at least twice as high as would be required for an all-copper joint; (2) in the case of all-aluminum construction approximately 20 per cent more splicing labor is required than for copper, and splicing material costs an estimated 50 to 75 per cent higher; (3) in the case of neutral cable, the aluminum must be insulated from water and where it is connected to bare copper neutrals the additional expense of water seals is incurred. For these reasons, the use of aluminum as a neutral conductor is even less attractive than its use as a phase conductor.

In the case of the aluminum cable purchased in '55, it is estimated that the installed cost was 7 per cent higher than copper costs would have been, although the purchase price for the aluminum was $2.36, as compared with $3.31 per

circuit foot for copper. Had aluminum joints been available for the installation work, it is estimated that the aluminum and copper costs, installed, would have been about the same. These comparisons are on the basis of cable installation costs, only, as box enlargements were avoided by selecting locations where enlargements would not be required.

[fol 6639] On the basis of present costs, the use of aluminum is definitely uneconomical and it appears very improbable that aluminum cable costs can become low enough in comparison to copper to compensate for the discrepancy in installation costs as illustrated in attached Table I.

attach.
Prepared by L. F. Porter
1-8-59

[fol. 6640] Aluminum Underground Secondary Mains

Table I

Summary of Costs
(Dollars Per Circuit Foot)

		Aluminum Circuit (1)	
	Copper (1) Circuit	Installed on Existing Copper System	Installed in New Subway
Installation	$1.04	$1.47	$1.26
Loss Salvage (Present Worth)	−.29	−.16	−.16
Add'l Service Box Enlargements (for aluminum) (2)	....	.90	.16
Net Installation	.75	2.21	1.26
Present Cable Costs ('58)	2.28	2.33	2.33
Total	$3.03	$4.54	$3.59

(1) Copper Circuit: Phase cables = 6 − #4/0 R/N + 2 − #4/0 bare copper
Aluminum " Phase cables = 6 − 350 MCM R/N (aluminum) + 2 − #4/0 bare copper

(2) Where new subway is built for aluminum cable, some service boxes must be built larger than is required for copper cable. If aluminum cable is used for all mains work (reinforcements, extensions and replacements), then some existing service boxes must be enlarged and new service boxes must be larger because of the larger aluminum splices as compared with copper.

[fol. 6641] Aluminum Underground Secondary Mains

Appendix A

1. Cable Prices Per Circuit Foot

	1955	1958
6−#4/0 R/M+2−#4/0 bare (all copper)	3.31	2.28
6−350 MCM R/N (aluminum)+2−#4/0 bare copper	2.60	2.33
*6−350 MCM R/N (aluminum)+2−350 MCM Polyethelene covered (all aluminum)	2.36	2.37

2. Basis of Comparison—Installed Costs

(a) Comparison on circuit foot basis
(b) Circuit length (average) = 150 ft.

3. Salvage of Cable Removed in Future

Salvage price of copper = 80% copper price. Salvage price of aluminum = 22% aluminum price. Assuming cable has an average life of 25 years, present worth of salvage = 23% of future salvage value (interest at 6%). For purpose of this study, future copper price is assumed to be 30¢ per lb. aluminum 25¢ per lb.

4. Installation Cost Data—Direct Cost Only—No Overhead

(a) Copper Cable Installation Costs
6−#4/0 R/N and 2−#4/0 Bare−$1.04 per circuit foot

(b) Aluminum Cable Installation Costs

Circuit	Installed on Existing Copper System	Installed in New Subway
6−350 MCM R/N (aluminum) +2−#4/0 bare (copper)	$1.47	$1.26
*6−350 MCM R/N = 2+350 MCM Polyethelene covered (all aluminum)	1.72	1.40

* Installed in 1955–58. Not recommended for future consideration.

[fol. 6642] Aluminum Underground Secondary Mains

Appendix B

Additional Subway Costs

Incurred by use of Aluminum Mains

I. Reinforce Mains on Existing System—Survey of Typical Areas

A. Brooklyn—

1. Total trench feet of subway	50,500
2. Total No. of service boxes and manholes	413
3. Average section length—(Approx.)	120'
4. To add (1) additional circuit copper main—thru-out enlarge 43 service boxes to 'S' boxes	
5. To add (1) additional circuit of aluminum mains thru-out enlarge 26 service boxes to 'S' boxes	
" 15 service boxes to 'TS' boxes	

B. Queens—

1. Total trench feet of subway	45,600
2. Total No. service boxes and manholes	285
3. Average section length—(Approx.)	160'
4. To add (1) additional circuit of copper mains—thru-out enlarge 69 service boxes to 'S' boxes	
" 2 service boxes to 'TS' boxes	
5. To add (1) additional circuit of aluminum mains—thru-out enlarge 88 service boxes to 'S' boxes	
" 37 service boxes to 'TS' boxes	
" 3 service boxes to manholes	

C. Brooklyn and Queens Areas Combined (Difference between Aluminum and Copper)

1. In recent years secondary mains work has been divided as follows— Brooklyn 40% (Approx.)
Queens 60% "

2. Additional service box enlargements required for aluminum per 1000 circuit feet of mains cable installed:

	Number
Increase to 'S' box	.38
" to 'TS' "	.38
" to manholes	.04

3. Cost of service box enlargements

to 'S' boxes	.38 x	$ 614 =	$234	per 1000 circuit ft.
to 'TS' "	.58 x	772 =	448	" " " "
to manholes	.04x	2,374 =	95	" " " "
		Total	$777	

[fol. 6643]

4. Cost to divert ducts and piece-out mains cables

Since some service boxes must be relocated to permit enlargement, duct diversions and mains piece-outs are required.

a. Number of diversions required per 1000 circuit feet of new mains installed = .50
b. Cost of duct diversions
.50 x $350 = $175 per 1000 circuit feet
c. Cost of mains piece-outs
.50 x $264 = $132 per 1000 circuit feet

5. Total Cost to Enlarge Service Boxes

a. build service boxes	$ 777	per 1000 circuit ft.
b. divert ducts	175	" " " "
c. piece-out mains	132	" " " "
Total	$1,084	

II. Extend Mains—New Subway

Based on survey of jobs issued, additional cost of boxes to accommodate aluminum cable (additional to requirements for copper cable)
$160 per 1000 circuit feet

III. Weighted average of enlarging existing service boxes and building larger new service boxes for aluminum.

It is estimated that 80% of all mains cable splices are made in existing or enlarged service boxes. On this basis, the weighted average incremental cost of service boxes for aluminum is $900 per 1000 circuit feet higher than would be required for copper cable.

[fol. 6644] Part III

Aluminum for Overhead Conductors

[fol. 6645] Resume and Conclusions

Overhead System Cost Study

Study of the Overhead use of copper and aluminum was made in three pieces, viz.

A) Primary Feeder Installations (Table I)
B) Secondary Mains Installations (Table II)
C) Service Drops (Table III)

An examination of the data in these tables indicates that on our System there is little or no saving in the use of aluminum cable over copper. This is due to the higher installation cost for aluminum.

Table IV compares costs for a package installation for various combinations. Again it is seen that the savings realized are small and when scrap values are included the saving is in favor of copper for covered primary.

Appendix I indicates the derivation of a formula for use in determining when to purchase aluminum or copper cable.

Appendix II covers the evaluation of the factor "k" for use in the equation of Appendix I.

This situation should be reviewed on a yearly basis or whenever there is a large difference in the prices of the raw copper and aluminum.

Plate I shows the variation in the price differences between copper and aluminum cables of comparable current carrying capacities. It also shows the variation in price difference between the raw metals.

Data on cable prices and specs relating to Overhead Construction are included under "Source Data".

[fol. 6646] Pertinent Facts Needed to Evaluate the Use of Aluminum

Aside from the matter of material and construction costs, aluminum as a metal has characteristics which make it a difficult one to work with from an electrical point of view. Surface oxides, having a high electrical resistance, form almost instantly after the surfaces have been cleaned. To

obtain oxide free surfaces to provide a low resistance joint, they must be cleaned of oxide through a grease coating that prevents the entrance of air to the surfaces being cleaned. Practically, this means that additional care must be used in preparing oxide-free surfaces at points where joints are to be made. This requires special training of men and closer supervision.

In addition, aluminum is relatively soft and cold flows under sustained pressure. This action reduces contact pressure in the joint, increases joint resistance, and results in joint failure if the connector is not properly designed.

Electrolytic potencial between copper and aluminum is in the order of 2 volts. In the presence of an electrolyte, corrosion takes place. This very frequently results in the formation of high resistance compounds in the joint that leads to ultimate failure. In other cases the aluminum conductor is corroded through at a point near the connector.

To prevent entrance of moisture into the joint a very thorough insulating job must be done. A covering that permits entrance of moisture and traps at the joint will result in more corrosion than if no covering had been provided.

Thus wherever aluminum conductors are joined to copper the possibility of electrolytic corrosion exists and special attention is required to limit its occurrence.

For this reason it is recommended that on new construction we do not intermix copper and aluminum conductors; that we install either all aluminum (primary, secondary, and service drops) or all copper as prices dictate.

To this end the formula developed for use in purchasing is based on a "package" deal consisting of average extensions of 600 feet of 4 wire primary, 600 feet of 4 wire secondary and 16 3 wire service drops of 50 feet each.

Galvanic corrosion at connections where copper and aluminum come together brings about an incremental rate of failure as compared to an all copper system. The "cold flow" property of aluminum under connector pressure is another source of difficulty which has been non existent in the case of all copper connections.

With added experience and continuing development of connectors by manufacturers the time will come when these connectors will have the same reliability as those used on copper.

[fol. 6648]

Table II

Cost Comparison

Secondary Mains Installation, Overhead—2/0 Copper vs. 4/0 Aluminum

Material	Install Two Sets of Four Sec Dead Ends		Install Four Wires Sight and Sag		Cost of Conductor	
	Labor	Material	Labor	Sub Total	Material **	Total
			For 300 Foot Extension			
Copper	43.20	9.68	76.47	129.35	257.53	386.88
Aluminum	43.20	9.68	109.14	162.02	196.58	358.60
			For 600 Foot Extension			
Copper	43.20	9.68	152.94	205.82	515.07	720.89
Aluminum	43.20	9.68	218.28	271.16	393.15	664.31

** Cost includes 21% for storeroom charges and corporate overhead.

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[fol. 6649]

Table III

Cost Comparison

Overhead Service Drops—Aluminum vs Copper

One 3 Wire Service Average Run of 50 Feet

Size of Sec. Mains	Size of Service Drop	Service Drop Stringing	Cost of Pole Splice Material	Cost of Pole Splice Labor	Cost of House Splice Material	Cost of House Splice Labor	Cost of Dead Ends Pole	Cost of Dead Ends House	Sub Total	Cost of Conductor **	Grand Total
2/0 Copper	#6 Copper	2.97	2.53	2.97	0.99	2.97	6.79	6.96	26.18	8.98	35.16
2/0 Copper	#4 Aluminum	2.97	2.57	2.97	1.70	2.97	6.79	6.96	26.93	5.95	32.88
2/0 Copper	#2 Copper	2.97	2.53	2.97	1.34	2.97	6.79	6.96	26.53	19.84	46.37
2/0 Copper	1/0 Aluminum	2.97	2.57	2.97	1.70	2.97	6.79	6.96	26.93	11.76	38.69

** Cost includes 21% for storeroom charges and corporate overhead.

1-28-59

[fol. 6647]

Table I

Cost Comparison

Primary Installation, Overhead—2/0 Copper vs 4/0 Aluminum

Material	Remove Set of Four Dead Ends	Install Set of Four Tension Splices		Install Set of Four Primary Dead Ends		Install Four Wires Sight and Sag	Sub-Total	Cost of Cable **		Total
	Labor	Labor	Material	Labor	Material	Labor			Material	
				For 300 Foot Extension						
Copper.....	24.30	2.16	6.63	54.00	38.14	76.47	201.70	Bare	224.74	426.44
								Covered	257.53	459.23
Aluminum...	—	—	—	*151.20	95.64	109.14	355.98	Bare	111.32	467.30
								Covered	196.58	552.56
				For 600 Foot Extension						
Copper.....	24.30	3.02	9.28	54.00	38.14	152.94	281.68	Bare	449.49	731.17
								Covered	515.07	796.75
Aluminum...	—	6.90	1.95	*151.20	95.64	218.28	474.01	Bare	222.68	696.69
								Covered	393.15	867.16
				For 1000 Feet Extension						
Copper.....	24.30	3.60	11.04	54.00	38.14	254.90	385.98	Bare	749.14	1,135.12
								Covered	858.47	1,244.45
Aluminum...	—	11.50	3.26	*151.20	95.64	363.80	625.44	Bare	371.03	996.47
								Covered	655.28	1,280.72
				For 2000 Foot Extension						
Copper.....	24.30	5.04	15.45	54.00	38.14	509.80	646.73	Bare	1,498.27	2,145.00
								Covered	1,716.94	2,363.67
Aluminum...	—	23.00	6.52	*151.20	95.64	727.60	1,003.96	Bare	742.07	1,746.03
								Covered	1,310.57	2,320.53

x Apportioned cost based on 1500 ft. reels of cable.
* Two required per extension.
** Cost includes 21% for Storeroom charges and corporate overhead.
The use of dead ends is based on the fact that most aluminum extensions at present will be from existing copper conductors.

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[fol. 6650]

Table IV

Total Cost of Primary and Secondary Extensions and Service Drops

Consisting of

600 ft. Primary, 600 ft. Secondary, and 16 Service Drops

Conductor	Item No.	Copper		Aluminum	
		Bare	Covered	Bare	Covered
Primary	1	731.17	796.75	696.69	867.16
Sec. Mains	2	*	720.89	*	664.31
(16) Services	3	*	562.56 (#6)	*	526.08 (#4)
(16) Services	4	*	741.92 (#2)	*	619.04 (1/0)

* Use Covered Wire Prices.

Summations

Items (1+2+3)	2,014.62	2,080.20	1,887.08	2,057.55
(1+2+4)	2,193.98	2,259.56	1,980.04	2,150.51

Summations
(Scrap Value Included)

Items (1+2+3)	1,897.62	1,963.20	1,868.85	2,044.03
(1+2+4)	2,060.74	2,126.32	1,960.01	2,135.59

Difference in Overall Cost
(Scrap Value Included)

For Bare Primary

Service Drops	Costs		Saving for Aluminum	
	Copper	Aluminum	Dollars	%
#6 Cu vs #4 Al	1,987.62	1,863.85	28.77	1.51
#2 Cu vs 1/0 Al	2,060.74	1,960.01	100.73	5.0

For Covered Primary

#6 Cu vs #4 Al	1,963.20	2,044.03	−80.83	−4.1
#2 Cu vs 1/0 Al	2,126.32	2,135.59	− 9.27	−0.43

Notes:

1. Scrap value of copper taken as 60% of electrolytic.
2. Scrap value of aluminum taken as 22% of virgin metal for covered wire and 41% for bare wire.
3. Assumed cost of copper 25 yrs. hence—30¢ per lb.
4. Assumed cost of aluminum 25 yrs. hence—25.2¢ per lb.
5. Present value of scrap is 23% of its value 25 yrs. hence.

1-28-59

[fol. 6651] Appendix I

Development of Formula for Purchasing Cable For Overhead Use

When installed cost of aluminum cable is equal to the installed cost of copper cable there is no advantage (saving) in the use of aluminum.

This is expressed by the following equation:

$$I_c + C_c - S_c = I_a + C_a - S_a \qquad \text{(Equation A)}$$

Where I = Installation Cost
C = Cable Cost (Purch. Price x 1.21)
S = Scrap Value

Subscripts: $_c$ = copper; $_a$ = aluminum

For this study (Nov. 1958) I, C, and S will be taken for a package deal, viz; 600 ft. of 3¢, 4 wire pri., plus 600 ft. of 3¢, 4 wire secondary, plus 16—3 wire services.

$I_c = 281.68 + 205.82 + 418.88 = 906.38$
$I_a = 474.01 + 271.16 + 430.88 = 1176.05$
$C_c = 515.07 + 515.07 + 143.68 = 1173.82$
$C_a = 393.15 + 393.15 + 95.20 = 881.50$

Scrap value of copper is approximately 80% of virgin while that of aluminum is 22% of virgin for covered cable and 41% for bare cable.

600 feet of 2/0, 4 wire, pri. copper cables contains	600 x 4 x 0.403 =	967# copper
600 feet of 2/0, 4 wire, sec. " " "	=	967# "
Sixteen 50' runs of 3 wire cu. Service cables "	50 x 3 x 16 x 0.0795 =	191# "
	Total	2125# "

Present value of scrap copper to be sold 25 years hence is 23% of the assumed scrap price at that time.

If we assume a price of 30¢ per lb. for virgin copper its scrap value today is 30.0 x 0.8 x .23 = 5.5¢ per lb.

Total scrap value is 2125 x .055 = $117.00.

The aluminum conductors weigh 1068#; therefore if we assume a value of 25.2¢ for virgin aluminum the present per pound scrap value is $0.0127 for covered cable.

The total scrap value is 0.0127 x 1068 = $13.70.

Transposing the equation, we get

$$C_c = (I_a - I_c) + (C_a - S_a + S_c)$$

[fol. 6652] This equation gives the break even price that may be paid for copper cable when the price of aluminum cable is known.

Example:

For values given above

$$C_c - (1176.05 - 906.38) + 881.50 - 13.70 + 117.00$$
$$= 269.67 + 881.50 + 103.30 = 1254.47$$

This represents the maximum price that may be paid for copper cables to break even. Comparing this with prices of copper cable shown, in the report we observe

From Table I (600 ft. extension), Covered Cable	$ 515.07
From Table II (600 ft. extension), Covered Cable	515.07
From Table III (16 service drops @ 8.98 ea	143.68
Total price of copper cable	$1173.82

Since this value is less than the $1254.47 determined by the formula, we should be using copper instead of aluminum now.

On the basis that this is done and we start using copper, should aluminum costs change in the future to indicate equal costs to copper, we should not make the change at that time. To avoid seesawing a factor (k) of 1.20 should be introduced to Equation A, this factor being designed to cover certain incremental costs associated with aluminum which could not be readily evaluated. (See Appendix II) This would change the form of Equation A to

$$I_c + C_c - S_c = k\,(I_a + C_a - S_a) \quad \text{(Equation B)}$$

By the same token if at some future time aluminum is in use on our system and we are considering reverting to copper due to economic and other reasons, then, the factor (k) to be used in Equation B should be 1.10 instead of 1.20 in order to avoid frequent reversals of procedure.

A. F. Newman.

1-28-59

[fol. 6653] Appendix II

Derivation of Factor "k"

In order to arrive at the "k" factor in the equation of Appendix I it is necessary to evaluate some of the incremental operations involved in the use of aluminum conductors. Some of the items are impossible to evaluate exactly but approximations will be made.

The operations referred to are:

1. To prevent electrolytic corrosion of copper—aluminum joints special care is required to properly insulate the joint to prevent entrance of moisture.
2. Wire brushing of aluminum conductors to remove oxides at the joint location and the application of grease to minimize reoxidation requires additional care and effort.
3. To obtain good low resistance joints proper bolting torques must be used. This is more important with aluminum than with copper due to the aluminum being softer than copper.

All of these items require more labor and supervision than for their equivalent copper joints. While our figures on primary and secondary mains reflect the real costs involved with the two metals the incremental costs in labor and supervision involved in services are not in the picture. It is estimated that these costs will be 10% greater for aluminum than for copper.

For our Package which includes 16 Services, 10% of the total labor and supervision costs for services is $33.

Because of the characteristics mentioned in items 1, 2 and 3, there are more complaints of flickering lights and no lights. This is not conducive to good customer relations and also it means that a crew must be sent out to correct the complaint.

Currently, the failure rate of aluminum joints is greater than copper by 4 per 1000 services per year. However, since electrolytic corrosion, reoxidation, and loss of contact pressure due to cold flow of aluminum are cumulative effects, it is expected that the failure rate will increase with time. Just how such this increase will be is not predictable.

The number of failures of copper joints is very low.

The average cost of a service call is $25. On the basis of 4 calls per 1000 services in the first year the outlay is $100 per 1000 services. With the increase of failure rate over the years, we can assume conservatively an average cost of $150 per 1000 services per year.

This represents the excess yearly maintenance cost due to the use of aluminum and is a continuing one. The present worth of this expenditure over a 25 year period is $150 \times 12.78 = \$1916/1000$ Services. For our Package the present worth is $\frac{1916}{1000} \times 16 = \$30.60$. If the number of failures per year increase beyond the value assumed, then this figure would have to be increased correspondingly.

[fol. 6654] In addition to the above, if purchase of aluminum and copper cable were being made on small changes in prices, accessories and cable will be in stock for both metals. It is estimated that it will add 7½% to the handling costs of the materials. This would amount to $.075 \times 1356 = \$101.75$ for the Package. The figure at $1,356 represents the cost of materials in the Package.

The sum of the items enumerated above amounts to $101.75 + $30.60 + $33.00 or $165.35. This represents 8.3% of the Package cost.

It is believed that a differential of 20% in installed costs represents a better evaluation of the disadvantages associated with the use of aluminum, and to avoid frequent seesawing from one metal to the other. The constant (k) of Equation B then becomes 1.2.

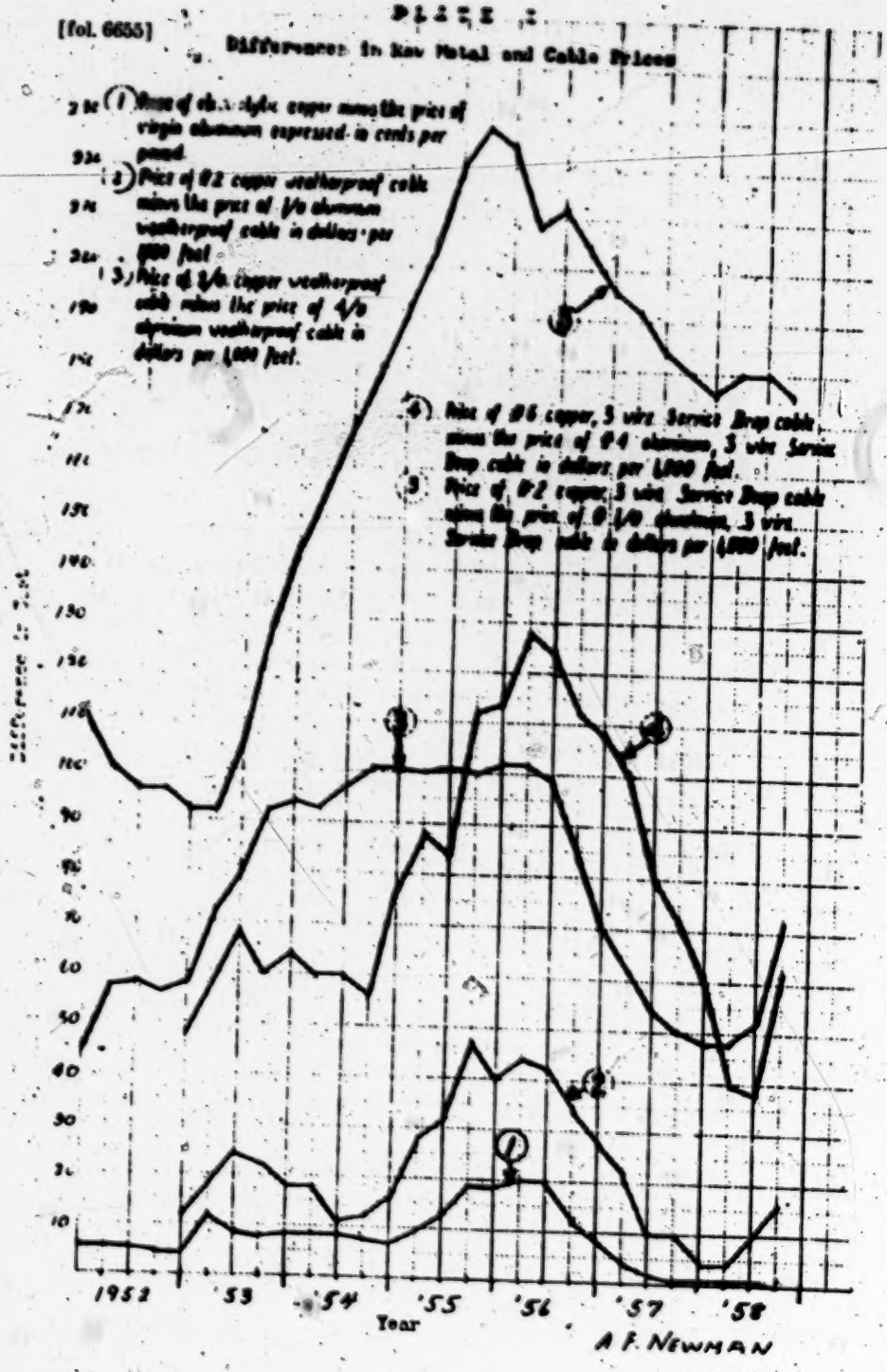
Prepared by
A. F. Newman

1-28-59

[fol. 6655]

PLATE 2

Differences in Raw Metal and Cable Prices



[fol. 6656] Source Data

[fol. 6657] Consolidated Edison Company of New York, Inc.

Memorandum

November 20/1958.

Re: Copper vs. Aluminum Cable

Mr. F. Van Olinda
Outside Plant Engineer

Attention: Mr. C. P. Xenis

In accordance with your recent request, the prices paid for certain overhead cables made of copper and aluminum conductors have been reviewed and are shown on the attached tabulations, together with the corresponding prices of Electrolytic Copper and Ingot Aluminum.

The data has been incorpoarted into chart form for the Weatherproof Wire and Service Drop Cables as per attached Charts. There were too few transactions to warrant charting the Bare Wires.

From the data and the charts, it is apparent that, in general, the copper cables fluctuate in line with major changes in the price of Electrolytic Copper. The aluminum cables have sold with little regard to the prevailing price of Aluminum Ingot, since the aluminum fabricators have been more interested in capturing markets from copper. Hence aluminum cable prices have been dominated more by the competitive situation of the moment, rather than by basic metal prices. This tendency is expected to persist for sometime in the future.

It will be noted that during the seven year period under review, copper has risen from 24½¢ to 46¢ per lb., declined to 25¢ and is currently selling for 29¢ per lb. Aluminum on the other hand, has only risen from 19¢ to 28.1¢, declined to 26.1¢, and is currently selling for 26.8¢ per lb. There is a marked disparity in the relationship between scrap and

virgin metal prices, viz: Scrap Copper 23¢ vs. 29¢ Virgin, Scrap aluminum 6-11¢ vs. 26.8¢ Virgin. This fact should be taken into consideration in any long range study.

Similar studies will be made on the Underground Cables.

David [copy illegible], Manager, Cable Bureau.

attach
dw.mjk

CC: Mr. R. W. Gillette.

[fol. 6638]

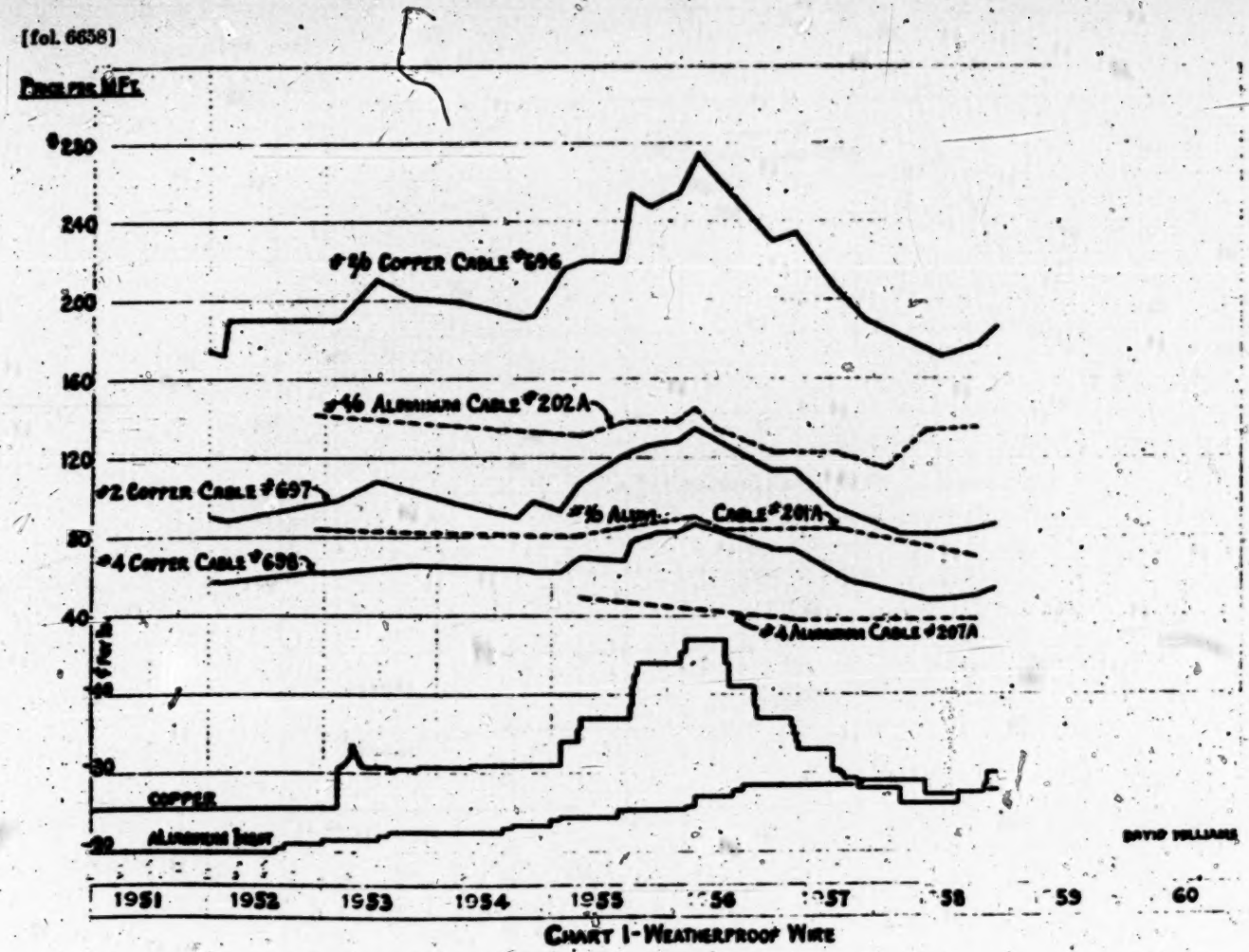
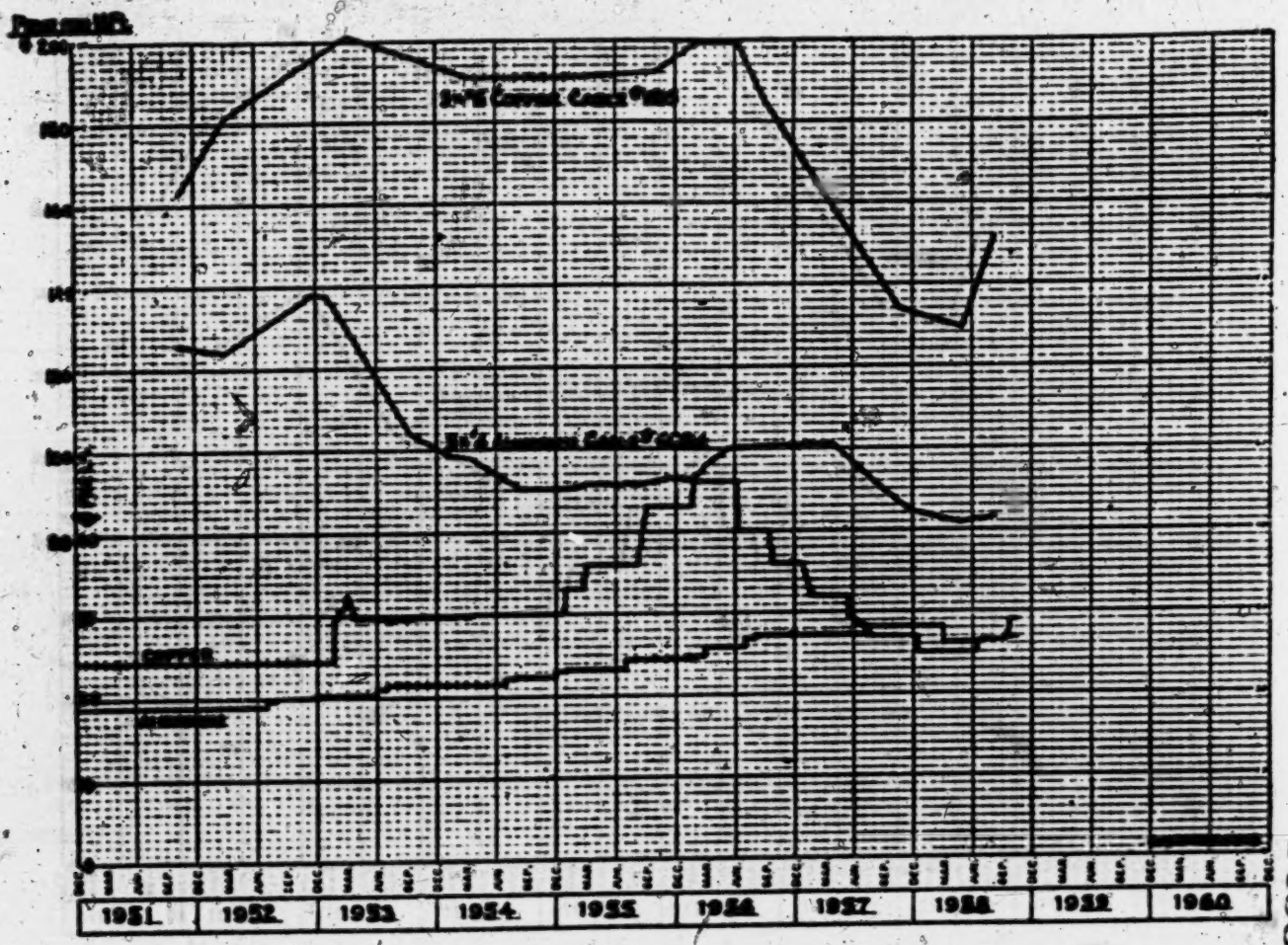
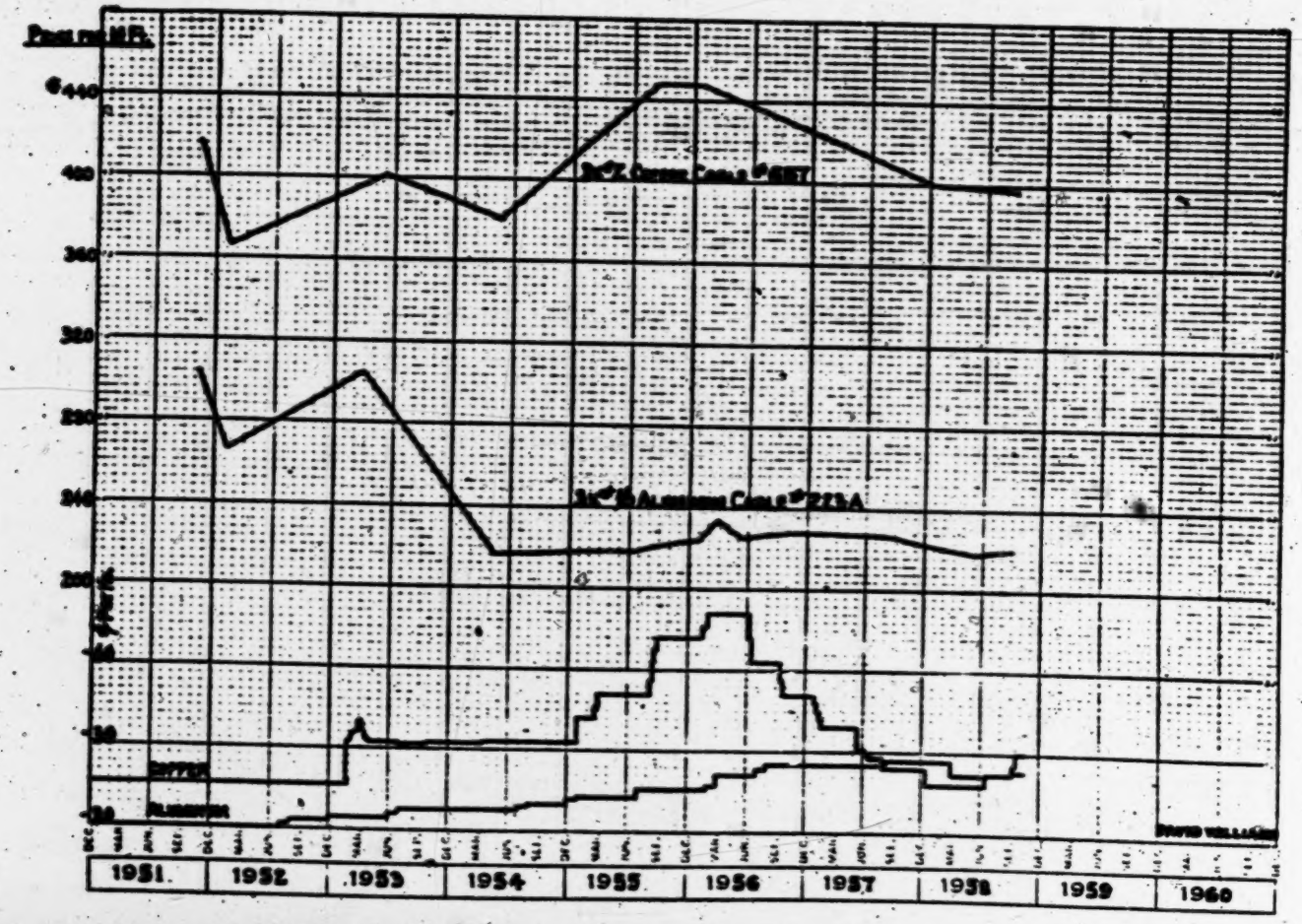


CHART I - WEATHERPROOF WIRE

[fol. 6659]



[fol. 6660]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1960

[fol. 6661]

3500

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

DATA SHEET

No.

Date 10-15-58.

Location

Prepared by

Subject

	COPPER					ALUMINUM				
PRIMARY	SIZE	OPEN WIRE SPEC	DES.	Price per 1000 ft	USAGE %	SIZE	SPEC	DES	PRICE
BARE									
	2/0	763	Bare	154.78	90	4/0	216A	Bare	76.66
	2	762	Bare	72.66	5	1/0	215A	ACSR	48.35
	4	761	Bare	45.68	5	4	214A	ACSR	20.89
COVERED									
	2/0	696	WP	177.37	90	4/0	202A	WP	135.39
	2	697	WP		5	1/0	201A	ACSR	70.40
	4	698	WP	51.05	5	4	207A	ACSR	39.70
SECONDARY OPEN WIRE									
COVERED									
	2/0	696	WP	177.37	90	4/0	202A	WP	135.39
	2	697	WP	84.00	10	1/0	201A	ACSR	70.40
SERVICE DROP									
	3C 6	685M	Poly	151.80	60	3C 4	689A	Poly	83.00
	3C 2	687	Poly	378.00	40	3C 1/0	223A	Poly	220.00
UNDERGROUND									
MAINS									
	8E 1/c	629-1	RN	227.50	95	3C 2	205A	Poly	
	1C 2/c	606 M3	RN	210.00	5	1/c	690A	RN	2367.00
SERVICES									
	1#6	604M	RN	43.00	60	1#4		RN	61.00
	1#2	605M	RN	101.00	40	1#1/0		RN	115.00

9-3 (PAD) 150M 7-56 OUTSIDE PL. CONST

[fol. 6662]

| | | |

[fol. 6663] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 77

Ebasco Services, Incorporated

Engineers—Constructors—Business Consultants

Two Rector Street

New York 6, N. Y.

Cable Address "Ebascoe"

April 3, 1958.

Mr. R. V. Davies, Vice President
Aluminum Company of America
1501 Alcoa Building
Pittsburgh 19, Pennsylvania

Dear Mr. Davies:

It was a pleasure to talk with you on the telephone today about how Ebasco could be of service to Alcoa in its insulated cable and wire program. I appreciate your confidence in asking us to proceed with the first preliminary step.

As we discussed, the first step would be to prepare a list of companies in the insulated cable and wire manufacturing field from published and other available sources. Pertinent data would be compiled on each, including size, sales volume, products, earnings record, capitalization, stock ownership, markets served, location and size of plants, affiliations or connection with other companies, banking connections and the like. From this preliminary data a number of companies will be selected by consultation with you as being most suitable for further study and more complete data will be obtained on these companies.

Billings for our services shall be at applicable per diem rates (which are based on a normal work day of 7½ hours) in effect for the classification of personnel engaged on your work applied to the actual time such personnel are specifically so engaged. We shall be reimbursed at cost for "out-of-pocket" expenses, including traveling and living expenses, telegraph and telephone toil charges and similar items.

The work will be the responsibility of our Corporate Finance Department which is headed by F. W. Ohles. We should have most of the data assembled in about three weeks' time and either I or Mr. Ohles will contact you toward the end of April and arrange to get together for discussion of the data and our conclusions.

I appreciate this opportunity of again being of service to you, and with best personal regards,

Very truly yours, F. C. Gardner, President.

FCG:ah

[fol. 6664] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 78

June 16, 1958.

Memorandum from
Corporate Finance Department
To: H. Richter
From: W. C. Huebner
Subject: Re: Cable Companies Study

In line with our discussion of June 13, the following areas are of interest to us for as many of the companies (already given to you) as you have the information.

A Product Line

1 Diversity
2 Quality
3 Prices and pricing policy

B Technical and Manufacturing

1 Manufacturing know-how
2 Engineering and technical reputation
3 Quality control of product

C Company Performance

1 Accuracy of bids
2 Delivery performance

3 Complaints and servicing
4 General standing and regard

D Plant

1 Condition of facilities (maintenance, housecleaning)
2 Modernity
3 Location with respect to materials and customers

E Management (personal comment by individuals and position)

1 Quality
2 Depth
3 Age and general health
4 Experience
5 Sales organization (aggressive, technically competent)

WCH:ah
cc—R. E. Pierce, R. B. Chase, H. L. Lowe, F. W. Ohles.

[fol. 6665] In United States District Court

Defendants' Exhibit 81

Aluminum Wire

Long Island Investment Dealer

Year	Alcoa	Rome	Anaconda	Kaiser	General	Reynolds	Cerro	Essex	Southern	PD	Total
1957	$382,272 (36%)	— —	$430,083 (41%)	$70,000 (7%)	$95,173 (4%)	— —	$6193 —	$38852 (4%)	40,259 (4%)	$39,183 (4%)	$1,057,441
1958	43,500 (20%)	45,990 (21%)	101,550 (46%)	— —	24,975 (11%)	— —	4,200 (2%)	— —	— —	— —	221,163
1959	$15,693 (7%)	$22,542 (10%)	81,984 (35%)	58,970 (25%)	— —	3797 (1%)	50,810 (22%)	1,483 —	— —	— —	235,028
Total 1957, 1958, 59	$441,465 (19%)	$68,532 (4%)	$613,617 (40%)	$133,216 (9%)	$99,148 (4%)	$3,797 —	$61,203 (4%)	$40,335 (3%)	$40,259 (3%)	$39,183 (3%)	$1,513,632
1960	Reynolds/Alcoa $44,899 (10%)		$85,884 (19%)	$67,434 (15%)	$38,815 (8%)	$11,000 (2%)	$44,767 (10%)	$132,700 (29%)	$30,193 (7%)	— —	$455,754
1961	$69,511 (8%)		$10,408 (2%)	591,591 (62%)	$121,119 (13%)	$78,352 (8%)	— —	1963 —	Olin $64,000 (7%)	$745 —	$924,914
Total 1960/61	$114,910 (9%)		$103,492 (7%)	$658,025 (46%)	$159,932 (12%)	$89,909 (6%)	$44,767 (3%)	$134,168 (10%)	$94,237 (7%)	$745 —	$1,378,190

In 1958 Crouse Hinds placed for transmission conductors with Anaconda ($322,078) and Alcoa ($129,801). Defendants' records are not immediately available for 1959 but it would appear that Rome did not participate in any aluminum business in that year. Anaconda, Alcoa, General, Kaiser & Southern shared in Defendants' purchases.

** Actually placed power headed

[fol. 6666] IN UNITED STATES DISTRICT COURT

DEFENDANTS' EXHIBIT 82

Public Utilities Purchasing Covered or Insulated Overlap Aluminum Conductor from Both Alcoa and Rome in 1958

	Rome ($)	Alcoa ($)
California Pacific Utilities Co. San Francisco, Calif.	13,174	3,148
Central Hudson Gas & Elec. Co. Poughkeepsie, N. Y.	11,364	34,927
Central Illinois Public Service Co. Springfield, Ill.	9,619	10,294
Cleveland Elec. Illuminating Co. Cleveland, Ohio	911	1,787
Dayton Power & Light Co. Dayton, Ohio	8,574	18,455
Illinois Power Co. Decatur, Ill.	755	5,021
Long Island Lighting Co. Hicksville, L. I., N. Y.	37,844	37,590
New York State Elec. & Gas Co. Binghamton, N. Y.	43,072	198,576
Niagara Mohawk Power Corp. Syracuse, N. Y.	146,542	151,194
Public Service Elec. & Gas Co. Newark N. J.	35,499	1,330
Rochester Gas & Elec. Co. Rochester, N. Y.	19,651	83,722
Virginia Electric Power Co. Richmond, Va.	9,502	566
West Penn Power Co. Greensburg, Pa.	6,464	14,107

Source: Defendants' Answers to Plaintiff's Interrogatories 10 and 11.

[fol. 6667] SUPREME COURT OF THE UNITED STATES, OCTOBER TERM, 1963

No. 204

UNITED STATES, Appellant,

vs.

ALUMINUM COMPANY OF AMERICA, et al.

ORDER NOTING PROBABLE JURISDICTION—October 14, 1963

Appeal from the United States District Court for the Northern District of New York.

The statement of jurisdiction in this case having been submitted and considered by the Court, probable jurisdiction is noted.

☆ U. S. GOVERNMENT PRINTING OFFICE: 1963 718510 622

INDEX

	Page
Opinion below	1
Jurisdiction	2
Question presented	2
Statute involved	2
Statement	3
1. The merging companies	3
2. The merger in its commercial setting	5
3. The proceedings below	11
The question is substantial	14
Conclusion	30
Appendix A	1a
Appendix B	38a
Appendix C	63a

CITATIONS

Cases:

Brown Shoe v. *United States*, 370 U.S. 294 ..... 15, 16, 17, 19, 20, 23, 24, 25, 27, 29

United States v. *Aluminum Co. of America*, 153 F. Supp. 132 8

United States v. *Aluminum Co. of America*, 91 F. Supp. 333 8

United States v. *Bethlehem Steel Corp.*, 168 F. Supp. 576 15

United States v. *Columbia Steel Co.*, 334 U.S. 495 ..... 2, 19

United States v. *du Pont & Co.*, 353 U.S. 586 .. 2

Statute:

Clayton Act, 38 Stat. 731, as amended, 64 Stat. 1125, 15 U.S.C. 18:

Section 7 ..... 2, 9, 14, 16, 17, 19, 24, 27

Miscellaneous:

	Page
Fed. R. Civ. P., Rule 52(b)	1
H. Rep. No. 1191, 81st Cong., 1st sess., p. 8	16
S. Rep. No. 1775, 81st Cong., 2d sess., p. 5	19

In the Supreme Court of the United States

OCTOBER TERM, 1962

No. —

UNITED STATES OF AMERICA, APPELLANT

v.

ALUMINUM COMPANY OF AMERICA AND ROME CABLE CORPORATION

ON APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF NEW YORK

JURISDICTIONAL STATEMENT

OPINION BELOW

The opinion of the district court (App. A, *infra*) is reported at CCH, 1963 Trade Cases ¶ 70,653. The findings of fact and conclusions of law (App. B, *infra*), are unreported.[1]

[1] As printed herein, the opinion reflects corrections made by the district court and communicated to appellant and appellees on February 20, 1963. Subsequent to the filing of the district court's opinion, findings of fact, and conclusions of law, appellees moved under Rule 52(b), Fed. R. Civ. P., for additional findings of fact. The additional findings requested by appellees were adopted by the district court on February 21, 1963, and are included in Appendix C.

JURISDICTION

The judgment of the district court was entered on January 28, 1963. The notice of appeal was filed by the United States on March 29, 1963. The time to docket the appeal was extended by the district court to and including June 11, 1963. The jurisdiction of the Court is conferred by Section 2 of the Expediting Act of February 11, 1903, 32 Stat. 823, as amended, 15 U.S.C. 29. *United States* v. *du Pont & Co.*, 353 U.S. 586; *United States* v. *Columbia Steel Co.*, 334 U.S. 495.

QUESTION PRESENTED

This case concerns the validity under Section 7 of the Clayton Act of the acquisition by Aluminum Company of America (Alcoa), the nation's largest producer of primary aluminum and aluminum conductor wire and cable, of all the stock and assets of Rome Cable Corporation (Rome), one of the few substantial independent fabricators of aluminum conductor wire and cable. The question presented by this appeal is whether the acquisition of Rome by Alcoa may substantially lessen competition or tend to create a monopoly in the production and sale of (i) aluminum conductor wire and cable and (ii) insulated aluminum wire and cable, in violation of Section 7.

STATUTE INVOLVED

Section 7 of the Clayton Act, 38 Stat. 731, as amended, 64 Stat. 1125, 15 U.S.C. 18, provides in pertinent part:

> No corporation engaged in commerce shall acquire, directly or indirectly, the whole or any part of the stock or other share capital and no

corporation subject to the jurisdiction of the Federal Trade Commission shall acquire the whole or any part of the assets of another corporation engaged also in commerce, where in any line of commerce in any section of the country, the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly.

STATEMENT

1. The merging companies

Alcoa is a fully integrated aluminum producer, owning and operating its own shipping lines, water companies, railroads, electric power systems, and coal properties as well as many raw material locations, refineries, and plants for the production and fabrication of aluminum (GX 49). Its three refineries and thirty plants—exclusive of Rome facilities—produce a full range of primary, intermediate and fabricated aluminum products, including, *inter alia,* ingot, sheet and plate, rod, extrusions, castings, foil, and aluminum conductor wire and cable (Fdg. 12, App. B).

Alcoa is, by a substantial margin, the largest domestic producer of primary aluminum. In 1960 it had assets of $1.4 billion and gross revenues of $870 million (GX 49). In that same year its primary capacity (existing or under construction) was 38.6 percent of the nation's total, approximately 45 percent greater than that of the next largest producer (Reynolds Metals Company, with 26.4 percent), approximately 67 percent greater than that of the third largest producer (Kaiser Aluminum & Chemical Corp., with 23 percent), and more than 200 percent

greater than the remaining three primary producers together (Ormet, Inc., with 6.8 percent; Harvey Aluminum, with 2.8 percent; and Anaconda Aluminum Company, with 2.4 percent) (App. A, 8a).

The lines of commerce upon which the merger would bear most heavily are aluminum conductor wire and cable ("aluminum conductor") and insulated or covered aluminum conductor wire and cable ("insulated aluminum" or "aluminum insulated"). Conductor wire and cable is a major end use of aluminum. Thus, in 1958 the total United States production of primary aluminum ingot was 3,131 million pounds, while 226 million pounds of aluminum conductor were produced, of which 51 million pounds were insulated wire and cable (AR 49; GX 434, GX 436).

Prior to this merger, Alcoa was also the leading producer of aluminum conductor and the third largest producer of insulated aluminum conductor (GX 434, GX 436). In 1958, the last year before the Rome acquisition, Alcoa shipped 27.8 percent of aluminum conductor wire and cable, and 11.6 percent of insulated aluminum conductor (Fdg. 45(a); App. B).

Rome Cable Corporation was incorporated in 1936 and began business in Rome, New York, as a fabricator of copper conductor wire and cable. By the time it was acquired twenty-three years later, Rome had established two additional plants, at Collegeville, Pennsylvania, and Torrance, California, and had grown into one of the nation's largest and most important independent fabricators of aluminum and copper wire and cable products. One year after its incorporation, Rome reported assets of $1.9 million

and annual sales of $1.8 million; on March 31, 1958, a year before its acquisition, Rome's assets had increased to $24 million and its annual sales to $40.6 million (GX 9, GX 17, GX 47). In the five years preceding the acquisition, Rome's sales averaged $47 million annually (GX 7).

Rome enjoyed an excellent reputation in the trade because of its broad range of high quality aluminum and copper conductor and accessory products, its high degree of technical skill, and its substantial progress in research and development. As one of four independent fabricators which were integrated backward through the aluminum rod-making stage (Tr. 403–404, 743, 1895), Rome produced both aluminum and copper rod for its own use and for resale to others (Fdg. 16, App. B). Thus while most independents must buy aluminum rod, an intermediate product, for drawing into wire, Rome was able to buy aluminum ingot, the primary product—a significant competitive advantage (Tr. 116; Tr. 1008–1009). Its range of conductor and accessory products compared favorably with the offerings of other independent fabricators, and was much broader than Alcoa's (Tr. 1263–1264). In 1958, the last year prior to merger, Rome accounted for 1.3 percent of aluminum conductor shipments, and 4.7 percent of aluminum insulated conductor shipments (Fdg. 45(a), App. B).

2. The merger in its commercial setting

As noted above, in 1958 alone, 226 million pounds of aluminum conductor wire and cable were produced, almost exclusively for use by electric utilities in carry-

ing electric power from generating plants to consumers throughout the United States. Copper is the only other material utilized commercially for the same general purpose. However, each metal has found, or is in process of finding, those particular utility applications for which it is peculiarly fitted from a commercial standpoint.

The 3,300 operating electrical utilities which presently purchase such wire have developed clear patterns of use for copper cable and for aluminum cable, both in transmission lines (the "wholesale" lines which carry current at high voltages to substations) and distribution lines (the "retail" lines which route the electricity at reduced voltages from the substations to the consumers). Both types of lines are usually strung above ground, except in heavily congested areas, such as city centers, where they are run underground. Underground, where the conductor must be heavily insulated, copper has always been and remains today virtually the only conductor used (GX 468). Overhead, where transmission and some distribution lines are bare and other distribution lines are less heavily insulated, aluminum has replaced copper at a rapid rate. By 1950, 74.4 percent of all additions to overhead transmission lines were being constructed with bare aluminum conductor or ACSR (aluminum cable, steel reinforced); by 1959, this figure had increased to 94.4 percent (GX 468). As the district court found, bare aluminum conductor "has practically displaced copper for use in overhead transmission lines" (App. A, 15a).

In the overhead distribution field, the primary application for insulated aluminum conductor, aluminum did not begin to make serious inroads upon copper until the early 1950's. The scarcity of copper during the Korean conflict, and copper's subsequent price increases (GX 467), quickly turned the electric utilities to aluminum. Thus, in 1950 only 6.5 percent of additions to insulated overhead distribution lines were of aluminum conductor, but by 1959 77.2 percent were being constructed with aluminum (GX 468). In the latter year, 61 million pounds of insulated aluminum conductor wire and cable were shipped by domestic producers (GX 436).

Accordingly, by 1958, the year prior to the merger, a substantial business had developed in the production of aluminum conductor wire and cable. Alcoa, though it no longer enjoyed the monopoly it had held at the end of World War II, remained the leading producer with 27.8 percent. The sharp decline in Alcoa's market share was in part the result of federal governmental programs. As an adjunct to the relief in the government's antitrust suit, and also to create needed additional capacity, Kaiser Aluminum and Chemical Corporation (Kaiser) and Reynolds Metals Company (Reynolds) were given various forms of assistance in constructing profitable enterprises in the primary aluminum field—including sales of Government surplus facilities at bargain prices, guaranteed supply contracts, and rapid tax write-offs. Olin Mathieson Chemical Corporation (Olin Mathieson) and Anaconda Wire and Cable Company (Anaconda)

were also beneficiaries of such tax write-offs. See *United States* v. *Aluminum Co. of America*, 91 F. Supp. 333, 353, *et seq.* (S.D.N.Y.); *United States* v. *Aluminum Co. of America*, 153 F. Supp. 132 (S.D. N.Y.). In 1958 Kaiser ranked behind Alcoa in aluminum conductor shipments with 23.1 percent; followed by Anaconda, 15.8 percent; Reynolds, 10.4 percent; General Cable Corporation, 6 percent; and Olin Mathieson, 4.5 percent. All of these except General Cable were producers of primary aluminum,[3] and the five integrated producers accounted for 81.6 percent of total aluminum conductor production. Four non-integrated producers—General Cable, Essex Wire Corporation (4.5 percent); Southwire Corporation (2.3 percent); and Rome (1.3 percent)—accounted for another 14.1 percent, leaving 4.3 percent for all others (GX 434).

In the field of insulated aluminum conductor, the pattern is similar. Kaiser, the largest, accounted for 26.8 percent in 1958; Anaconda, 16.9 percent; Alcoa, 11.6 percent; General Cable, 9.5 percent; Essex, 6.1 percent; Olin Mathieson, 5.3 percent; Reynolds, 4.8 percent; Rome, 4.7 percent; and Southwire, 2.5 percent. Thus the five integrated producers (Kaiser, Anaconda, Alcoa, Olin Mathieson, and Reynolds) accounted for 65.4 percent; the four listed independents accounted for another 22.8 percent. This left 11.8 percent for all others—twenty other producers, according to the court's findings—a number of whom

[3] General Cable is related, through stock ownership and common directors, to a primary aluminum producer (Tr. 1877, 1897–1900).

are but marginally in the field (compare GX 436 with AR 5).

As insulated aluminum conductor gained in popularity, Alcoa, which formerly had the entire aluminum conductor field to itself, found itself without the insulating skills necessary for full development of this market. At first, Alcoa hired insulating "know-how," through a 1952 tolling arrangement with Rome whereby the latter, which was just entering the insulated aluminum field, undertook to insulate or cover bare aluminum conductor supplied by Alcoa. In 1957, however, Alcoa began to fear that some of its competitors might be outdistancing it in the insulated aluminum field to the detriment of its entire aluminum conductor business. In that year Olin Mathieson acquired Southern Electrical Corporation, an independent wire and cable fabricator which in the previous year accounted for 8.1 percent of aluminum conductor wire and cable shipments and 6.1 percent of insulated aluminum conductor shipments (Fdgs. 47 and 48, App. B; GX 434, 436); and Kaiser acquired the Bristol, Rhode Island wire and cable plant of the U.S. Rubber Company.[3]

Alcoa believed its "No. 1 spot" in the aluminum conductor field to be endangered by Kaiser, especially after the Kaiser-Bristol merger (GX 161, GX 168). Though its business in insulated aluminum conductors was growing (4,349,000 pounds in 1955 and 5,970,000 pounds in 1958, GX 436), Alcoa could not offer customers a full line of its own insulated products, both

[3] The government has filed suit to invalidate this merger under Section 7 of the Clayton Act, Civil No. 2795, D. R.I.

aluminum and copper, as could certain of its competitors. In order to increase its insulated aluminum capabilities and develop insulated copper capacity, Alcoa considered both internal expansion and acquisition of a rival firm. Anticipating that the former course would present substantial difficulties and that five to ten years would be required before Alcoa would achieve its desired position (GX 161, Tr. 2026–2027), it decided to proceed by acquisition. In October 1957, it offered $24 million in Alcoa stock for Rome Cable Corporation (GX 165). In the words of one Alcoa executive:

> Rome Cable, with its fine personal [*sic*] and in general excellent "know-how", is by far the best acquisition, in my opinion, that Alcoa could hope to find. The step would be the answer to the present Kaiser threat to push Alcoa out of first place in the electrical conductor field. [GX 161.]

When Rome refused this offer, Alcoa attempted to acquire other independent wire and cable fabricators, but these efforts, too, came to nought (GX 398–406). By the fall of 1958, its plans for acquisition apparently having failed, Alcoa was prepared to expand on its own in insulated conductor; its president ordered the development of plans for "a rounded out program well beyond the neoprene stage * * * to keep us in the No. 1 spot in the aluminum conductor field and, if necessary, a sufficient factor in the copper field to help us maintain the No. 1 position in the aluminum field" (GX 168).

This program was never executed, for in early 1959 Alcoa's second attempt to acquire Rome proved successful. On March 31, 1959, 355,226 shares of Alcoa common stock (the value of which ranged in 1959 from $27 million to $47 million) were exchanged for all the assets of Rome (Fdg. 6, App. B; GX 16), and Rome has since been operated as a wholly-owned Alcoa subsidiary (Fdg. 4, App. B).[4]

3. Proceedings below

The government's complaint, filed April 1, 1960, charged that the acquisition violated Section 7 of the Clayton Act, because of its impact upon competition in various conductor and accessory product lines. Pending final adjudication on the merits, the district court enjoined Alcoa from encumbering the stock of its Rome subsidiary, and from further transferring operations from Rome to any other plants of Alcoa. At trial, the government claimed that the forbidden anti-competitive effect would be felt in ten "lines of commerce", but only two are involved in this appeal: aluminum conductor (consisting of both bare and insulated types) and insulated aluminum conductor.

After trial, in an opinion dated January 28, 1963, the district court dismissed the complaint. The court concluded that aluminum conductor and insulated aluminum conductor were not appropriate submarkets for assessing the impact of the merger, and that in

[4] The transfer was accomplished through the formation by Alcoa of a subsidiary corporation, the Rome Cable Corporation of Delaware, to which was transferred all of the assets, business and good will of the Rome Cable Corporation of New York. The New York corporation was thereafter liquidated.

any event the merger lacked the prohibited anti-competitive effect in any line of commerce.

In rejecting insulated aluminum conductor as a line of commerce, the court noted that it is functionally interchangeable with its copper equivalent, their respective purchase and use being dictated principally by economic factors, and that the insulated aluminum product is not recognized in the industry as a separate economic entity, has no distinct customers, and lacks specialized vendors (App. A, 15a–16a). Although finding that the aluminum and copper products sell at different prices and that these prices are not sensitive to one another, the court concluded that insulated aluminum conductor is "in actual competition with its copper counterpart", and therefore could not be considered a "line of commerce" (App. A, 16a). And since aluminum insulated is, along with bare aluminum, one of the two components which make up the aluminum conductor category, the latter, too, was denied the status of a "line of commerce" (*ibid.*).

Turning to the issue of competitive effect, the district court found that Alcoa's purpose in acquiring Rome was to secure the special competence which Rome had developed in the insulated cable field and which Alcoa admittedly lacked (App. A, 21a); that the concentration of about 80 percent of the aluminum cable market in the five integrated producers "loses its significance when it is realized that the production of aluminum and the fabricating of its products were concentrated to the point of a monopoly less than twenty years ago and has undergone a gradual decentralization by the entry of new producers and fabri-

cators since that time" (App. A, 22a–23a); and that acquisitions in the aluminum cable field by other integrated producers, which preceded and followed the Alcoa-Rome merger, do not constitute a "significant pattern or trend of merger", especially in view of the post-merger declines suffered by the merging parties. (App. A, 23a; Fdg. 46, App. B.)

The court found no serious barriers to entry in the insulated aluminum market, noting that the number of producers had increased in ten years from four to twenty-nine, and that most of the new entrants had come from the copper field (App. A, 24a). It also relied upon the absence of any complaints concerning the "actual or potential effect of the acquisition upon suppliers and purchasers," and upon testimony from certain aluminum cable competitors and purchasers that no adverse effect had been felt (App. A, 27a–28a). In addition, the court took into account the declining market shares held by Alcoa, both before and after the Rome acquisition,[5] a decline in the rate of return on Alcoa's invested capital, and an increase in number and market position of other primary aluminum producers and cable fabricators, concluding that Alcoa does not enjoy a "dominant" position.

[5] In 1958, the year prior to the acquisition, Alcoa had 27.8 percent of aluminum conductor wire and cable shipments and Rome 1.3 percent; in 1961, the combined Alcoa-Rome share was 24.8 percent. In 1958, Alcoa had 11.6 percent and Rome 4.7 percent of insulated or covered aluminum conductor wire and cable; in 1961, Alcoa-Rome accounted for 13.0 percent (App. A, 25a).

THE QUESTIONS ARE SUBSTANTIAL

1. This case presents an important question involving the application of Section 7 of the Clayton Act to a merger of substantial companies in an oligopolistic industry. The government's position is this: in an industry already characterized by a high degree of concentration, the acquisition by the leading company of one of its few substantial independent competitors is a violation of Section 7, for in that setting, the effect of such an acquisition necessarily "may be substantially to lessen competition." The district judge's contrary "finding" rested upon an erroneous interpretation of the statute, which this Court is free to correct.

A. In the case at bar, all of the elements which combine to spell out an offense under a correct interpretation are established by the record.

(a) *The industry is highly concentrated.* In 1958, the year before the merger, five vertically integrated aluminum companies accounted for 81.6 percent of the production of aluminum conductor wire and cable, and these companies, plus four independents (including Rome), accounted for 95.7 percent. Among the remaining companies whose production statistics appear in the record,* none produced as much as one percent. In the aluminum insulated line, the five

*The Central Cable Corporation supplied the Department of Justice no information on its shipments, either of aluminum conductors or aluminum insulated. It is believed, however, that this company, which was acquired early in 1963 by Aluminum Ltd. of Canada (*infra*, p. 18), was a substantial fabricator in both lines (Tr. 120–121, 712).

integrated companies accounted for 65.4 percent, and the top four independents whose production statistics appear in the record added another 22.8 percent. We may point out, by way of comparison, that in *United States* v. *Bethlehem Steel Corp.*, 168 F. Supp. 576, 584 (S.D.N.Y.), Judge Weinfeld found the iron and steel industry "highly concentrated" because twelve integrated producers accounted for 83 percent of industry capacity. And in *Brown Shoe Co.* v. *United States*, 370 U.S. 294, 300, this Court noted the district court's finding that a small number of shoe manufacturers "occupied a commanding position" in that the top four produced approximately 23 percent of the nation's shoes.

(b) *The acquiring company, Alcoa, was the leading producer.* Though it ranked third in the field of insulated aluminum conductor, with 11.6 percent of total production, Alcoa was the leader both in bare aluminum conductor, with 32.5 percent, and in aluminum conductor, generally, with 27.8 percent (GX 434–436; Fdg. 45(a), App. B). This is not a case in which two small companies combined in order to compete more effectively with larger corporations dominating the market. See *Brown Shoe*, 370 U.S. at 331. Indeed, the avowed purpose of the present acquisition was to protect that "No. 1 position" by securing for it the facilities, technical skills, and full product line which Rome had developed in the insulated field—assets and capabilities which it would have taken Alcoa five to ten years to develop through its own efforts.

(c) *The acquired company, Rome, was a thriving and substantial enterprise.* Rome, one of the five leading non-integrated fabricators of aluminum wire and cable products, shipped in 1958 products having an aluminum content of 2,948,000 pounds, 1.3 percent of the aluminum conductor total (GX 434); and its share of the insulated aluminum conductor market was 4.7 percent (GX 436). A pioneer in the field of aluminum insulation, Rome offered a broad line of high-quality wire and cable products, and its technical "know-how," experienced marketing organization, and active research program had earned it an outstanding reputation in the industry. In short, it was precisely the sort of competitive factor which Congress, in amending the Clayton Act, sought to preserve. See H. Rep. No. 1191, 81st Cong., 1st Sess., p. 8; *Brown Shoe Co.* v. *United States,* 370 U.S. 294, 321.

In these circumstances, the effect of Alcoa's acquisition of this important independent firm "may be substantially to lessen competition" within the meaning of Section 7. This conclusion is borne out by the legislative history of the 1950 amendment. According to the House Report, the forbidden effect of "lessening competition" may be demonstrated by a showing that the acquisition has eliminated an enterprise which had been "a substantial factor in competition." H. Rep. No. 1191, *supra; Brown Shoe, supra,* 370 U.S. at 321, fn. 36. There can be little doubt that Rome, one of ten companies whose share of the aluminum conductor market exceeded one percent, fits that description.

The dominant theme pervading the legislative history of the 1950 amendments to Section 7, as this Court explained at length in *Brown Shoe,* was the concern of Congress to stem what it considered to be a "rising tide of economic concentration in the American economy." *Id.* at 315. Congress sought to arrest the formation of further oligopolies "with their attendant adverse effects upon local control of industry and upon small business," and thereby to preserve an "economic way of life" in which numerous independent units might compete. *Id.* at 333. The acquisition of an important independent fabricator by the nation's largest producer of primary aluminum and aluminum conductors, in lines of commerce dominated by a small handful of such integrated producers, is plainly inimical to these legislative ends. In *Brown Shoe,* this Court affirmed the decision of the district court striking down a merger in the retail shoe industry, a highly fragmented line of commerce composed of 70,000 retail outlets, of which 22,000 were "shoe stores" in the ordinary sense (370 U.S. at 300); in many cities, the combined market share of the acquired and acquiring companies did not exceed 5 percent, and the effect of the acquisition was to give the acquiring company control over only 7.2 percent of the nation's retail "shoe stores." (*Id.* at 343, 345.) It would be strange indeed to find that Congress had barred acquisitions in fragmented industries on the ground that they might constitute a step on the road to oligopoly, yet at the same time

tolerated more substantial acquisitions the effect of which was further to consolidate the power of a dominant firm in an already oligopolistic industry structure.

Moreover, the present acquisition did not stand alone. It is worth pointing out, though not essential to our argument, that the absorption of this non-integrated fabricator was one of five such acquisitions by producers of primary aluminum since 1957. In that year, Olin Mathieson acquired the Southern Electrical Corporation, then the largest independent manufacturer of aluminum conductor (GX 434; Defendants' Answer to Plaintiff's Interrogatory (47-48); and Kaiser acquired the Bristol, Rhode Island, plant of the U.S. Rubber Company, one of the top ten in the insulated aluminum field. These moves, and the threat they were thought to pose, were specifically identified as factors influencing Alcoa's 1959 decision to acquire Rome (GX 150; GX 161; Tr. 2028-29.) And it was partly in response to the three prior acquisitions, that Reynolds, in 1961, acquired the wire and cable facilities of John A. Roebling's Sons Division of the Colorado Fuel and Iron Company, a small fabricator (GX 387, 396). Finally, in February 1963, too late to be noted in the record below, Aluminum Ltd. of Canada announced the acquisition of Central Cable Corporation, one of the largest of the independents (see p. 14, *supra*, fn. 6). As a result of this series of mergers, there now remain only four non-integrated fabricators[7] of aluminum conductor whose individual shares of total industry production (based on 1959 figures, the latest in the record)

[7] The four are General Cable Corp., Southwire Company, Essex Wire Corp., and Nehring Electrical Works.

amounted to more than one percent. And since Harvey Aluminum Company, another primary producer, is presently considering entry into the conductor field through the acquisition of an existing manufacturer (Tr. 873–874), it seems likely that the ranks of the independents will soon be further depleted, if the decision below is allowed to stand. In sum, the aluminum conductor industry is experiencing precisely that process of creeping concentration which the amended Section 7 was designed to thwart, and which was described in the Senate Report on the bill (S. Rep. No. 1775, 81st Cong., 2d Sess., p. 5, quoted in *Brown Shoe*, 370 U.S. at 333–334):[8]

> Under the Sherman Act, an acquisition is unlawful if it creates a monopoly or constitutes an attempt to monopolize. Imminent monopoly may appear when one large concern ac-

[8] The same point was stressed by Mr. Justice Douglas in his dissenting opinion in *United States* v. *Columbia Steel Co.*, 334 U.S. 495, 534–535: "This is the most important antitrust case which has been before the Court in years. It is important because it reveals the way of growth of monopoly power—the precise phenomenon at which the Sherman Act was aimed. Here we have the pattern of the evolution of the great trusts. Little, independent units are gobbled up by bigger ones. At times the independent is driven to the wall and surrenders. At other times any number of 'sound business reasons' appear why the sale to or merger with the trust should be made * * *. We have here the problem of bigness. Its lesson should by now have been burned into our memory by Brandeis. *The Curse of Bigness* shows how size can become a menace—both industrial and social. It can be an industrial menace because it creates gross inequalities against existing or putative competitors. * * *" It was *Columbia Steel* and its demonstration of the inadequacy of existing law to cope with mergers that spurred Congress to enact the 1950 amendment to the Clayton Act (see *Bowrn Shoe*, pp. 318–319, fn. 33).

> quires another, but it is unlikely to be perceived in a small acquisition by a large enterprise. As a large concern grows through a series of such small acquisitions, its accretions of power are individually so minute as to make it difficult to use the Sherman Act test against them * * *.
>
> Where several large enterprises are extending their power by successive small acquisitions, the cumulative effect of their purchases may be to convert an industry from one of intense competition among many enterprises to one in which three or four large concerns produce the entire supply. S. Rep. No. 1775, 81st Cong., 2d Sess. 5. And see H. R. Rep. No. 1191, 81st Cong., 1st Sess. 8.

B. Though the district court gave attention to many of the factors mentioned in *Brown Shoe*, it reached a result wholly at variance with the congressional policy explained therein. The court below did not dispute the underlying facts relied upon by the government, *e.g.*, that five integrated producers accounted for more than 80 percent of the aluminum conductor market; rather, its error lay in the failure to perceive that these facts themselves established that the effect of this merger may be substantially to lessen competition. Whatever may be the significance of the factors upon which the court relied (the principal ones of which are discussed below) in testing the validity of a merger of competitors in a less concentrated industry, they cannot serve to validate the elimination of one of the few remaining competitors in this oligopolistic market.

The court took the position—erroneously, we submit—that the government's concentration data were without significance because the production of aluminum and the fabricating of its products "were concentrated to the point of monopoly less than twenty years ago" and have "undergone a gradual decentralization by the entry of new producers and fabricators since that time." This overlooks completely the fact that it was action by the federal government, not the forces of the market, which broke up Alcoa's monopoly and brought about this "decentralization" (see pp. 7–8, *supra*). It would be a remarkable outcome if Alcoa's long history as a monopolist—a status which was judicially terminated only two years before this acquisition—were now deemed a mitigating factor.[9]

Similarly, the court noted that whereas there were four fabricators of insulated aluminum conductor in 1951, the number had risen to twenty-nine as of April 1, 1961 (App. A, 23a). This statistic loses significance, however, when it is observed that in 1959, the latest year for which figures are available, only eleven of the twenty-nine companies referred to by the court (listed in AR 5) produced as much as one percent of the insulated aluminum total;[10] only four others had

[9] In view of the fact that from 1945 to 1957 the scope of relief to be given in the government's antitrust suit against Alcoa had not been finally determined, and could have included divestiture or dissolution, it is not surprising, as the district court noted, that Alcoa had "no history of acquisitions or mergers" or of "forbidden anti-competitive practices" (App. A, pp. 23a and 29a).

[10] Ten companies, each accounting for one percent or more of the insulated aluminum total in 1959, are listed in GX–436. It is assumed that Central Cable Co., regarded in the industry

as much as two-tenths of one percent;[11] five others were, by the time of trial, out, or "almost completely out," of the field;[12] and five others did not make overhead conductors at all, but only specialty items.[13] A directory of producers shows only one fabricator in 1961 which was not also listed in 1955, other than those which acquired existing firms (GX–442). These facts also dispel the significance of the court's finding that there is "ease of entry" in this industry. The possible entry of new firms is important only if the character of the industry is such that new firms are likely to appear, and to become as important competitors as the firm being eliminated. In this industry, however, most of the newcomers have been able to acquire only inconsequential shares of the market. In such circumstances, it would seem that: (1) substantial firms are unlikely to venture into a field which holds such slim prospects of success; and (2) even if they do, they are unlikely to develop to a point where they will be effective substitutes for the firm whose independence has been terminated.

The court further "found" that the four acquisitions of aluminum conductor fabricators by primary aluminum producers (the fifth, by Aluminum Ltd. had not yet been announced; *supra*, p. 18) did not amount to a "significant pattern or trend of mergers" (Fdg. 46, App. B)—chiefly because the combined market

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as a substantial producer, also produced one percent or more in that year. See fn. 6, *supra*.

[11] GX–436.

[12] Tr. 491–492, 433–434, 777–779, 799, 992–995.

[13] Defendants' Answer to Plaintiff's Interrogatories, Table II.

shares of the acquired and acquiring companies in each case declined after the merger (Fdg. 48; App. B). The short answer is that the significance of this series of acquisitions does not lie in short-run increases in the market shares of the particular acquiring companies, or even of integrated companies generally, but in the fact that each combination (except the Reynolds-Roebling) eliminated one of the few substantial independent competitors. In any event (as we have already observed, *supra*, pp. 17–18), in an industry already acutely concentrated, it is not essential that the government establish a "trend" toward further centralization in order to defeat a substantial merger. In such an industry a substantial merger would be unlawful even if the tide of concentration had receded.

The court below, having concluded that the concentration data were without significance, then went on to consider other factors mentioned in *Brown Shoe, e.g.*, the purpose of the merger (App. A, 21a), and the lack of evidence of specific injury to suppliers, purchasers or remaining independent fabricators (App. A, 27a). These factors are undoubtedly important in gauging the effect, particularly the incipient effect, upon competition of questionable mergers in fragmented industries. But they cannot vindicate this acquisition. In enumerating "some of the factors, relevant to a judgment as to the validity of a given merger" (370 U.S. at 316), this Court obviously did not intend that enumeration to be used as a mechanical checklist with which to total up points

for and against an acquisition. Not all of the factors mentioned by the Court are of equal weight; nor is their relative weight the same in all situations. Where, as in this case, an acquisition takes place in a highly concentrated industry (*Id.* at 322) and eliminates one of the few significant competitors therein, these facts alone demand the conclusion that industry competition may be substantially lessened.

2. This case also presents an important question as to the proper standards for defining the relevant product markets within which to examine the effects of an acquisition. The court below determined that bare aluminum conductor was an appropriate line of commerce. However, the court also determined that neither (1) insulated aluminum conductor nor (2) aluminum conductor was a "line of commerce" within the meaning of Section 7. In so concluding, it misapplied the guidelines laid down by this Court in *Brown Shoe* and rendered uncertain the criteria for resolving an issue which lies at the threshold of every Section 7 case.

In holding that insulated aluminum is not a submarket competitively distinct from its copper counterpart, the court below ticked off the "practical indicia" listed in *Brown Shoe,* noting that producers do not regard the aluminum product as "a separate economic entity"; that the same equipment and personnel can be utilized to produce either the copper or aluminum product; that both are sold to the same customers; that there are no specialized vendors; and that, as a technical matter, the insulated copper product can

be utilized wherever aluminum insulated is used. On the other hand, the court recognized that in the only application for which insulated aluminum cable is widely used—overhead distribution lines—the customers make their purchases solely on the basis of economic factors; that the aluminum product is sold at prices distinct from copper; and that there is little price sensitivity between them. These latter factors, however, which we regard as decisive, were dismissed by the court on the ground that they did not destroy the conclusion "that covered aluminum wire and cable is in actual competition with its copper counterpart and may not be found as a line of commerce herein" (App. A, 16a). Apparently, therefore, the court considered that a finding that two products are "in actual competition"—without considering the degree of competition—necessarily precludes a ruling that either constitutes a "line of commerce." This represents a clear misunderstanding of the *Brown Shoe* decision.

In *Brown Shoe* the Court carefully pointed out (370 U.S. at 325) that while the outer boundaries of the product market must be broad enough to embrace all reasonably interchangeable substitutes, within these boundaries there may exist well-defined submarkets which are themselves "lines of commerce." This means, obviously, that two or more products—*e.g.*, insulated aluminum cable and insulated copper cable—though sufficiently competitive to be grouped together within a single product market, may at the same time be sufficiently noncompetitive to be treated as distinct submarkets; in other words, that degree of competitiveness which serves to justify the inclusion of

several items in the same line of commerce does not necessarily preclude their division into separate lines. The district court plainly failed to appreciate this point, for it characterized (App. A, 16a–17a) as an "inconsistent position" the government's contention that "insulated aluminum wire and cable is a line of commerce and therefore competitively distinct from insulated copper but * * * that insulated aluminum and insulated copper constitute a single line of commerce." If the court's view were correct, the distinction drawn by this Court between broad product markets and lesser included submarkets would be completely obliterated.

Had the court applied the proper standard, it could not have failed to recognize insulated aluminum conductor as a line of commerce distinct from the copper product. For most purposes, insulated aluminum is so inferior to insulated copper that it enjoys virtually no commercial acceptance.[14] In the conduction of electricity in overhead distribution lines, however,

[14] For example, aluminum has no significant usage in underground cable (GX 468), telephone or communications cable (TR. 1910), automotive wiring (Tr. 395–96), appliance wire and other flexible conductors (GX 267, GX 378, Tr. 398, 495–96, 1912), switchboard cable (Tr. 774–75), portable power cable (GX 375, Tr. 773), control cable (Tr. 773–74), fine wire (Tr. 772, 799, 1910–11), shipboard cable (Tr. 770–71), magnet wire (AR 18, Tr. 399, 798–800, 1226), missile cable, transformer wiring, instrumentation cable, street lighting cable, machine cable, signal cable, dredge cable or radio hook-up wire (AR 18, Tr. 1226). In the field of building wire, aluminum has achieved only a very limited acceptance, largely confined to the larger sizes of building wire in very large buildings. It is not considered as a significant factor in the building wire market (Tr. 399, 419, 492–94, 770).

aluminum has gained wide acceptance. In that application it is functionally interchangeable with insulated copper, but enjoys a decisive economic advantage because primary aluminum is much cheaper than primary copper and, pound for pound, will carry twice as much electricity. Consequently, aluminum has dramatically displaced copper in insulated overhead distribution lines; its share of total annual installations has increased from 6.5 percent in 1950 to 77.2 per cent in 1959 (the last year for which statistics were available at the trial) (*supra*, p. 7). As of the date of the merger, therefore, "actual competition" between the two metals in the field of overhead distribution was rapidly disappearing—just as it had already disappeared in the field of overhead transmission, where bare aluminum, having almost completely displaced bare copper, was conceded by Alcoa and found by the court to be a distinct line of commerce. It is axiomatic that Section 7 demands an assessment of future, as well as present, conditions of competition. *Brown Shoe*, 370 U.S. at 332–333.

To the extent that it still exists, competition between the copper and aluminum insulated conductor is extremely tenuous. Utilizing a high-cost metal, fabricators of insulated copper cable are powerless to eliminate the price disadvantage under which they labor and thus are not in a position to compete effectively in the overhead distribution field. Furthermore, so wide is the price differential between the two insulated products that a relatively large increase in the price of aluminum conductor would be necessary before a significant number of customers would shift

back to copper.[15] Accordingly, the availability of a copper substitute exerts little, if any, restraint upon the power of the aluminum cable manufacturers to raise the price of their product. In light of these considerations, it seems clear that insulated aluminum wire and cable is a realistic and economically significant submarket within which to appraise the impact of the acquisition upon competition.

It necessarily follows that aluminum conductor is a relevant market. Plainly, it accords with the commercial realities of the electrical industry to combine the bare and insulated types of cable in the same line of commerce, since both are used for the same broad purpose of conducting electricity, and both are sold to the same customers, the electrical utilities. And indeed the court so found (Fdg. 31, App. B). There remains only the question whether aluminum conductor can be separated from copper conductor. The same physical characteristics and cost considerations which differentiate the two insulated product lines also differentiate the broader conductor lines. Having found that bare aluminum is a distinct submarket, the court denied that status to aluminum conductor only because it determined the other component—insulated aluminum—to be inseparable from its copper equivalent. Since that premise is unfounded, there

[15] As of January 1, 1961, the prevailing price of a representative size of polyethelene insulated aluminum weatherproof wire was $73.50 per thousand feet; polyethelene insulated copper of equivalent conductivity cost $115.83. Comparable figures for a representative polyethelene insulated service cable were: aluminum $114.00; copper $206.00. (Defendants' Answer to Plaintiff's Interrogatory 61.)

can be little doubt that aluminum conductor, like its two components, is a distinct line of commerce.

Contrary to the district court's belief, *Brown Shoe* is no barrier to these conclusions. There the appellant's contention was that the district court had erred by delineating the relevant submarkets (men's shoes, women's shoes, and children's shoes) too broadly and should instead have subdivided them further on the basis of price and quality differences. It was in response to that contention that this Court made the statement, cited by the court below (App. A, 16a), that the boundaries of the relevant market must be drawn with sufficient breadth to include all competing products. By this statement, the Court indicated its approval of broad lines of commerce encompassing all reasonably competitive substitutes, but it did not thereby rule out less inclusive submarkets as well. This is not to say that the Court would have sanctioned further subdivision of the market in *Brown Shoe* itself; on the contrary, it characterized as "unrealistic" Brown's contention "that, for example, men's shoes selling below $8.99 are in a different product market from those selling above $9.00." (*Id.* at 326.) Thus the Court pointed up the lack of realism in any effort to put shoes into different "lines of commerce" where the difference in price might be as little as one cent per pair. In sharp contrast, insulated aluminum wire and cable, used in overhead distribution, is significantly cheaper than its copper equivalent. In most cases, insulated aluminum distribution cable sells at 50 percent to 65 percent of the price of the copper counterpart (Defendants' Answer

to Plaintiff's Interrogatory 61). Moreover, the purchaser of shoes selects among available alternatives with an eye not only to price but also to quality, style, and the intangible factor of how much of his income he chooses to spend on shoes; hence, two consumer products may be highly competitive, though disparate in cost. By contrast, a public utility's selection between insulated aluminum and insulated copper cable for use in overhead distribution lines is based almost exclusively on economic considerations, so that any significant differential in price is bound to reduce drastically the degree of competition, as in fact it did here. To put price to one side, as the district court did, is to ignore the single most important practical factor in this business—a result surely not consonant with this Court's decision in *Brown Shoe*.

CONCLUSION

The questions presented by this appeal is substantial and of public importance. Probable jurisdiction should therefore be noted.

Respectfully submitted.

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JUNE 1963.

APPENDIX A

United States District Court
Northern District of New York

Civil No. 8030

UNITED STATES OF AMERICA, PLAINTIFF

against

ALUMINUM COMPANY OF AMERICA AND
ROME CABLE CORPORATION, DEFENDANTS

ANTITRUST ACTION—VIOLATION OF SECTION 7,
CLAYTON ACT

Tried Feb. 5–Mar. 1, 1962; Submitted Aug. 18, 1962;
Decided Jan. 28, 1963

Opinion

BRENNAN, *Judge:*

This is a civil antitrust action brought by the United States against the Aluminum Company of America, hereinafter referred to as "Alcoa" and the Rome Cable Corporation, hereinafter referred to as "Rome" to annul the acquisition by Alcoa of the stock and assets of Rome.

The complaint in this action was filed April 1, 1960 and charges that the acquisition, above referred to, is in violation of Section 7 of the Clayton Act, 15 U.S.C. § 18. The complaint seeks the usual relief in this type of case—to wit: an order of divestiture and injunction against further acquisitions and such other and further

relief as may be just and proper. Defendants' answers, while admitting certain allegations of the complaint, deny that the transaction involved is in violation of the statute. No question is raised as to the jurisdiction of this court.

On March 31, 1959, pursuant to a prior agreement, Alcoa acquired all of the assets of Rome by an exchange of stock of the two corporations. Title to the assets of Rome was taken in a newly formed corporation also known as the Rome Cable Corporation. The new company is a wholly owned subsidiary of Alcoa and, since the acquisition, has been operated as a division thereof. The crux of the litigation arises from plaintiff's contention that the effect of such acquisition may be substantially to lessen competition or tend to create a monopoly in certain lines of commerce consisting principally of wire and cable products—all in violation of Section 7 of the Clayton Act.

Brief reference is made at this point to the defendants and the general nature of their business activities in order to afford an insight into the more detailed discussions to follow.

Alcoa is a fully integrated aluminum producer. In the manufacturing process, it refines aluminum bearing ore into primary aluminum and converts same into intermediate and various aluminum end products. It manufactures such products in several states and sells and ships same in various forms throughout the United States and in foreign countries.

Rome was incorporated in 1936. It was and is primarily engaged in the manufacture of wire and cable products in which copper was and is the predominant metal used in its operations. In 1952 Rome installed equipment for the manufacture of aluminum rod from aluminum ingot purchased from primary producers. It began producing such rod for its own use in 1953.

Thereafter it began to manufacture and sell certain types of aluminum wire and cable in addition to its broad line of copper products.

THE LAW

Before proceeding to discuss Alcoa's and Rome's position in the markets in which they are active participants, it would seem logical to refer briefly to the legal principles involved. An understanding of the language and purpose of the statute is essential as an approach is made to the decision which must necessarily involve the recognition of the prohibitions imposed and the application of same to the facts disclosed.

The basis of this action rests upon the provisions of Section 7 of the Clayton Act, 15 U.S.C. § 18, the relevant part of which is quoted below.

> No corporation engaged in commerce shall acquire, directly or indirectly, the whole or any part of the stock or other share capital and no corporation subject to the jurisdiction of the Federal Trade Commission shall acquire the whole or any part of the assets of another corporation engaged also in commerce, where in any line of commerce in any section of the country, the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly.

The language of the above statute, taken alone, poses problems both in its construction and application. The courts have proceeded upon a case-to-case basis to construe and apply the statute to the facts of a particular litigation. It seems fair to state that the law involved is still in a state of development and that no formula, possessing rigidity, may be applied. This is necessarily so since the statute deals with reasonable probability in the constantly changing economy in which we live.

The recent decision of the Supreme Court in *Brown Shoe Co.* v. *U.S.*, 370 U.S. 294, is, as stated therein, the first case coming before that court wherein an analysis of the scope and purposes of the statute, as it now exists, was necessary to the issue raised. It would seem to follow that reference to the holdings in that decision would be more profitable than to discuss how far the previous landmark decisions under the Sherman Act are applicable or to reconcile or distinguish decisions of circuit and district courts which had decided Section 7 cases prior to the *Brown Shoe* decision. The most often quoted decisions, referred to above, are either cited or are found in the notes in the Brown Shoe opinion and their application may be gathered from the text thereof.

The legislative history of the statute is discussed in the above *Brown Shoe Co.* decision and does not require repetition here. Such discussion appears to confirm some previously stated purposes of the statute and sets at rest certain controversies relative to the meaning and application thereof. This court's understanding thereof is summarized below and the quotations therein are, unless otherwise indicated, taken therefrom.

Congress considered that ". . . a rising tide of economic concentration in the American economy" was an evil to be curbed. Effective competition and the protection of small businesses were results to be accomplished. The statute was intended to supply a deficiency in the existing statute and to apply to all types of mergers. Its purpose was to curb monopolistic acts at their beginnings or incipiency rather than await their fruition and the standards for judging their legality are broader than, but may include, those applied in Sherman Act violations. All mergers however are not to be condemned. Con-

demnation is limited to those having "demonstrable anticompetitive effects" although such demonstration is satisfied by a probability. Certainty is not required. Proof of probability is sufficient provided the menace to competition is clear-cut as distinguished from a temporary condition or an "ephemeral possibility". No particular tests are provided in the statute to measure either the product or geographic market. Neither are qualitative or quantitative tests controlling in measuring the effect of a merger. Both measurements must be made in the light of all the relevant factors which may vary in accordance with the facts of the particular acquisition under consideration.

In addition to the above summary of the discussion of the legislative history as gathered from the opinion in the *Brown Shoe* case, the decision therein, in its holdings seems to otherwise clarify the vagueness of the language of the statute and afford something of a guide to the trial courts in their application to the facts of the litigation before them.

The lines of commerce or product market may consist of both broad and submarket lines. No rigid formula exists for their determination. The realities of competition are the ultimate test. The broad market line may be extended to cover a product where there exists "the reasonable interchangeability of use or the cross-elasticity of demand between the product itself and substitutes for it". Seven "practical indicia" are set forth as factors to be considered in determining the boundaries of a submarket. They are (1) industry or public recognition of the submarket as a separate economic entity, (2) the product's peculiar characteristics and uses, (3) unique production facilities, (4) distinct customers, (5) distinct prices, (6) sensitivity to price changes, and

(7) specialized vendors. The existence or non-existence of each of the above indicia is not determinative of the problem in itself. All relevant facts must be considered and we are admonished "to recognize competition where in fact competition exists". Peculiar characteristics and uses may be one of such indicia but it is not determinative. To be of effective weight, they must be so peculiar as to render the product "non-competitive".

In determining the impact of the merger, the size of the share of the market foreclosed is not decisive unless it approaches monopoly proportions or is of de minimus effect. The market shares held by the merged companies are an index of market power to be applied in all aspects of the realities of competition in "an economically significant market". Mergers may not be condemned per se upon the basis of such shares alone; same "will seldom be determinative". The purpose of the merger is a most important factor as is the existence of trends toward concentration in the industry. The testimony of those engaged in industry has its weight and significance although "It is competition, not competitors, which the Act protects". An evaluation of the competitive realities disclosed, based upon a pragmatic factual approach, would seem to be the obligation of the trier of the facts.

THE INDUSTRY

The litigation involves principally the effect of the merger as tending to lessen competition in certain aluminum product lines of commerce. In the decision of *Brown Shoe Co. Inc.* v. *U.S., supra,* at 321, we find the following quotation: "* * * Congress indicated plainly that a merger had to be functionally viewed, in the context of its particular industry" and at

page 329 the court refers to the examination of "economic and historical factors" as necessary to the decision. It follows that the facts must be weighed and the law applied with some understanding of the industry as a whole and the status of both Rome and Alcoa therein.

The history of the aluminum industry in this country from its beginning to World War II is for all practical purposes a history of Alcoa itself. The economic demands of World War II account for the entry of competing primary aluminum producers, the details of which may be gathered from the lengthy court decisions which involve the position of Alcoa in the business of aluminum production and the sale of aluminum products within the United States. Such details may be gathered from the decisions—*U.S.* v. *Alcoa,* 44 F. Supp. 97; *U.S.* v. *Alcoa,* 148 F. 2d 416; *U.S.* v. *Alcoa,* 91 F. Supp. 333; and *U.S.* v. *Alcoa,* 153 F. Supp. 132. It is sufficient to say that principally due to government action during the above period, Reynolds Metal Company and Kaiser Aluminum and Chemical Corporation shared with Alcoa, then and now, a place in the aluminum industry as fully integrated aluminum producers.

The above corporations are described in their activities as fully integrated in that their facilities permit the processing of the necessary materials from the mine through the intermediate stages to the finished aluminum product. Statistics appear to be first available in the above process when same reaches the primary aluminum stage, so that for all practical purposes we are not particularly concerned with the status of industry prior to the production of primary aluminum. Three additional corporations have since 1955 joined Alcoa, Kaiser and Reynolds as such producers. These corporations—Ormet, Inc. (Olin

Mathieson), Harvey Aluminum Company and Anaconda Aluminum Company, although not as fully integrated as Alcoa, Kaiser and Reynolds, are producers of primary aluminum. The above corporations are in a position to manufacture and sell aluminum billet, pig, ingot and rod which are termed intermediate products. Each of the above corporations, except Harvey, fabricates the intermediate products into numerous finished merchantable items, intended directly for consumer use. Included in such items are the wire and cable products urged as proper lines of commerce in this case. The five above companies, thus engaged in processing intermediate aluminum products, are considered as "integrated producers" as the term is used in this litigation.

An indication of the status of the above companies engaged in producing primary aluminum may be gathered from the exhibit set out below—

Aluminum Ingot Capacity Existing or Under Construction at the End of 1960
[Short tons]

Company	Capacity	Percent of U.S. total
United States total	2,635,750	100.0
Aluminum Company of America	1,025,250	38.6
Reynolds Metals Company	701,000	26.4
Kaiser Aluminum & Chemical Corp	609,500	23.0
Ormet, Inc.	180,000	6.8
Harvey Aluminum	75,000	2.8
Anaconda Aluminum Company	65,000	2.4

The above percentage of total capacity of Alcoa differs slightly from that provided by the defendant which is set at 35%. This may be accounted for by the fact that Alcoa abandoned construction of a plant in Indiana when it was apparent that there was an oversupply of capacity. No doubt production figures are more meaningful than the above since it appears that 15% of Alcoa's primary aluminium capacity was

unused in 1960. Alcoa's percentage of United States primary aluminum for 1960 was 36% of the total supply, having declined 9% from 1956. That Alcoa's percentage of such production has declined over a period of years is self-evident from the entry of new producers as indicated above but it would seem to be fair to say that the three principal producers supply around approximately 80% of such production. The record is indicative of a further increase in domestic aluminum capacity and production, both from the documentary evidence and the oral testimony. This increase would come about by entry of new producers and the increase in production capacity of Alcoa's present competitors.

Only brief reference need be made to the copper industry since it is involved only to a limited extent in this controversy. Copper products are manufactured from an ore from which intermediate products are refined and the end product eventually produced for consumer use. Like aluminum, there are companies which are so integrated as to be able to refine and produce copper products from the original ore to the finished items. Such companies sell intermediate products, such as ingot, to processors or fabricators, who then process same for ultimate use in their final form. There is no contention here that the merger involved has anti-competitive impact in the copper industry as a whole or upon the integrated copper producers or fabricators. No further discussion of the copper industry appears to be necessary.

We now turn to a brief discussion of the industry as it pertains to the particular lines of commerce involved in this litigation. The lines of commerce which are principally litigated here consist of those products capable of conducting electricity and are generally referred to as wire and cable products.

While it is claimed that some of such lines involve both aluminum and copper, emphasis is placed principally upon aluminum wire and cable which are the end products of processing or fabricating an intermediate aluminum product such as ingot into the completed wire and cable which may be of various sizes, electrical conductive capacity and of different weight, size and strength.

There are a large number of firms engaged in the fabrication of wire and cable copper products. There are a lesser number of such fabricators engaged in the business of fabricating aluminum products. As the word "fabricators" is used in this litigation, it is distinguished from the integrated aluminum and copper producers who also fabricate and sell their end products. Upwards of two hundred fabricators are engaged in the manufacture of both aluminum and copper wire and cable products. There is a vigorous competition as to wire and cable between the integrated companies among themselves and between those fabricators whose process of manufacture begins with the intermediate product purchased from a primary aluminum producer. This active competition is also evident as between aluminum and copper wire manufacturers whose product may be used interchangeably. In other words, there is a lively competition between aluminum and copper products in certain areas which is accounted for by the increasing use of aluminum products and the economic factors which apply thereto. Both the aluminum and copper industries are important factors in the present day economic and business life. They maintain effective and costly research departments designed to improve the efficiency of their products and to create new uses therefor. Both the copper and aluminum industry must meet competition at the intermediate manufac-

turing stage from foreign countries or concerns. Canada produces primary aluminum equal to about 35% of the total United States production and supplies a significant portion thereof which is available to this country's fabricators. European producers apparently furnish a small portion of primary aluminum for the use of American fabricators. In view of the above, no shortage in primary aluminum is foreseeable.

THE STATUS OF ALCOA AND ROME IN THE INDUSTRY

Since Alcoa has not been engaged in the manufacture of copper products, its place in the industry, above described, is limited to the production, manufacture and sale of aluminum products. Its position in the aluminum industry is to some extent apparent in the above discussion.

Alcoa still maintains its position as the leading producer of primary aluminum. Its share in that market, as may be expected, has declined sharply since the entrance of competitors in that field. This decline has been reasonably consistent since the newcomers in the field reached productive capacity. In 1948, Alcoa had 52% of United States primary aluminum production. It declined to 45% by 1956 and from 1956 to 1960, it declined to 36%. Its percentage of primary aluminum capacity has declined substantially in the same manner.

Alcoa manufactures and sells a variety of aluminum products. This litigation however involves primarily wire and cable products so that reference to its position in the market will be limited thereto. Alcoa pioneered the use of aluminum as an electrical conductor and sold substantially all of the aluminum cable used for electrical transmission in the United States prior to World War II. Since that time,

Alcoa has encountered increased competition and its relative participation in the above market has declined materially. Its principal products in that field are bare aluminum cable and ACSR (aluminum covered steel reinforced). ACSR is a bare aluminum cable with a steel core primarily used by utilities in the overhead transmission of electric current. Alcoa's share in ACSR and bare aluminum cable declined from 48.4% in 1954 to 32.5% in 1958 and to 26.1% in 1961. Its second principal product is known as aluminum conductor wire and cable. Its share in that product declined from 42.8% in 1954 to 27.8% in 1958 and to 23.5% in 1961. The decline in the above market percentages is reasonably consistent between the dates above mentioned and continuing since the acquisition. Alcoa's third such product is known as aluminum wire and cable, insulated or covered. Its share in that item varied from 10% in 1954 to 11.6% in 1958 and to 7.3% in 1961. The comparatively recent increase in demand for covered or insulated aluminum conductor wire found Alcoa in an unfavorable market position. It manufactured line wire and multiplex cable with a polyethylene insulation or covering but it lacked the know-how and the facilities for the manufacture of the more complicated line of insulated aluminum wire and cable products.

In March 1952 Alcoa and Rome entered into a continuing agreement referred to as a "tolling agreement" whereby Rome would cover or insulate bare aluminum wire with the more complicated insulated constructions. This arrangement broadened the scope of Alcoa's ability to provide insulated wire products to its trade.

As already indicated, Rome was primarily the manufacturer of copper products, including wire and cable. It has been successful in its manufacturing efforts

and expanded same so that at the time of its acquisition it had plants at Rome, New York; Torrance, California; and Collegeville, Pennsylvania. It maintained an active and efficient research department and sales organization. Prior to its acquisition by Alcoa, Rome was one of the ten largest manufacturers of copper conductor wire and cable in the United States. In 1952, Rome installed equipment for the manufacture of aluminum rod from aluminum ingot purchased from primary producers. It began producing such rod for its own use in 1953. Thereafter it began to manufacture and sell certain types of aluminum wire in addition to its broad line of copper products. In the course of its experience and research, Rome developed a special aptitude or skill in the matter of insulating wire and cable. It manufactured a relatively full line of the more complicated insulated wire and cable, designed and built to meet customers' requirements. This skill prompted the so-called "tolling arrangement" between Alcoa and Rome, referred to above.

At the time of the merger, here under consideration, only five products were manufactured and sold by both Alcoa and Rome and their direct competition in the market was limited thereto. These products may be identified as follows—(1) ACSR and bare aluminum cable; (2) covered line wire or weather-proof; (3) multiplex cable; (4) conduit; (5) aluminum redraw rod. The market shares of Rome and Alcoa in these competitive products, generally speaking, were not great and a further discussion of same may better be considered in the discussion of the impact of the merger upon or within the competitive market.

In this type of action, a burden is imposed upon the plaintiff to establish three essential elements, listed below, in order to establish a violation of the statute.

(1) The relevant products markets or "lines of commerce"; (2) the geographic markets within which the impact of the merger may be measured as to each such line of commerce; and (3) the substantial lessening of competition or tendency to create a monopoly in any such line of commerce in the relevant geographic area. The proof as to these elements will be discussed in the order in which they are mentioned above.

LINES OF COMMERCE

The Government offers proof as to ten lines of commerce and contends that each has been established thereby as applicable in this action. The defendants agree that four such lines of commerce are appropriate and disputes the relevancy of the remaining six lines and the sufficiency of the proof to establish same. There is set out below the list of specific products as contended by plaintiff, showing which are agreed upon and those in dispute. The position in which they appear below follows the order of the proof and the order in which they are discussed in the submitted briefs.

Item 1.	Aluminum conductor wire and cable	In issue.
Item 2.	Bare aluminum cable and ACSR	Agreed.
Item 3.	Insulated or covered aluminum wire and cable	In issue.
Item 4.	Aluminum ingot and rod used in the production of aluminum conductor wire and cable.	In issue.
Item 5.	Conductor wire and cable (aluminum and copper)	Agreed.
Item 6.	Conductor wire and cable, bare (aluminum and copper),	In issue.
Item 7.	Wire and cable, insulated and covered (aluminum and copper).	Agreed.
Item 8.	Service drop cable (aluminum and copper)	In issue.
Item 9.	Conduit (aluminum and steel)	Agreed.
Item 10.	Aluminum conduit	In issue.

The Government relies in its brief upon the peculiar characteristics and uses test as the bases upon which a finding of the relevant lines of commerce may rest. This test may find support in such deci-

sions as *A. G. Spalding & Bros. Inc.* v. *F.T.C.*, 301 F.2d 585; *Crown Zellerbach* v. *Federal Trade Commission*, 296 F. 2d 800; and *U.S.* v. *Bethlehem Steel Corp.*, 168 F. Supp. 576, but by the decision in the Brown Shoe case, such test is but one of seven of the "practical indicia" which may serve as a guide in determining submarket lines. Even if so used, such characteristics and uses must be such as to render the product "generally non-competitive".

The consideration and determination of the lines of commerce issue is made having in mind the discussion of the problem in the *Brown Shoe* case and the rules or guides laid down therein and referred to above.

Items 1, 2 and 3 are generally referred to herein as the aluminum conductor lines and are so related as to be discussed together.

Since Item 1 is a rather broad line and is simply a combination of Items 2 and 3, the latter two should first be determined. Item 2, bare aluminum cable and ACSR, is a heavy cable product which has practically displaced copper for use in overhead transmission lines. It is agreed that same constitutes a line of commerce here.

Item 3, insulated or covered aluminum wire and cable, is not a line of commerce because it is not recognized in the industry as a separate economic entity. While differing in some characteristics and preferred uses from its copper counterpart, they both perform the same functions and it is not "generally non-competitive" with copper. The Government's evidence shows in 1959 that insulated copper conductor comprised 22.8% of the gross additions to insulated overhead distribution lines. Both aluminum and copper wire may be produced interchangeably, using the same facilities. Covered aluminum wire has no

distinct customers as distinguished from covered copper wire purchasers. Neither has it specialized vendors. Insulated aluminum and copper wire are generally functionally interchangeable. Their purchase and use are likewise principally dictated by economic factors. While aluminum wire and cable is sold at prices generally distinct from copper and does not have the same price sensitivity, these factors do not destroy the conclusion that covered aluminum wire and cable is in actual competition with its copper counterpart and may not be found as a line of commerce herein. A different conclusion would ignore the admonition, "But the boundaries of the relevant market must be drawn with sufficient breadth to include the competing products of each of the merging companies and to recognize competition where, in fact, competition exists".

Since Item 1 is a broad line embracing both Items 2 and 3 and Item 3 is held not to be a proper line of commerce, their combination cannot result in a line of commerce. To find that Item 1 is a line of commerce extends the outer boundaries of the market beyond its legal limits because covered copper wire and cable is interchangeable in use and there is cross-elasticity of the demand therefor between insulated or covered aluminum and copper. To constitute a proper line of commerce, same must include the substitutes therefor which are reasonably interchangeable in use and for which there is a cross-elasticity of demand.

The above conclusion is fortified by the inconsistent position taken by the Government, at least as far as the vertical aspect of the merger is involved. The plaintiff contends here that insulated aluminum wire and cable is a line of commerce and therefore competitively distinct from insulated copper but agrees as to Item 7 that

insulated aluminum and insulated copper constitute a single line of commerce.

Item 4, aluminum ingot and rod, used in the production of aluminum conductor wire and cable is simply a grade of aluminum generally referred to as E.C. (electrical conductor). It is but one of 173 recognized aluminum alloys which may be manufactured interchangeably at the will of the producer. All six integrated primary aluminum producers produce various of such alloys including aluminum of E.C. grade which is required by industry standards to contain a minimum aluminum content of 99.45%. Generally the standard is met by the addition of a small percentage of boron to "a high purity pig". The purifying boron however may be added to the ingot during the course of the fabricating process. The rod represents a further product in the reduction of the ingot to the desired wire or cable size. It results from a continuing casting and rolling process and assumes a form or shape which is the starting point for most wire fabricators in their operation.

Although it may be doubtful that ingot and rod of the E.C. grade should be fragmented from the many aluminum alloys, it seems that it satisfies the most of the indicia laid down by the *Brown Shoe* decision and will be found as a line of commerce in this action.

Items 5, 6, 7 and 8 are generally referred to as conductor lines. They embrace both aluminum and copper wire and cable as distinguished from the four items discussed above which involve aluminum conductor only.

Item 5, conductor wire and cable (aluminum and copper), is a broad line covering all such products whether bare or insulated. Both litigants have agreed that same, together with Item 7, wire and cable, insulated and covered (aluminum and copper), may also be considered as a line of commerce here.

The first dispute arises when the defendants contend that the broad line, referred to above, may not be broken down by separating therefrom, as a separate line, Item 6, conductor wire and cable, bare. The court adopts such contention and holds that Item 6 does not constitute a proper line of commerce. Such a grouping would include bare aluminum wire and cable and ACSR. The Government has already asserted and agreed that such products are not competitive with copper or interchangeable therewith. In fact, these products are used in the overhead transmission field to the practical exclusion of copper. Grouping them together in Item 8 does not define a single product market. The Bureau of the Census has established separate product classifications for bare copper and for bare aluminum wire and cable. Because a broad line of commerce may be proper does not mean that it may be broken down into all possible fragments.

The proof as to Item 8, service drop cable (aluminum and copper), asserted by the Government as a line of commerce, is rather confusing. As so urged, it is referred to as multiplex cable and consists of one or more insulated conductors twisted around a cable or uninsulated conductor. This contention seems to again recognize that insulated aluminum is not competitively distinct from insulated copper wire and cable.

The product is or can be made by any manufacturer equipped to produce insulated wire or cable and is simply a separation of a particular item from the many other insulated products. Its use is primarily to carry electricity from the distribution point of the utility to the home or business place of the user and as secondary distribution lines carrying no more than 600 volts. The most popular type is of triplex construction and same is displacing open wire or weatherproof wire as a more popular product for service

drop, especially in new construction. The evidence is inconclusive as to amount of product known as service drop as distinguished from its use for other purposes including secondary distribution. As just indicated, weatherproof wire is still used as a service drop product from the utility pole to the entrance of the user's premises. No reliable data is available as to the extent of such use at the times relevant here. Two other types of cable, known as type "K" and type "SD" are presently used for the above purpose in particular localities. It would seem that to constitute a line of commerce, the substitutes for multiplex cable for secondary distribution use, weatherproof and the two types of cable, referred to above, may not be eliminated from consideration as a part of the service drop product line. Their absence, together with a consideration of the indicia, referred to herein, leaves the proof something less than convincing. If a product line is designated in terms of function, it must include all competitive substitutes accomplishing the same result. The Item is held not to be a relevant line of commerce herein.

THE GEOGRAPHIC MARKET

The litigants have agreed that in respect to all of the above lines of commerce, whether or not allowed as such herein, the United States as a whole constitutes a section of the country within the contemplation of Section 7 of the Clayton Act.

Item 9, conduit (aluminum and steel), has been agreed upon as a line of commerce. This item includes both rigid conduit and electrical metallic tubing (EMT). It is simply a metallic enclosure to protect lines or cables carrying electric current from outside injury or harm.

Controversy again arises in the matter of the Government's contention that the above broad conduit line may be separated by a submarket line of aluminum conduit alone. The contention is based principally on the separate characteristics and uses test. This single test, as indicated above, is not conclusive; in fact it is not applicable where such characteristics and uses do not render it generally non-competitive. Here the great weight of evidence is to the effect that aluminum and steel conduit are in direct and vigorous competition for the consumer trade. They are functionally interchangeable; alternate quotations are frequently sought by consumers and they react or are related in price change to each other. Aluminum conduit, taken alone, fails to meet the majority of the prescribed tests as a separate submarket and the contention of plaintiff that Item ten is a relevant line of commerce is rejected.

THE GEOGRAPHIC MARKET

There is no dispute but that the United States as a whole is an appropriate section of the country in which the impact of the merger may be considered as to both steel and aluminum conduit and aluminum conduit alone. The Government claims however that eleven western states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming) also constitute an appropriate geographic market for both of the above products. The claim is based upon the fact that the greater portion of Rome's total sales of conduit prior to the merger was made to customers within that area. The above statement is also true as to sales made after the merger. The evidence fails to show that such sales were made in that area as a particular market. Rome's sales expanded from a six state area

to a fourteen state area. The above eleven state area was used because data within same was available for comparison purposes. The evidence shows that freight rates and commercial realities are such that outside or eastern producers can ship conduit within the eleven state area and compete effectively with western producers.

In other words the purchaser within that area can turn for supplies to a producer located in any section of the country. *Tampa Electric Co.* v. *Nashville Co.*, 365 U.S. 320 at 327. The eleven state area is rejected as a proper geographic market in which to measure the impact of either conduit lines of commerce.

THE COMPETITIVE EFFECT OF THE ACQUISITION

The competitive effect of the acquisition upon the relevant lines of commerce, referred to above, is not determined in accordance with a rigid formula. Guides are furnished in the *Brown Shoe* decision and the cases cited therein. Reference will be made to those which seem to be pertinent here and will be applied to all claimed lines of commerce whether or not allowed as above.

Purpose

The "nature and purpose of the arrangement" is referred to as a most important factor and will first be discussed since it necessarily involves the participants' competitive problems and something of the background of the defendants previously referred to herein.

Alcoa was the prime mover in bringing about the acquisition. Its share in the aluminum market had declined as referred to herein. Its return on invested capital had declined from 9.3% in 1950 to 3.7% in 1961. It admittedly lacked the "know-how" to manufacture the more complicated types of insulated wire and cable for which there was a growing demand. Its principal

wire and cable product was ACSI. and bare aluminum cable. The need for product diversification was apparent. Rome was known to Alcoa as a substantial organization with special competence in the insulating field. The time required to obtain such competence from within its own organization and the expense involved seemed to foreclose such a program. Rome was first approached and negotiations failed. An engineering company was retained to explore the market to obtain an organization which would furnish the "know-how" in the insulated wire and cable field. Negotiations were reopened with Rome and the acquisition followed. Competition between Rome and Alcoa was limited to four wire and cable products. Rome's production thereof was not significant in amount.

All of the above indicates an effort to overcome a market disadvantage rather than to obtain a captive market for its product or to eliminate a competitor. The terms of the contract itself indicates an intention to retain Rome after the acquisition as an active participant in the market which it occupied.

Concentration

Another factor deemed important in providing a factual background for weighing the probable effect of the acquisition is the trend toward concentration in the industry involved. The Government contends that such a trend exists insofar as the aluminum conductor lines of commerce are involved. In support of the contention, emphasis is placed upon the fact that the combined shares of the market produced by the five integrated producers is roughly averaged at 80%. This fact loses its significance when it is realized that the production of aluminum and the fabricating of its products were concentrated to the point of a monopoly less than twenty years ago and has undergone a gradual decentralization

by the entry of new producers and fabricators since that time.

Alcoa has no history of acquisitions or mergers prior to the acquisition of Rome. Alcoa acquired equipment or assets of three other corporations but aluminum wire and cable products were not involved therein and same could in no way contribute to a concentration in that industry.

The Government cites the acquisition by Olin-Mathieson of the Southern Electric Corp. in 1957. The acquisition by Kaiser in the same year of the U.S. Rubber Co. plant at Bristol, R.I. and the acquisition of John A. Roeblings' Sons Co. by Reynolds in 1961 as indicating a merger trend. When examined, the facts hardly support such an indication. Olin-Mathieson manufactured no aluminum wire and cable products prior to its acquisition of Southern. U.S. Rubber's market share of said products was 0.8% and Roebling's share was never over 0.1% prior to their acquisition by Kaiser and Reynolds as above. More significantly as indicating lack of competitive impact in the product market referred to is the post-acquisition market shares of the above acquiring and acquired companies which show a decline therein as does the Alcoa-Rome market share.

The market situation as to the two principal aluminum conductor lines of commerce can be summarized by stating that as to ACSR and bare aluminum cable, the number of producers of those products increased from Alcoa, alone, in 1940 to twelve such producers in 1950 which number is practically unchanged to date. There were about four producers of insulated wire and cable in 1951 (although government allotments of aluminum for that purpose were issued to eight) and as of April 1, 1961, there were twenty-nine producers of such products.

Ease of entry

Closely related to the question of trends of or concentration in the aluminum conductor lines of commerce is the question of the existence of barriers to the entry of additional competitors in that particular branch of the industry. This is sometimes referred to as the "case of entry".

The facts already stated above demonstrate that no serious impediment or barrier exists which would bar the entry of producers of wire and cable products. This is accounted for principally for the reason that similar techniques and the same machinery with but slight alterations may be used in the production of such copper and aluminum products. The fact that in ten years the number of producers of insulated wire and cable have risen from four to twenty-nine and most of the new entrants came from the ranks of insulated copper conductor producers is indicative that entry into the aluminum conductor field is dictated by the status of the competition rather than being controlled by actual economic barriers. That some companies have ceased making this product is not determinative. "It is competition, not competitors, which the Act protects". The evidence discloses that the withdrawal of certain producers from the production of this item was occasioned by an inability to make a profit and there is no evidence which would indicate that any potential producer has been unable to enter the industry when he thought that a profit could be made therein.

There is no doubt that problems are presented in the matter of the entry of a producer in the ACSR and bare aluminum cable market. The product itself involves specialized techniques and equipment especially in the larger sizes used in the overhead transmission field. In spite of difficulties, there are now

twelve such producers, one of whom plans an extension of its facilities. The situation in the industry as to the ease of entry of competitors therein is of course not determinative but is simply another factor to be considered in the appraisal of the problem as a whole.

Market shares

The market shares which Alcoa and Rome may control by the acquisition is one of the most important factors to be considered. Since the shares in each line of commerce (whether allowed or not) are discussed in the briefs, they will be set out here and the ultimate conclusions to be drawn therefrom will be found in the detailed findings to be filed in connection with this opinion.

In 1958, the Alcoa and Rome market percentages in the three principal aluminum conductor lines as claimed by plaintiff appear below.

	Alcoa	Rome
ACSR and Aluminum Cable, Bare	32.5	0.3
Aluminum Wire and Cable, Insulated or Covered	11.6	4.6
Aluminum Conductor Wire and Cable	27.8	1.3

The decline in the combined market percentages of Alcoa and Rome in the above products appears below, which shows a generally continued decline therein both pre- and post-acquisition.

	1954	1958	1961	Decline (percentage points)		
				1954–58	1958–61	1954–61
ACSR and Aluminum Cable, Bare	48.6	32.8	26.1	15.8	6.7	22.5
Aluminum Wire and Cable, Insulated or Covered	16.9	16.3	13.	.6	3.3	3.9
Aluminum Conductor Wire and Cable	43.9	29.1	24.8	14.8	4.3	19.1

In 1958 the market percentage of Alcoa and Rome in the four conductor (aluminum and copper) lines of commerce are set out below.

	Alcoa	Rome
Conductor Wire and Cable	1.8	1.4
Conductor Wire and Cable, Bare	10.3	2.
Wire and Cable, Insulated or Covered	.3	1.3
Service Drop	10.8	8.1

The plaintiff contends that the above percentage table should be increased by the shipments of conductor wire and cable made by the Rea Magnet Wire Co. for 1958. This company was acquired by Alcoa in 1960. Same would seem unimportant from a competitive standpoint since its product was entirely copper wire of small size used principally in coils, transformers, etc. It made no product which competed with Rome. If such products were added, it would increase the total of Alcoa and Rome by 1.1% for conductor wire and cable and 1.3% for wire and cable, insulated, and actually add little or nothing to the significance of the percentages involved.

There is no evidence that the market shares in the conductor lines of commerce have increased or diminished since the acquisition. It would be speculative to assume that the percentages have changed appreciably except perhaps in the case of service drop which is composed principally of aluminum as the conductor and would seem to be included within the insulated or covered aluminum wire line and therefore subject to the post-acquisition decline therein.

In the conduit lines of commerce, no probative pre-acquisition market data is available. At that time, Alcoa made only aluminum conduit while Rome made only steel conduit. Based upon a survey first made about 1960, Alcoa's share in the conduit market

(aluminum and steel) was 3.4% and Rome's share was 3.5%. In aluminum conduit alone, the survey shows that in 1960 Alcoa's market share was 12.0% and Rome's as agent for Alcoa was 14.5%. These later figures should not be construed as showing that Rome in the post-acquisition period actually manufactured aluminum conduit. It had no extruding facilities. The above percentage apparently represents sales of aluminum conduit completely manufactured by Alcoa but sold by Rome as its agent and conduit pipe produced by Alcoa and threaded at the California plant of Rome. The accuracy of the above market shares is seriously questioned by defendants which, together with their incompleteness, afford little, if any, basis for a finding of the effect of the acquisition upon competition in either of the alleged lines of commerce whether or not allowed as such.

The market shares of the defendants in aluminum ingot and rod line of commerce appear to be inconclusive. Rome was not a producer of primary aluminum and did not compete in that market. Rome's purchase of primary aluminum amounted to .2% of the total industry production and .3% of Alcoa's production. Rome manufactured its own rod and additionally sold a small amount thereof for conductor use to non-integrated producers of wire and cable. Percentagewise, such sales amounted to a fraction of one percent of the market.

Industry evidence

In Brown Shoe, as in several other reported decisions, industry evidence as to the actual or potential effect of the acquisition upon suppliers and purchasers has been considered as a factor in determining the effect of the acquisition upon suppliers and purchasers. There is an entire absence of such evidence on the part of the Government. The passage of al-

most three years from the time of acquisition to the time of trial would seem to bring to light the anti-competitive effect of same if in fact it existed. Evidence to the contrary appears in the record. The defendants, through some eight or more witnesses, actively engaged in the aluminum wire and cable industry—all testified without exception that the acquisition has not had an adverse effect upon the purchasers of such products. No difficulty has been encountered in expanding their list of suppliers and that competition among such suppliers has not been affected.

The dominant position of Alcoa

Throughout the trial and in the submitted briefs, the Government has taken the position that Alcoa occupies a dominant position in the production of primary aluminum and in the manufacture of aluminum conductor wire and cable products. It is urged that this acquisition has enhanced that position and is therefore a factor in determining the competitive effects thereof. So much reliance is placed thereon that a brief discussion would seem appropriate.

Undoubtedly Alcoa is large in size, both physically and financially. Its activities are varied and extensive. Care however must be taken not to exaggerate its influence because of its size alone, especially in the absence of evidence of the abuse of the power which goes with size. *U.S.* v. *U.S. Steel Corp.*, 251 U.S. 417; *U.S.* v. *Swift & Co.*, 286 U.S. 106. The mere intrusion of "bigness" into a competitive market will not in itself violate the statute. *Reynolds Metals Co.* v. *F.T.C.*, 309 F. 2d 223 at 230. Here the Government's contention as to the dominance of Alcoa appears to rest upon size alone without evidence as to the exercise of the power that goes with it. In 1957, Judge Cashin in *U.S.* v. *Aluminum Company of*

America, 153 F. Supp. 132 at 167, found as a fact that Alcoa's relative share of the aluminum market had declined at that time. That such decline has continued to date appears without contradiction in this case. An increase in the money value of products sold means nothing in the light of the increase in the total market and the decline in the rate of return on Alcoa's invested capital. The increase in the number and market shares of primary aluminum producers and wire and cable producers all point to the conclusion that Alcoa's position in the above markets is something less than dominant. In any event, if Alcoa has the power to dominate, the record fails to show that such power has been used to its own advantage. The position of Alcoa in the above mentioned markets is relevant in this proceeding as a part of the overall picture upon which the decision must be based but this court sees nothing therein from which it could find that such position and the use thereof are indicative of forbidden anti-competitive practices.

The competitive impact

In appraising the impact of the acquisition, we turn first to the relationship between Alcoa and Rome as a source of supply and as direct competitors.

The customer-supplier relationship, referred to as the vertical aspect, requires little comment. Rome's purchase from Alcoa of primary aluminum was about 1/10 of one percent of Alcoa's production of that product. This small amount is without significance from a competitive standpoint but indicates rather clearly that the acquisition did not involve the purchase by Alcoa of a captive market.

The market area in which both the acquiring and acquired companies manufactured and sold competing products was limited to four or five items previously mentioned herein. The combination of the manufac-

turing and selling facilities of the two companies on these items involves the horizontal aspect of the acquisition in its actual and probable effects upon competition.

In ACSR and bare aluminum cable, Rome's pre-acquisition share of the market was 0.3%. In fact, Rome competed only in the smaller sizes of the product while Alcoa manufactured and sold a full line thereof. The products known as covered line wire or weatherproof and multiplex cable may be discussed together. These products have many end uses but are limited here to "service drop" which has been rejected as a line of commerce. In 1958, Alcoa's share in the service drop market, according to the figures of the Census of Manufactures was 10.8% and Rome's was 5.1%. These figures do not however include the product known as weatherproof wire, also used as service drop, which was reported under a different classification. Pre-acquisition figures are not available as to the market shares of the defendants in the product known as conduit. During the above time period, Rome manufactured steel conduit, both rigid and thin or electrical metallic tubing (E.M.T.). Alcoa manufactured rigid aluminum conduit and aluminum E.M.T. so that competition between them was in effect the competition between steel and aluminum. The nature and extent of the inter-defendant competition, resulting from the above, may be gathered from the discussion of the market shares of the defendants in the conduit lines of commerce as contained herein and needs no repetition here. The same may be said of the item of redraw rod. The extent of the competition therein may also be gathered from the brief discussion herein of market shares of defendants in that item.

Considered only from the manufacturing level, the comparatively small percentages of the market which Rome held in the overlap or competing products would not alone condemn the acquisition especially in view of the purpose and the other relevant factors previously discussed.

The principal contention urged as violative of the statute arises from the premise that the integrated producers are involved in a struggle for monopoly power with the non-integrated producers as their opponents. The argument proceeds to the conclusion that the acquisition adds to the numerical and market strength of the integrated companies especially in the aluminum lines of commerce and is therefore to be condemned.

Without doubt, an integrated company enjoys advantages over its non-integrated competitor. Such advantages would include the ability to sell intermediate products as well as end or fabricated products. Thus at least two opportunities to make a profit are available. They are able to offer a broader line of products to the trade and their sales organizations are likewise given more latitude and sale techniques extended. These advantages are not necessarily conducive to competitive strength in the lines of commerce involved. The financial outlay required, the obtaining and holding of the required skills, the constant research and experimentation, which are required of the seller of intermediate products, are burdens which the fabricator avoids but the integrated producer must carry.

The arraying of the integrated companies on one side and the non-integrated companies on the other overlooks entirely the active and vigorous competition among the integrated companies. In Alcoa's analysis of its lost business from 1957 to 1959, it

appears that the larger portion of same was lost to integrated producers. Its loss of business to Rome during the same period was insignificant. Previous government action was designed to facilitate the entry of manufacturing competitors of Alcoa's products. Now that such competitors have come into existence, the realities of competition dictate that same may not be ignored or distorted in appraising the competitive market as a whole.

Plaintiff presents statistics tending to show that the market shares of the integrated companies in the aluminum conductor lines of commerce have increased from 1955 to 1959 while the shares of the non-integrated companies have decreased during the same period. This is accounted for principally by the addition of Anaconda and Olin-Mathieson (Ormet) to the list of integrated producers. More significant however is the fact that since the acquisition and up to 1961, the non-integrated companies have held or increased their market shares in the lines under discussion while the shares of the Alcoa-Rome combination have declined. In the ACSR and bare aluminum cable and aluminum conductor wire and cable lines, the non-integrated producers have retained their shares of the market, while the share of Alcoa-Rome in ACSR has dropped from 32.8% to 26.1% In aluminum conductor, the non-integrated producers have retained their market shares while the share of Alcoa has decreased from 29.1% to 24.8%. In the insulated or covered line of commerce, the non-integrated producers market share has increased from 29.8% to 33.5% while the share of Alcoa-Rome has declined from 16.3% to 13.0%.

The above is proof of what has actually happened in the competitive market. It is a competitive reality much more convincing than arguments based upon speculative future market conditions. When such facts

are supported by the oral testimony of utility purchasing agents and non-integrated manufacturers to the effect that the acquisition has not adversely affected their businesses, a finding of a substantial lessening of competition is precluded. The fact that some four or five non-integrated producers have reduced or abandoned their aluminum conductor wire business since 1956 is offset by the entry of at least one new company and increase in their productive facilities by four others. The reduction in or abandonment of the manufacturing of these products were brought about principally by an inability to make a profit therein. This situation tends to confirm rather than to negate the existence of a vigorous competition in the products involved.

The plaintiff advances the argument that the acquisition has eliminated the "potential competition" which would have existed if Rome and Alcoa had separately expanded their facilities so as to include additional aluminum products or increased the production of the overlapping competing products. Like many business concerns, the defendants undoubtedly were constantly reviewing their product lines and exploring the possibilities of expansion. There is no evidence however that either had reached a firm conclusion that such an expansion had or would meet with the necessary approval of those in authority. Expansion from within rather than by acquisition may be preferable from the economist's point of view but the statute makes no such prohibition. The substantial lessening of competition, either actual or probable, is the test.

Considerable discussion is found in plaintiff's brief to the effect that this acquisition increased the problem of a "price squeeze" by the integrated producers or by Alcoa in particular. The discussion proceeds upon the theory that the price of primary aluminum to the fabri-

cators may be so increased that they will be unable to make a profit from sale of the end products. This court does not understand just how the acquisition could affect the problem. Rome was not a primary aluminum producer and its acquisition by Alcoa did not affect either the production or price of that product. Certainly the fabricator would like to buy his basic material as cheap as possible. This contention ignores the competition between primary aluminum producers and seems to assume without evidence to support it that such producers will abandon by an unconscionable pricing arrangement the market for primary aluminum and be content to sell only the end product. This overlooks entirely the present competitive situation among primary aluminum producers, the government required allotment of primary aluminum, and the availability of Canadian and foreign intermediate aluminum products. The argument is purely speculative and without evidence to support it.

Although the above discussion applies particularly to the three alleged aluminum conductor lines of commerce, the factors considered would also apply to aluminum ingot and rod used in the production of aluminum conductor wire and cable and to service drop cable which are urged as proper lines of commerce here by the plaintiff. No separate discussion of the competitive effect of the acquisition upon those two lines of commerce is necessary. While service drop is made with either an aluminum or copper conductor, the aluminum type presently predominates. The ease of entry into the business of manufacturing of service drop and the evidence that the Alcoa-Rome share of the market in insulated or covered aluminum conductor, which includes aluminum conductor service drop, has diminished since the acquisition, in particular prompts the conclusion that the acquisition does

not violate the statute insofar as the service drop and aluminum ingot may be involved.

The competitive effect of the acquisition in the three principal conductor (aluminum and copper) lines of commerce is not particularly stressed in the plaintiff's briefs or argument. The market shares of Alcoa and Rome therein are not impressive. Alcoa's higher percentage of the market in conductor wire and cable, bare, is made up of ACSR and bare aluminum cable which comprises all but one-tenth of one percent of its market share. Rome's share in the same item (lacking one-tenth of one percent, is made up of bare conductor copper wire and cable which are not competitive with ACSR as indicated in the discussion of ACSR as an appropriate line of commerce. There is no evidence of post-acquisition trends in the lines now considered. Likewise there is no evidence that the market, broadened by the inclusion of the competition afforded by the over two-hundred wire and cable producers (both aluminum and copper), will suffer actual or probable anti-competitive effects. There is evidence that such market comprises many strong and vigorous competitors. Alcoa obtained by the acquisition a diversification of its product line by the addition of Rome's copper wire and cable products. Rome however remains as the same source of supply of such products. Considering the same factors discussed herein and applying same to the items presently referred to leads to the conclusion that the statute is not violated as to the three conductor lines of commerce referred to above.

The approach to the consideration of the competitive effect of acquisition upon the conduit lines of commerce is handicapped by the absence of reliable market data. The Brown Shoe case opinion, in referring to the Congressional intent, uses the language

"demonstrable anticompetitive effects" as the type of mergers to be invalidated by the statute. Prior to the acquisition, Alcoa manufactured only aluminum conduit, Rome only steel. We have no evidence of the pre-acquisition share of either company in the market. We do have a hesitating and inconclusive estimate of Rome sales in the eleven western states which is rejected as a proper geographic market. The available post-acquisition data lacks the reliability upon which a demonstrable anticompetitive effect may rest. In 1960, the Bureau of the Census compiled figures that defendants' market share of conduit, both steel and aluminum, was 6.9%. This percentage was allocated 3.4% to Alcoa and 3.5% to Rome. The same report attributes the defendants' combined share of aluminum conduit at 26.5%. The above was the first such survey made by the Bureau and forms for same were sent only to those who designated themselves as producers of conduit in 1958 and 1959. The evidence shows that at least three aluminum producers entered the conduit field in the 1958–1960 time period.

Again plaintiff appears to stress the status of the defendants in the aluminum conduit line as having anticompetitive effects. Although aluminum conduit has been rejected as a relevant line of commerce here, brief comment will be made relative thereto. Entry to the aluminum conduit market requires only an outlay of ten to fifteen thousand dollars by those producers owning extruding equipment. In 1950, there were fifty such owners. The number increased to one hundred and ten in 1955 and to one hundred thirty-three in 1960. The ease of entry is further corroborated by the substantial number of new producers of aluminum conduit in recent years. This is due to the increased demand for the product and provides an active competitive market therein. There is a failure

of proof to show that the statute is violated by the acquisition as to either of the conduit lines of commerce as claimed by the plaintiff.

Using the pragmatic practical approach, an appraisal of the acquisition here involved designates same as the combination of an aluminum and an essentially copper manufacturing company. Such an acquisition implies advantages to the acquiring company. Such advantages are not to be condemned unless they portend or approach monopoly proportions. It is the loss to competition rather than the advantage gained that invokes the statute here. Alcoa gained an increase in its scientific knowledge and ability in insulating techniques and a diversification of its line of salable products. This would seem to be a legitimate end in the face of its declining market. There is less need than usual to speculate here upon the effect of the acquisition upon competition. Not only do we have industry evidence as to the actual effect from competitors and purchasers but we also have the factual results of almost three years of market experience. After consideration of all of the evidence offered herein, it is concluded that the acquisition by Alcoa of the capital stock of Rome has not been shown to be in violation of Section 7 of the Clayton Act; that the claim of the complaint has not been established and that same should be dismissed.

This opinion, together with the Findings of Fact and Conclusions of Law, to be filed herewith, will constitute the Findings and Conclusions of this court and judgment is directed accordingly.

So ordered.

STEPHAN W. BRENNAN,
United States District Judge.

APPENDIX B

United States District Court
Northern District of New York

Civil No. 8030

UNITED STATES OF AMERICA, PLAINTIFF

against

ALUMINUM COMPANY OF AMERICA AND
ROME CABLE CORPORATION, DEFENDANTS

The Findings of Fact and Conclusions of Law, set out below, together with the opinion, filed herewith, will constitute the decision in this case.

Findings of Fact

1. The defendants, Aluminum Company of America and Rome Cable Corporation, hereinafter referred to as Alcoa and Rome, maintain offices, transact business and are found within the Northern District of New York.

2. The defendant Alcoa is a corporation organized and existing under the laws of the State of Pennsylvania, with its principal office in Pittsburgh, Pennsylvania.

3. Alcoa is an integrated aluminum producer engaged in the manufacture and sale of primary aluminum, intermediate aluminum products, and various end products. It manufactures these products in several states and sells and ships such products throughout the United States in interstate commerce.

4. The defendant Rome is a wholly owned subsidiary of Alcoa, organized and existing under the laws of the State of Delaware, with its principal office at Rome, New York. It was organized by Alcoa for the purpose of holding the assets of its predecessor, also called Rome Cable Corporation, a New York corporation.

5. Rome manufactures, among other products, copper rod, electrical wire and cable, conduit and cable trough and cable installation devices. It manufactures these products in several states and sells and ships them in interstate commerce to its customers located in many states of the United States.

6. On March 31, 1959, defendant Alcoa acquired by stock transfer all of the assets of Rome-New York. Title to such assets was taken by the defendant Rome (Delaware) which also assumed Rome-New York's liabilities.

7. Alcoa's purpose in acquiring Rome was to acquire the ability to manufacture the more complicated insulated wire and cable products and diversify its operations. Rome's manufacture of aluminum products did not induce said acquisition.

8. In its search for a suitable company, Alcoa in 1958 retained the services of Ebasco Services, Inc. Ebasco was advised that Alcoa's purpose was to secure know-how in the insulating field.

9. While Alcoa considered other insulating companies, Rome was its first choice. This preference arose principally from the fact that Rome's personnel and organization were well and favorably known to Alcoa through their mutual association in a "tolling arrangement" entered into in 1952.

10. In the course of negotiations with Rome, Alcoa made it clear that, if acquired, Rome would operate as a separate division with a high degree of autonomy

and increased responsibility with regard to the sale of wire, cable and conduit products.

11. The evidence does not establish that Alcoa's acquisition of Rome was part of a continuing program contemplating future expansion through mergers or acquisitions in wire and cable, conduit, or any related field.

12. Alcoa mines and processes bauxite, refines bauxite into alumina, and smelts alumina into aluminum. The aluminum, so produced, is sold either in alloyed or unalloyed form, as ingot, or is used by Alcoa in its own fabrication of a wide variety of semi-finished and finished products. Among the products fabricated by Alcoa are sheet and plate, extrusions, castings, forgings, wire, rod and bar, electrical conductors and accessories, conduit, foil, tubing, rivets and screw machine products, closures, and powder and paste.

13. Prior to the acquisition of Rome, Alcoa's participation in the electrical wire and cable field was limited to the manufacture and sale of bare all-aluminum cable, bare aluminum conductor steel reinforced (ACSR), and polyethylene covered line wire and multiplex cable. It also sold neoprene covered line wire and multiplex cable manufactured for it by Rome. Alcoa made no electrical wire and cable products using copper as the conductor; nor did it make any of the more complicated insulated constructions, such as, among others, building wire, power cable, control cable, and magnet wire.

14. Bare wire and cable products constituted the great preponderance of Alcoa's sales in the electrical wire and cable field. In 1958, out of Alcoa's total conductor wire and cable shipments of 62.9 million pounds, ACSR and bare aluminum cable amounted to 56.9 million pounds, or more than 90 percent of the total.

15. While Alcoa continues to be the leading United States producer of primary aluminum and fabricated aluminum products, its position has declined markedly in recent years (Opinion, page 11).

16. Prior to the acquisition, Rome was primarily a manufacturer of electrical wire and cable. It had three manufacturing plants located at Rome, New York; Torrance, California; and Collegeville, Pennsylvania. It produced and sold bare wire and cable and a diversified line of insulated wire and cable products; it manufactured copper and aluminum rod for use in its own operations and for sale to other manufacturers; and it produced copper rod and certain wire and cable products on a toll basis using materials supplied by others. In addition, at its plant in Torrance, California, Rome manufactured steel rigid conduit and electrical metallic tubing (commonly referred to as EMT) and mechanical steel tubing. At its Cope Division plant in Collegeville, Pennsylvania, it manufactured a line of cable supporting systems, including cable trough and trays. In calendar year 1958, Rome's sales (exclusive of toll conversion) in its major product categories were approximately as follows: Wire and cable, $23.4 million; rod, 4 million (includes aluminum rod sales of $128 thousand); conduit (rigid and EMT) $6.5 million; and, Cope products, $1.3 million.

17. Rome's primary emphasis in the wire and cable field was on the manufacture of insulated wire and cable products. It was a skilled manufacturer of the more complicated insulated products, and had in this area technical ability that Alcoa lacked.

18. Copper was by far the predominant metal used by Rome in its wire and cable operations. Its importance is shown by the fact that in the five years prior to the acquisition copper represented more than

90 percent of Rome's combined copper and aluminum purchases, and copper products accounted for more than 90 percent of its wire and cable sales revenue.

19. On March 7, 1952, Alcoa and Rome entered into a continuing agreement, referred to as a "tolling agreement", whereby Rome would cover bare aluminum wire furnished by Alcoa for the account of Alcoa. The agreement provided that Rome would cover or insulate bare aluminum wire with neoprene or polyethelene insulating materials. The arrangement permitted Alcoa to take advantage of the superior "know-how" of Rome in the matter of covering of bare wire products some of which were sold in competition with Rome.

20. Prior to the acquisition only five products were manufactured and sold by both Alcoa and Rome. These products can be identified as follows: (a) Aluminum Conductor Steel Reinforced (ACSR) and Aluminum Cable, Bare; (b) Covered Line Wire (also referred to as Weather-proof). This product consists of a copper or aluminum conductor covered with a synthetic rubber (neoprene), thermo-plastic (Polyethylene), or fibrous covering; (c) Multiplex Cable; (d) Conduit; (e) Aluminum Redraw Rod. Aluminum redraw rod is an intermediate aluminum product used in the fabrication of aluminum wire.

21. Prior to the acquisition, defendants manufactured and sold the overlap products refered to in Finding 20 as follows:

(a) ACSR and Aluminum Cable, Bare. Alcoa made ACSR and aluminum cable, bare, in a full range of sizes; Rome made only a limited range of sizes. Alcoa's total sales amounted to approximately $23,000,000 in 1958 of which approximately $8,000,000 represented sales in the size range Rome was able to make.

Rome's sales in 1958 amounted to approximately $240,000.

(b) Covered Line Wire and Multiplex Cable. Alcoa did not sell these products until 1952 when it entered into a tolling arrangement with Rome under which Rome manufactured polyethylene and neoprene covered aluminum line wire and multiplex cable which Alcoa sold for its own account. In 1956, Alcoa started to produce its own polyethylene covered line wire and multiplex cable, and at the time of the acquisition it had under consideration a plan to install neoprene covering facilities. Rome produced covered line wire using copper or aluminum conductors and having either neoprene, polyethylene or fibrous covering. It also produced multiplex cable using copper and aluminum insulated conductors. Alcoa's covered line wire and multiplex sales in 1958 amounted to approximately $4,200,000; Rome's sales in that year, including both copper and aluminum, were approximately $3,700,000.

(c) Conduit. Prior to the acquisition, Rome manufactured steel conduit, both rigid and EMT; it made no aluminum conduit. Alcoa manufactured rigid aluminum conduit and aluminum EMT; it made no steel conduit. Alcoa's sales of aluminum conduit in 1958 amounted to approximately $525,000; Rome's sales of steel conduit amounted to about $6,500,000.

(d) Aluminum Redraw Rod. Prior to the acquisition Alcoa produced aluminum redraw rod on its rolling mills and Rome produced such rod by the Properzi method. Alcoa made sales of aluminum rod to other manufacturers of approximately $2,500,000 in 1958. Most of Rome's aluminum rod was consumed in its own operations, its sales to other manufacturers in 1958 amounting to only about $128,000.

22. Alcoa's net sales and operating revenues in 1958 amounted to approximately $753,000,000. Its sales in the overlap area, consisting of ACSR and aluminum cable, bare (sizes 336,400 cir. mils. and smaller), covered line wire and multiplex cable, conduit and aluminum rod, totalled approximately $15,300,000, or about 2 percent of its net sales and operating revenues. The ratio between Alcoa's overlap and total sales for earlier years is approximately the same.

LINES OF COMMERCE

Explanation

Items 1–10, set forth on pages 13 and 14 of the filed opinion, detail the lines of commerce urged by the plaintiff as properly established in this action. Reference to same is made here without the repetition thereof. The Findings below are intended to supplement those made in the discussion of the various items as same appears in pages 14 to 19 of said opinion.

Aluminum conductor lines

23. Item 1, aluminum conductor wire and cable, is a composite of Items 2 and 3 and is not a separate and distinct line of commerce here. (See Opinion, page 15.)

24. Item 2, bare aluminum cable and ACSR (aluminum covered steel reinforced) have virtually displaced bare copper cable for use in overhead transmission lines. They are generally recognized as a separate product classification and the manufacture and sale of these products require special stranding equipment and designing skill. The parties have agreed that the manufacture and sale of bare aluminum cable and ACSR may be treated as a separate line of commerce for the purpose of this case and it is so found.

25. Item 3, insulated or covered aluminum wire and cable. The wire and cable industry defines insulated wire and cable products according to function or type, not according to the metal used as conductor.

26. Manufacturers of insulated wire and cable products regard themselves as insulators of wire and cable products, not as insulators of copper wire and cable on the one hand, or of aluminum wire and cable on the other.

27. The evidence establishes that wire and cable fabricators can draw, strand and insulate copper and aluminum interchangeably on the same equipment and with the same personnel. The only change required is the use of a different lubricant in the drawing operation and a cleanup of the drawing machine when it is to be used on a different metal.

28. Since copper and aluminum products are completely interchangeable from a performance standpoint, utility companies choose between copper and aluminum insulated or covered overhead products solely on the basis of economics. The decision requires evaluation of numerous economic factors in addition to the cost of the wire or cable itself.

29. While aluminum is used in various insulated wire and cable products, most such products, accounting for more than $1,250,000,000 out of total 1958 insulated wire and cable shipments of $1,320,000,000, are predominantly made from copper. Aluminum has gained its greatest acceptance in the insulated or covered field in products used in the overhead distribution of electric power, principally, covered line wire (weatherproof) and multiplex cable. Even with respect to these products, however, substantial quantities are sold using copper as the conductor.

30. Item 4. Aluminum ingot and rod used in the production of aluminum conductor wire and cable is a separate line of commerce. (See Opinion, page 16.)

Conductor wire and cable lines

31. Item 5, Conductor wire and cable (aluminum and copper) as a line of commerce corresponds to the electrical wire and cable industry. It includes the manufacture and sale of all bare and insulated or covered electrical wire and cable products, whether made from copper or aluminum. There is a generally recognized electrical wire and cable industry and the parties agree that conductor wire and cable may be treated as a line of commerce for the purpose of this case.

32. Item 6, Conductor wire and cable, bare (aluminum and copper), which consists of ACSR and aluminum cable, bare; bare conductor aluminum wire; and bare conductor copper wire and cable, is not a separate line of commerce here (Opinion, page 17).

33. Item 7, Wire and cable, insulated or covered (aluminum and copper) line of commerce consists of the manufacture and sale of all insulated or covered wire and cable products, both copper and aluminum and it is agreed that same constitutes a separate line of commerce here.

34. By Item 8, Service drop cable (aluminum and copper), plaintiff refers exclusively to multiplex cable, both copper and aluminum. The evidence fails to establish that the manufacture and sale of multiplex cable is a line of commerce separate and distinct from the manufacture and sale of other insulated or covered wire and cable products.

35. Multiplex cable is only one of many products of the insulated wire and cable industry. It is one of the simplest of such products, being nothing more than one or more simple insulated conductors twisted together with a bare cable. It requires no unique production facilities.

36. Virtually any manufacturer of insulated wire and cable products is capable of making multiplex

cable. A company equipped to manufacture building wire, power cable, control cable, or practically any other insulated wire and cable product can use its existing machinery and personnel to manufacture multiplex cable. Such companies constantly review their product lines, and switch from one product to another whenever it is profitable to do so.

37. Multiplex cable is not used exclusively as a service drop from the utility pole to the building, nor is it the only product used for that function.

(a) Weatherproof line wire in the form of two or three separate wires is extensively used for service drop purposes.

(b) Other cable, including Type K and Type SD cable, are used for service drop purposes.

(c) In addition to being used for service drop purposes, multiplex cable is also used as a self-supporting secondary line. The IPCEA-NEMA Standards Publications covering multiplex cable define the product as "neutral-supported secondary and service drop cables."

38. Item 9, Conduit (aluminum and steel). The parties are agreed that the manufacture and sale of conduit, both aluminum and steel, may be treated as a line of commerce for the purpose of this case.

39. The evidence does not establish that the manufacture and sale of aluminum conduit is a separate line of commerce.

40. Steel conduit and aluminum conduit are functionally interchangeable. Both are used to enclose and protect electrical wires and cables against external mechanical and chemical abuse. The evidence establishes that steel and aluminum conduit are in direct and substantial competition with each other.

41. The pricing of steel and aluminum conduit is directly related. Changes in the price of steel con-

duit cause corresponding changes in the price of aluminum conduit, and vice versa.

42. Aluminum conduit manufacturers meet strong and vigorous competition from the manufacturers of steel conduit, and vice versa.

THE GEOGRAPHIC MARKET

43. The parties agree that the United States as a whole is a proper geographic market or "section of the country" within which the impact of the acquisition may be measured as to all of the lines of commerce, whether or not allowed herein.

44. It has not been established that the eleven western states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming) constitute an appropriate geographic market or "section of the country" with respect to either the conduit or the alleged aluminum conduit lines of commerce.

COMPETITIVE EFFECT IN THE CLAIMED LINES OF COMMERCE

45(a). Statistics showing Alcoa and Rome market shares in the aluminum conductor lines of commerce, both before and since the acquisition, are set forth in the following tables.

ACSR and Aluminum Cable, Bare

Year	Alcoa	Rome
	Percent	*Percent*
1954	48.4	0.2
1955	43.2	.1
1956	29.8	.3
1957	32.3	.3
1958	32.5	.3
1959	31.4	.7
1960	30.6	.1
1961	26.1	----------

Aluminum Wire and Cable, Insulated or Covered

Year	Alcoa	Rome
	Percent	*Percent*
1954	10.0	6.9
1955	10.8	6.9
1956	8.5	6.2
1957	9.4	5.3
1958	11.6	4.7
1959	12.2	4.4
1960	10.6	4.2
1961	7.3	5.7

Aluminum Conductor Wire and Cable

Year	Alcoa	Rome
	Percent	*Percent*
1954	42.8	1.1
1955	36.6	1.5
1956	24.8	1.7
1957	27.4	1.4
1958	27.8	1.3
1959	28.9	1.5
1960	25.4	1.2
1961	23.8	1.3

45(b). The relative market position of Alcoa and Rome combined in each of the three alleged aluminum conductor lines of commerce declined substantially both before and since the acquisition.

Alcoa-Rome Market Percentages

	1954	1958	1961	Decline percentage points		
				1954–58	1958–61	1954–61
ACSR and Aluminum Cable, Bare	48.6	32.8	26.1	15.8	6.7	22.5
Aluminum Wire and Cable, Insulated or Covered	16.9	16.3	13.	.6	3.3	3.9
Aluminum Conductor Wire and Cable	43.9	29.1	24.8	14.8	4.3	19.1

46. There is no significant pattern or trend of mergers with respect to the manufacture and sale of aluminum conductor wire and cable products.

47. In addition to Alcoa's acquisition of Rome, the only acquisitions which relate in any way to aluminum conductor wire and cable products were Olin-

Mathieson Chemical Corporation's acquisition of Southern Electrical Corporation in early 1957, Kaiser Aluminum and Chemical Corporation's acquisition of the Bristol plant of United States Rubber Corporation in early 1957, the Reynolds Metals Company's acquisition of the machinery of John A. Roebling's Sons Division of the Colorado Fuel and Iron Corporation in 1961.

48. Market statistics reflecting the market shares of the acquiring and acquired companies, both before and since the acquisitions are set forth in the following table:

Percentage Participation in Aluminum Conductor Wire and Cable

	1956	1956	1957	1958	1959
Southern Electrical	5.4	3.1			
Olin-Mathieson	.0	.0			
Combined Post-Acquisition			5.6	4.5	5.0
Kaiser	21.9	19.5			
U.S. Rubber	.8	.8			
Combined Post-Acquisition			18.8	23.1	19.0
Reynolds	8.0	8.1	9.0	10.4	10.8
Roebling	.0	.0	.0	.0	.1

49. The evidence fails to establish that Olin's acquisition of Southern and Kaiser's acquisition of the Bristol Plant of U.S. Rubber has hurt or will adversely affect competing manufacturers of aluminum wire and cable products.

50. No competing manufacturer of aluminum conductor wire and cable products has complained that this acquisition has or may adversely affect his competitive position. On the contrary, representatives of Central Cable, Southwire, General Cable, Essex, Nehring and other wire and cable manufacturers stated that in the three years since the acquisition there had been no adverse effect. No manufacturer-witness testified that he foresaw any future adverse effect, as a result of this acquisition.

51. The evidence fails to establish that Alcoa's ability to offer a broad line of insulated products, including those made from copper, gives it any substantial competitive advantage in the sale of aluminum wire and cable products.

52. The evidence establishes that prior to the acquisition, there was not substantial or vigorous competition between Alcoa and Rome in the sale of aluminum conductor wire and cable products. Alcoa's loss of business in such products from 1957 to 1959 was insignificant.

53. In regard particularly to the overlap wire and cable products, Rome was not an aggressive price competitor. It adhered to a policy of not going below the prices of its competitors. It rarely participated in competitive bidding for ACSR; on insulated or covered products, it would generally quote on the basis of its published price schedules. Rome's adherence to this policy is established by the testimony of utility purchasing agents who stated, without contradiction that Rome was not an initiator of price reductions.

54. As recently as 1951, there were only four manufacturers of insulated wire and cable using aluminum conductor. The evidence establishes that as of April 1, 1961, there were at least 29 producers of insulated aluminum wire and cable.

55. Companies equipped to manufacture more complicated insulated copper wire and cable products, such as building wire, power cable and control cable, can readily manufacture the more simple products such as line wire and multiplex cable, using either copper or aluminum conductors, with its existing machinery and personnel.

56. The numerous manufacturers of insulated wire and cable constantly review their product lines and

switch readily from one product or conductor metal to another in accordance with market conditions. Such manufacturers not presently making insulated or covered aluminum products have considered whether or not to make such products, and would make them if profitable orders were obtained.

57. There has been substantial entry into the manufacture of ACSR and bare aluminum cable. Prior to 1940, Alcoa was virtually the only producer of these products; by 1950 there were 12 producers, most of whom were experienced copper wire and cable producers before getting into the ACSR field.

58. The evidence fails to establish or to permit the inference that any person has ceased or has been or probably will be deterred from entering into the manufacture and sale of aluminum conductor wire and cable products because of this acquisition.

59. Purchasers of the overlapping aluminum conductor products—ACSR and aluminum cable, bare, aluminum line wire, and aluminum multiplex cable—have not been and will not be adversely affected by the Rome acquisition.

60. Some of the utilities which formerly purchased from both Alcoa and Rome have sought to broaden the competitive base of their wire and cable purchasing. No difficulty has been encountered in expanding the supplier group.

61. Prior to the acquisition, Rome was a follower rather than an initiater of price reductions or concessions. It was rarely awarded business on the basis of competitive bidding.

62. The evidence establishes that there is vigorous competition among all manufacturers of aluminum conductor wire and cable products. The evidence fails to establish that any competitor of Alcoa and Rome, either integrated or non-integrated, has been or will be adversely affected by this acquisition.

63. Non-integrated manufacturers of aluminum conductor wire and cable products will not be deprived of a source of aluminum as a result of Alcoa's acquisition of Rome.

64. Substantial quantities of aluminum are available from foreign sources. Canadian production alone in 1960 amounted to more than 1.5 billion pounds, or more than 35 percent of total U.S. primary aluminum production. Such foreign aluminum is suitable for use by wire and cable fabricators and such fabricators have, in fact, purchased substantial amounts of foreign aluminum.

65. Alcoa's ability to supply non-integrated fabricators, including manufacturers of aluminum wire and cable will not be affected by the acquisition of Rome. It has operated below capacity since 1957.

The following table shows Rome's pre-acquisition purchases of aluminum.

[Thousands of pounds]

Year	Total U.S. primary aluminum production	Alcoa primary aluminum production	Rome primary aluminum purchases	Rome primary aluminum purchases	
				Percent of total U.S. primary aluminum production	Percent of Alcoa primary aluminum production
1954	2,921,130	1,331,874	1,611	0.1	0.1
1955	3,131,442	1,404,461	3,175	.1	.2
1956	3,357,608	1,512,275	5,288	.2	.3
1957	3,295,418	1,424,095	3,256	.1	.2
1958	3,131,114	1,061,734	3,129	.1	.3

Under provisions of supply contracts with the General Services Administration, Alcoa is obligated to make available to non-integrated fabricators approximately 150,000,000 pounds of aluminum each year through 1971. Similar obligations on the part of Kaiser, Reynolds, and Harvey, make available to

non-integrated users approximately 300,000,000 additional pounds of aluminum.

66. The acquisition of Rome by Alcoa will not bring about, enhance or aggravate any so-called "price squeeze" on non-integrated fabricators of aluminum wire and cable.

67. The evidence fails to establish that either Alcoa or Rome would have become a more significant factor in the manufacture and sale of aluminum wire and cable products if the acquisition had not occurred. Neither company had definite plans to expand its aluminum wire and cable production.

68. The following table sets forth Rome's copper and aluminum wire and cable sales during the five full years preceding the acquisition.

[Thousands of dollars]

Year	Copper wire and cable	Aluminum wire and cable	Total	Percent copper
1964	$27,142	$1,770	$28,912	93.9
1965	36,921	2,458	39,379	93.8
1966	39,119	3,646	42,765	91.5
1967	26,992	2,858	29,850	90.3
1968	21,291	2,191	23,482	90.7
1969 (1st Qr.)	5,891	509	6,400	92.0

69. The evidence establishes that there is vigorous competition in the manufacture and sale of aluminum wire and cable products, that both integrated and non-integrated companies participate therein, and that there has been no reduction in the vigor of such competition since the acquisition.

70. Since Rome was not a primary aluminum producer, Alcoa and Rome did not compete in the sale of aluminum ingot whether used in the production of aluminum conductor wire and cable or otherwise.

71. Rome sold only limited amounts of aluminum redraw rod, of which only a de minimis amount was sold for electrical conductor use.

(a) Rome's sales of aluminum rod and the amounts sold for non-conductor and for conductor use are set forth in the following table:

[Thousands of pounds]

Year	Total EC rod sales	Sold for non-conductor	Sold for conductor use
1955	5		5
1956	139	124	15
1957	418	341	77
1958	387	372	15

(b) In its biggest year, 1957, Rome's rod sales for conductor use amounted to only about 3/10 of one percent of aluminum bar and rod sold by domestic primary aluminum producers to non-integrated producers of conductor wire and cable in that year. In addition, at least one other non-integrated fabricator sold aluminum rod, so that Rome's sales would be an even smaller percentage of the total.

72. The evidence fails to establish that Rome probably would have become a more significant supplier of aluminum redraw rod to manfacturers of conductor wire and cable.

73. At the time of the acquisition and for several years prior thereto, Rome was producing its own aluminum redraw rod and purchased only de minimis amounts from others.

74. The evidence fails to establish that any competing supplier of aluminum ingot or rod has been or may be adversely affected by this acquisition.

75. The evidence fails to establish any reasonable probability that Alcoa's acquisition of Rome has or will substantially lessen competition or tend to create a monopoly in any of the alleged aluminum conductor lines of commerce.

76. The pre-acquisition market percentages of Alcoa and Rome are set forth in the following table, which gives figures for 1958:

[Thousands of dollars]

	Shipments	Percent of industry
Conductor wire and cable:		
Industry	1, 553, 955	
Alcoa	28, 521	1. 8
Rome	22, 001	1. 4
Alcoa-Rome	50, 522	3. 2
Conductor wire and cable, bare:		
Industry	232, 280	
Alcoa	24, 020	10. 3
Rome	4, 579	.2
Alcoa-Rome	28, 599	12. 3
Wire and cable, insulated or covered:		
Industry	1, 321, 675	
Alcoa	4, 501	.3
Rome	17, 422	1. 3
Alcoa-Rome	21, 923	1. 6
Service drop:		
Alcoa		10. 8
Rome		5. 1
Alcoa-Rome		15 9

77. Alcoa and Rome were not substantially competitive in the manufacture and sale of bare conductor wire and cable products.

Industry and Alcoa and Rome shipments of bare conductor (aluminum and copper) products for 1958 are shown in the following table:

[Thousands of dollars]

	Industry shipments	Alcoa		Rome	
		Shipments	Percent	Shipments	Percent
ACSR and aluminum cable, bare	202, 392	23, 883	10.2	258	0.1
Bare conductor aluminum wire	13, 395	137	.1		
Bare conductor copper wire and cable	156, 493			4, 553	1.9
	222, 280	24, 020	10.3	4, 811	2.0

78. Alcoa and Rome were not substantially competitive in the manufacture and sale of insulated or covered wire and cable products. Both before and since the acquisition, Rome has manufactured a relatively full line of insulated wire and cable products, chiefly made from copper. Alcoa's preacquisition participation in the insulated wire and cable field was limited to aluminum covered line wire and multiplex cable, amounting in 1958 to 3/10 of 1 percent of total insulated or covered wire and cable shipments.

79. Alcoa's acquisition of the assets of Rea Magnet Wire Company on January 18, 1960 is without significance to any issue in this case.

80. Since Alcoa sold only aluminum bare and insulated or covered wire and cable products, the facts found with respect to the alleged aluminum conductor lines of commerce are also pertinent to the broader conductor lines of commerce.

81. The electrical wire and cable industry, including both copper and aluminum products, is characterized by vigorous competition. Upwards of 200 companies manufacture and sell electrical wire and cable, among them being many strong, well-financed and highly reputable concerns.

82. The evidence fails to establish any trend toward concentration in the manufacture and sale of wire and cable products.

83. On the basis of 1958 Census of Manufactures data, Alcoa in 1958 had 10.8 percent and Rome 5.1 percent of total industry shipments of service drop cable. The Census figures cannot be taken as a reliable measure of industry shipments of service drop products since they do not include weatherproof wire used as service drop which is reported to Census under a different classification. There is no evidence as to the amount of weatherproof wire used as service drop.

84. There is no company that makes only multiplex cable. On the contrary, it is only one of numerous insulated wire and cable products made by insulating companies. It is among the simplest of such products, and any company equipped to manufacture any other insulated wire and cable product, can use its existing machinery and personnel to make multiplex cable.

85. The evidence establishes that manufacturers not presently making multiplex cable constantly review their product lines, have considered entering into the manufacture of multiplex cable, and would be capable of doing so if market conditions warranted.

86. Aluminum has gained greater acceptance in multiplex cable than in any other insulated product. Prior to the acquisition, Alcoa sold only aluminum multiplex cable and Rome's multiplex cable was approximately 80 percent aluminum. The same is true as to other insulators for which data are available. Accordingly, the facts established with respect to the lack of effect of this acquisition on competition in the aluminum conductor lines of commerce are pertinent here.

87. The evidence fails to establish any reasonable probability that Alcoa's acquisition of Rome has or will substantially lessen competition or tend to create a monopoly in any of the alleged conductor wire and cable lines of commerce.

Conduit

88. There is no reliable evidence as to the pre-acquisition market shares of either Alcoa or Rome with respect to conduit, both steel and aluminum, or aluminum alone.

Based upon a 1960 Bureau of the Census report, defendants' combined share of the total conduit market in 1960 was 6.9 percent. Based upon the same

report, their combined 1960 share of conduit, other than steel, including aluminum conduit, was 26.5 percent.

The evidence shows the above report is based upon a survey undertaken for the first time in 1960 and lacks conclusiveness.

89. The evidence fails to establish that the acquisition has eliminated substantial actual or potential competition between Alcoa and Rome in the manufacture and sale of conduit or aluminum conduit.

90. Prior to the acquisition, Alcoa made and sold only aluminum conduit and Rome made and sold only steel conduit.

91. Alcoa's sales of aluminum conduit in the area where Rome sold most of its steel conduit were de minimis, ranging between $10,000 and $54,000 per year in the five years preceding the acquisition.

92. There are no substantial barriers to entry. Any company having extruding equipment can enter the aluminum conduit field by adding equipment needed for threading, labeling and lubricating which can be purchased for from $10 to $15 thousand.

93. The number of companies owning extrusion equipment has increased from 39 in 1950 to 110 in 1955, and to 133 in 1960.

94. It has not been shown that any company has been or will be deterred from entering the conduit field as a result of the Rome acquisition.

95. It has not been shown that purchasers of conduit or aluminum conduit have been or may be adversely affected in any way by Alcoa's acquisition of Rome.

96. It has not been established that any non-integrated manufacturer of aluminum conduit has been or may be adversely affected by this acquisition.

97. The decline in aluminum conduit prices since about 1958 is directly related to the competitive contest between steel and aluminum conduit.

98. The pricing of aluminum conduit to be competitive with steel was initiated by Hazelwood, a non-integrated producer, in about 1958 and continues as the result of such competition.

99. There is vigorous competition in the manufacture and sale of conduit and aluminum conduit. This competition has increased appreciably in recent years owing to the wider use and acceptance of aluminum conduit.

100. The evidence fails to establish any reasonable probability that Alcoa's acquisition of Rome has or will substantially lessen competition or tend to create a monopoly in the manufacture and sale of either aluminum conduit or conduit, including both steel and aluminum, in either the United States or the eleven western states.

CONCLUSIONS OF LAW

1. This Court has jurisdiction of the parties to and the subject matter of this action.

2. The manufacture and sale of each of the following products or product groups constitutes an appropriate line of commerce within the meaning of Section 7 of the Clayton Act:

Item 2. ACSR and aluminum cable, bare.
Item 4. Aluminum ingot and rod used in the production of aluminum conductor wire and cable.
Item 5. Conductor wire and cable (aluminum and copper).
Item 7. Wire and cable, insulated and covered (aluminum and copper).
Item 9. Conduit (aluminum and steel).

3. Plaintiff has failed to prove by a preponderance of the evidence that the manufacture and sale of any of the following products or product groups con-

stitutes an appropriate line of commerce within the meaning of Section 7 of the Clayton Act:

Item 1. Aluminum conductor wire and cable.
Item 3. Insulated or covered aluminum wire and cable.
Item 6. Conductor wire and cable, bare (aluminum and copper).
Item 8. Service drop cable (aluminum and copper).
Item 10. Aluminum conduit.

4. The United States as a whole constitutes a section of the country within the meaning of Section 7 of the Clayton Act with respect to each of the ten lines of commerce alleged in this case.

5. Plaintiff has failed to prove by a preponderance of the evidence that the eleven western state area, consisting of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming, is an appropriate section of the country within the meaning of Section 7 of the Clayton Act with respect to either the conduit or the aluminum conduit line of commerce.

6. Plaintiff has failed to prove by a preponderance of the evidence that the effect of Alcoa's acquisition of the assets and properties of Rome may be substantially to lessen competition or to tend to create a monopoly in any line of commerce in any section of the country.

7. Plaintiff has failed to prove by a preponderance of the evidence that the effect of Alcoa's acquisition of the assets and properties of Rome may be substantially to lessen competition or to tend to create a monopoly in any of the following lines of commerce, either in the United States as a whole or in the eleven western states (assuming that area to be an appropriate section of the country):

Item 2. ACSR and aluminum cable, bare.
Item 4. Aluminum ingot and rod used in the production of aluminum conductor wire and cable.
Item 5. Conductor wire and cable (aluminum and copper).
Item 7. Wire and cable, insulated and covered (aluminum and copper).
Item 9. Conduit (aluminum and steel).

8. Assuming each of the following to have been established as an appropriate line of commerce, plaintiff has failed to prove by a preponderance of the evidence that the effect of Alcoa's acquisition of the assets and properties of Rome may be to substantially lessen competition or to tend to create a monopoly therein, either in the United States as a whole or in the eleven western states (assuming that area to be an appropriate section of the country):

Item 1. Aluminum conductor wire and cable.
Item 3. Aluminum wire and cable, insulated or covered.
Item 6. Conductor wire and cable, bare (aluminum and copper).
Item 8. Service drop cable (aluminum and copper).
Item 10. Aluminum conduit.

9. Plaintiff has failed to prove by a preponderance of the evidence that the acquisition of the assets and properties of Rome by the defendant Alcoa violates Section 7 of the Clayton Act.

10. Plaintiff has failed to establish the claims or cause of action alleged in the complaint and the relief requested therein shall be and hereby is denied and this suit dismissed, and

Judgment is directed accordingly.

STEPHEN W. BRENNAN,
U.S. District Judge.

Dated: January 28, 1963.

APPENDIX C

United States District Court
Northern District of New York

Civil No. 8030

UNITED STATES OF AMERICA, PLAINTIFF

v.

ALUMINUM COMPANY OF AMERICA AND ROME CABLE CORPORATION, DEFENDANTS

Additional Findings of Fact

Pursuant to a motion made by the defendants under the provisions of 52(b) Federal Rules of Civil Procedure, the court makes the additional Findings of Fact which are set out below, same to be considered as supplemental to the Findings and Conclusions previously filed.

1. Because of the closer manufacturing controls required, E.C. grade aluminum, like other alloys, is sold at a premium; however, the price of E.C. aluminum ingot changes directly and correspondingly with the basic price of aluminum ingot.

2. In 1956, the year of Rome's greatest primary aluminum purchases, such purchases amounted to less than 7/10 of 1 percent of total primary aluminum sold to non-integrated fabricators.

3. In view of the ability of aluminum producers to make E.C. and other types and alloys of aluminum interchangeably in accordance with orders received,

there is no basis for an inference that other producers will be foreclosed from a substantial market for primary aluminum as a result of Alcoa's acquisition of Rome.

4. Item 1, aluminum conductor wire and cable, excludes insulated copper products and therefore does not include all wire and cable products for which there is reasonable interchangeability of use or cross-elasticity of demand. In addition, the evidence fails to establish that the combination of bare and insulated aluminum wire and cable, considered as a whole, is generally recognized in the industry as a separate economic entity or submarket; nor, in view of facts found with respect to Item 3, insulated or covered aluminum wire and cable (Findings 25 to 29, inclusive; Opinion pp. 14–15) does the evidence establish that aluminum conductor wire and cable, including both bare and insulated products, has competitively significant peculiar characteristics and uses, is made on unique production facilities, or is sold by specialized vendors to a distinct class of customers.

STEPHEN W. BRENNAN,
United States District Judge.

Dated: February 21, 1963.

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Supreme Court of the United States

OCTOBER TERM, 1963

No. 204

UNITED STATES OF AMERICA, *Appellant*

v.

ALUMINUM COMPANY OF AMERICA AND
ROME CABLE CORPORATION

On Appeal from the United States District Court for the Northern District of New York

MOTION TO AFFIRM

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PRESS OF BYRON S. ADAMS, WASHINGTON, D. C.

INDEX

	Page
Statement	2
1. The Background of the Acquisition	2
(a) The Contrast Between Alcoa and Rome	3
(b) Alcoa's Declining Market Position	4
(c) Alcoa's Market Disadvantage	5
2. The Proceedings in District Court	6
Argument	8
I. No Substantial Question is Presented by Appellant's Contentions on the Competitive Effect Issue	9
A. Market Share and Concentration Statistics Do Not Establish the *Prima Facie* Illegality of This Acquisition	11
(1) Aluminum Wire and Cable, Insulated or Covered	11
(2) Aluminum Conductor Wire and Cable	14
B. The Market and Historical Facts Affirmatively Establish the Absence of a Probable Anti-Competitive Effect	17
(1) The Absence of Significant Competition Between Alcoa and Rome	17
(2) The Lack of Effect on Competitors	18
(3) Ease of Entry	19
(4) The Absence of a Significant Merger Trend	19
(5) The Lack of Anti-Competitive Purpose	21
(6) The Lack of Effect on Consumers	21

Page

II. No Substantial Question is Presented by Appellant's Contentions on the Line of Commerce Issue 22

A. The Court's Line of Commerce Findings 24

B. Appellant's Contentions on Line of Commerce Are Without Substance 26

Conclusion 32

CITATIONS

CASES:

Brown Shoe v. *United States*, 370 U.S. 294 ..2, 6, 7, 10, 19, 21, 23, 24, 26, 27, 29

Tampa Electric Company v. *Nashville Coal Company*, 365 U.S. 320 (1961) 12

United States v. *E. I. du Pont de Nemours & Co.*, 353 U.S. 586 (1957) 23

United States v. *The Philadelphia National Bank, et al.*, ... U.S. .... (1963); 31 L.W. 4650 .....2, 10, 11, 12, 13, 21

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Federal Rules of Civil Procedure, Rule 52(a) 2

S. Rep. 1775, 81st Cong., 2d Sess. 20

IN THE

Supreme Court of the United States

OCTOBER TERM, 1962

No. 1176

UNITED STATES OF AMERICA, *Appellant*

v.

ALUMINUM COMPANY OF AMERICA AND
ROME CABLE CORPORATION

On Appeal from the United States District Court for the Northern District of New York

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MOTION TO AFFIRM

Pursuant to Rule 16, Paragraph 1(c), of the Revised Rules of this Court, appellees Aluminum Company of America and Rome Cable Corporation move that the judgment of the district court be affirmed on the ground that the questions on which decision of the cause depends are so unsubstantial as not to need further argument.

STATEMENT

This is a direct appeal from the judgment of the district court holding that the acquisition of Rome Cable Corporation ("Rome") by Aluminum Company of America ("Alcoa") did not violate Section 7 of the Clayton Act, 15 U.S.C. 18. The Government does not challenge the court's findings of fact as "clearly erroneous" (Rule 52(a), Federal Rules of Civil Procedure) but urges that its ultimate findings on the line of commerce and competitive effect issues rested upon an erroneous interpretation of the statute (J.S., 14). It is appellees' position that the court, guided by this Court's decision in *Brown Shoe* v. *United States*, 370 U.S. 294 (1962), correctly applied the statute to the facts before it, that the court's reasoning is fully supported by both the *Brown Shoe* and *Philadelphia Bank*[1] cases, that no novel question of law is presented, and that the judgment should, therefore, be affirmed without further briefing and argument.

1. THE BACKGROUND OF THE ACQUISITION

The court described this acquisition as "the combination of an aluminum and an essentially copper manufacturing company" (App. A, 37a),[2] and found that it was undertaken by Alcoa "in the face of its declining market" (*ibid.*) for the purpose of obtaining insulating know-how and diversification needed "to overcome a market disadvantage . . ." (App. A, 22a). These facts, not challenged by appellant, provide the background for the acquisition.

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[1] *United States* v. *The Philadelphia National Bank, et al.* .... U.S. .... (1963); 31 L.W. 4650.

[2] All references to the district court's opinion and findings are to Appendices A, B and C to the Jurisdictional Statement.

(a) The Contrast Between Alcoa and Rome

Alcoa is an integrated producer of aluminum and aluminum products (App. B, Fdgs. 3 and 12). Prior to acquiring Rome, its participation in the electrical wire and cable field was limited to bare aluminum conductor-steel reinforced ("ACSR"), bare aluminum cable, and two simple insulated or covered products, weatherproof line wire and multiplex cable. Bare aluminum wire and cable, including ACSR, was by far Alcoa's main conductor product, accounting in 1958 for more than 90 per cent of its total wire and cable sales (App. B, Fdg. 14). It made no product using copper conductor, did not make or sell any of the more complicated types of insulated wire and cable (App. B, Fdg. 13), and accounted for only .3 per cent of total 1958 insulated wire and cable shipments (copper and aluminum) (App. A, 26a; App. B, Fdg. 76).

Rome was and is primarily a manufacturer of electrical wire and cable (App. B, Fdg. 16).[3] Its primary emphasis was on the manufacture of insulated products, and it had the capability, which Alcoa lacked, to manufacture a broad range of complex electrical cables (App. B, Fdg. 17). Copper was by far the predominant metal used by Rome, accounting in the five years preceding the acquisition for more than 90 per cent of its combined copper and aluminum purchases and for from 90.3 per cent to almost 94 per cent of its total wire and cable sales revenue (App. B, Fdgs. 18 and 68). Rome's share of total 1958 insulated wire and cable shipments (copper and aluminum) amounted to 1.3 per cent (App. B, Fdg. 76).

[3] It produced these products only at its Rome, New York, plant; the Collegeville, Pennsylvania, and Torrance, California, plants referred to in the Jurisdictional Statement (p. 4) have never produced wire and cable products (App. B, Fdg. 16).

With respect to ACSR and bare aluminum cable—by far Alcoa's principal wire and cable product—Rome's total 1958 sales were approximately $240,000, representing about .3 per cent of industry sales and about 1 per cent of Rome's total wire and cable sales (App. B, Fdgs. 16, 21, 45(a)). With respect to aluminum weatherproof line wire and multiplex cable—the only overlapping wire and cable products which both companies sold to more than a *de minimis* extent—Rome's sales in 1958 amounted to $1.7 million,[4] or about 7 per cent of its total wire and cable sales revenue (AR 56; App. B, Fdg. 16). Alcoa's sales of these overlapping insulated aluminum products amounted to $4.2 million in 1958, or about one-half of one per cent of its net sales and operating revenues for that year (App. B, Fdgs. 21 and 22).

(b) Alcoa's Declining Market Position

The Alcoa of the 1960's is not the Alcoa of 30 years ago, and the district court so found. Rejecting appellant's claim that Alcoa occupies a "dominant position" in the production of aluminum and aluminum wire and cable products, it found that Alcoa's position in these fields has "declined markedly in recent years" (App. B, Fdg. 15; App. A, 28a-29a). In primary aluminum production, the court found, Alcoa's market share had fallen from 52 per cent in 1948, to 45 per cent in 1956, to 36 per cent in 1960 (App. A, 11a). In ACSR and bare aluminum cable, the court found an even steeper drop: from 48.4 per cent in 1954, to 32.5 per cent in 1958, and, combined with Rome, to 26.1 per cent in 1961, nearly three years after the acquisition (App. A,

[4] In 1958, Rome sold these same products using copper as the conductor metal in the amount of approximately $2 million (AR 56).

12a). These substantial declines, the increase in the number of competing producers, and the decline in Alcoa's rate of return on invested capital from 9.3 per cent in 1950 to 3.7 per cent in 1961 were among the factors which led the court to conclude that Alcoa's position "is something less than dominant" (App. A, 21a, 28a-29a).

(c) Alcoa's Market Disadvantage

The court found (App. A, 12a), and appellant concedes (J.S., 9), that the recent increase in demand for covered or insulated aluminum products found Alcoa in an unfavorable market position since it lacked insulating capabilities. In 1952, as a partial solution, it entered into a tolling arrangement under which Rome made aluminum covered line wire and multiplex cable for Alcoa's account (App. B, Fdgs. 19 and 21). By the time of the acquisition, Alcoa had acquired the ability to make these two simple products (App. B, Fdg. 21), but, as the court found, still lacked the know-how and facilities "to manufacture the more complicated types of insulated wire and cable . . ." (App. A, 21a). Accordingly, as appellant concedes, "Alcoa could not offer customers a full line of its own insulated products, both aluminum and copper, as could certain of its competitors" (J.S., 9-10).

In the face of this competitive disadvantage and Alcoa's declining market position, the court found that "[t]he need for product diversification was apparent" (App. A, 21a-22a). Since the time and expense involved "seemed to foreclose" developing the required insulating competence from within its own organization, Alcoa approached and, on March 31, 1959, acquired Rome (*ibid.*). "Alcoa's purpose," the court found (App. B, Fdg. 7)

was to acquire the ability to manufacture the more complicated insulated wire and cable products and diversify its operations. *Rome's manufacture of aluminum products did not induce said acquisition.* [Emphasis added.]

In short, its objective was "to overcome a market disadvantage rather than to obtain a captive market . . . or to eliminate a competitor" (App. A, 22a).

2. THE PROCEEDINGS IN DISTRICT COURT

On February 5, 1962, after approximately 22 months of extensive pre-trial discovery, the four-week trial of this action commenced. At the trial, the court received more than 500 documentary exhibits and heard and observed more than 50 witnesses, among them engineers and purchasing agents for public utilities, experienced wire and cable technical, sales and managerial personnel, and defendants' executive officers chiefly responsible for the acquisition. Following the trial, the parties filed briefs and proposed findings of fact, submitted memoranda dealing specifically with the application of *Brown Shoe* to this case, and presented oral arguments.

On January 28, 1963, the court filed its Opinion and Findings of Fact and Conclusions of Law and dismissed the Complaint. With respect to the two alleged lines of commerce involved in this appeal[5]—aluminum

[5] Ten "lines of commerce" were asserted at the trial: (1) Aluminum conductor wire and cable; (2) Bare aluminum cable and ACSR; (3) Insulated or covered aluminum wire and cable; (4) Aluminum ingot and rod used in the production of aluminum conductor wire and cable; (5) Conductor wire and cable (aluminum and copper); (6) Conductor wire and cable, bare (aluminum and copper); (7) Wire and cable, insulated and covered (aluminum and copper); (8) Service drop cable (aluminum and copper); (9) Conduit (aluminum and steel); (10) Aluminum conduit.

conductor wire and cable and insulated aluminum wire and cable—the court held (1) that they were not proper lines of commerce and (2) even assuming that they were proper lines, the prohibited anticompetitive effect had not been shown.

The crucial line of commerce determination—that insulated aluminum wire and cable is not properly segregable from insulated copper wire and cable—was based on findings that the industry does not recognize insulated aluminum wire and cable as a separate economic entity (App. A, 15a; App. B, Fdgs. 25 and 26); that manufacturers of insulated wire and cable "switch readily" from one conductor metal to another, using the same machinery and personnel on both copper and aluminum (App. A, 15a; App. B, Fdgs. 27, 55 and 56);[6] that insulated copper and insulated aluminum products are functionally interchangeable and are sold by the same vendors to the same customers for the same end use (App. A, 15a-16a; App. B, Fdg. 28). Evidence of a copper-aluminum price differential, the court found, did not destroy the conclusion that there is "actual competition" between copper and aluminum insulated products (App. A, 16a). Purchasers consider "numerous economic factors in addition to the cost of the wire or cable itself" and "substantial quantities" of copper insulated products are sold in direct competition with aluminum products for the same end use (App. B, Fdgs. 28 and 29).

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[6] The fact that the manufacture of aluminum insulated products does not require unique production facilities, a fact relied on heavily by the court below, was entirely omitted from appellant's statement of the grounds of decision below (J.S., 12), notwithstanding that the Government, itself, stressed manufacturing interchangeability in the *Brown Shoe* case.

In concluding that the Government failed to prove the prohibited effect on competition in the alleged aluminum conductor lines of commerce, assuming each to have been established, the court relied on a variety of factors, including what "actually happened in the competitive market" in nearly three years after the acquisition (App. A, 32a). It refused to condemn the acquisition solely on the basis of market share statistics since such data not only showed Rome's shares to be comparatively small but demonstrated continuous and substantial declines in Alcoa's pre-acquisition market share and in the Alcoa-Rome combined share after the acquisition (App. A, 25a, 31a; App. B, Fdg. 45). The nonstatistical evidence established, *inter alia*, that Alcoa's purpose was to overcome the market disadvantage resulting from its lack of insulating capability and product diversity, not to obtain a captive market or eliminate a competitor (App. A, 21a-22a, 37a; App. B, Fdg. 7); that there was not substantial or vigorous competition between Alcoa and Rome prior to the acquisition (App. A, 32a; App. B, Fdg. 52); that there is complete and demonstrated ease of entry (App. A, 24a; App. B, Fdgs. 54-58); that neither competitors nor purchasers have been or expect to be adversely affected in any way by the acquisition (App. A, 27a-28a, 32a-33a; App. B, Fdgs. 59-66); and that there has been and continues to be vigorous competition in the manufacture and sale of aluminum wire and cable products (App. A, 33a; App. B, Fdg. 69).

ARGUMENT

This appeal challenges the district court's application of amended Section 7 to two alleged aluminum conductor lines of commerce. Since the trial court ruled against the Government on both the line of com-

merce and competitive effect issues, the appeal must fail if the court can be sustained as to either issue. In this Motion, adopting the Government's order of proceeding, it will be demonstrated, first, that the Government's contentions as to competitive effect are wholly without substance, even assuming the two alleged aluminum conductor lines could be established. In Part II, it will be shown that the district court was clearly correct in rejecting both of the alleged aluminum conductor lines.

I. NO SUBSTANTIAL QUESTION IS PRESENTED BY APPELLANT'S CONTENTIONS ON THE COMPETITIVE EFFECT ISSUE

In the face of clear and unchallenged findings establishing, *inter alia,* lack of any adverse effect on purchasers, competitors, or the public, absence of anti-competitive purpose, complete ease of entry, substantial pre and post-acquisition market declines, and undiminished vigor of competition, appellant is forced to advocate the following strictly quantitative, *per se* test of illegality (J.S., 14):

> in an industry already characterized by a high degree of concentration, the acquisition by the leading company of one of its few substantial independent competitors is a violation of Section 7, for in that setting, the effect of such an acquisition *necessarily* "may be substantially to lessen competition." [Emphasis added.]

The premises of this test are contradicted by the facts: in the ACSR and aluminum cable, bare, line of commerce, where Alcoa was the leading supplier, Rome was so insubstantial a competitor that appellant has abandoned that line; in the insulated aluminum field, where Rome was not *de minimis,* Alcoa was not

"the leading company," lagging substantially behind its rivals not only in sales but in technical competence and product diversity as well.

Furthermore, while appellant avoids using the expression "*per se*," its use of synonyms, such as "necessarily" (J.S., 14), "these facts themselves" (J.S., 20), and "these facts alone" (J.S., 24), clearly indicates that it is advocating a *per se* test of illegality. In the *Philadelphia Bank* case, however, decided after appellant had filed its Jurisdictional Statement, this Court refused to adopt such an absolute *per se* test. Instead, it formulated a rule creating a rebuttable presumption of illegality on the basis of statistics as to market shares and increase in concentration resulting from a merger. "Specifically," the Court said (31 L.W. at 4662)

> a merger which produces a firm controlling an undue percentage share of the relevant market, and results in a significant increase in the concentration of firms in that market, is so inherently likely to lessen competition substantially that it must be enjoined in the absence of evidence clearly showing that the merger is not likely to have such anti-competitive effects.

The *Philadelphia Bank* case not only is dispositive of the Government's *per se* approach but strongly supports appellees' position. First of all, from the statistical standpoint, the market shares and increase in concentration attributable to this acquisition are far below levels suggested in the *Philadelphia Bank* opinion as possible bases of presumptive illegality. Secondly, there is here overwhelming market and historical evidence of the type deemed relevant in the *Brown Shoe* and *Philadelphia Bank* cases which affirmatively establishes that the acquisition is not likely to have the prohibited effect upon competition.

A. Market Share and Concentration Statistics Do Not Establish the Prima Facie Illegality of this Acquisition

Because of the "comparatively small percentages of the market which Rome held" and the substantial post-acquisition declines in the Alcoa-Rome market share, the court refused to condemn the acquisition on the basis of market statistics alone (App. A, 31a-32a). Analysis of these statistics for the two alleged aluminum conductor lines involved in this appeal will demonstrate that this acquisition is well outside of any area of *per se* or presumptive illegality, even assuming that the district court erred in its line of commerce determinations.

(1) Aluminum Wire and Cable, Insulated or Covered

As to this alleged line of commerce, appellant's basic premise that Alcoa was "the leading company" is demonstrably false. Alcoa, with 11.6 percent of total 1958 shipments, ranked a poor third, more than 60 per cent behind Kaiser, with 26.8 per cent, and more than 30 per cent behind Anaconda, with 16.9 per cent (App. B, Fdg 45; Gx 436). Moreover, not only did Alcoa lag far behind quantitatively, but it lacked the technical competence needed to make complementary insulated products, including copper products (App. A, 21a).

Analysis of the market share statistics makes plain that the court was absolutely correct in refusing to give controlling importance to such data (see App. B, Fdg. 45). Alcoa's share in 1958 was 11.6 per cent, and Rome's 4.7 per cent. The sum, 16.3 per cent, is not only far below the 30 per cent conservatively computed in *Philadelphia Bank,* but is substantially beneath the 20 to 25 per cent figures suggested as a test of *prima facie* unlawfulness by the economists cited in footnote

41. 31 L.W. at 4662. Moreover, the significance of the acquisition, considered solely in statistical terms, becomes even more tenuous in light of the substantial post-acquisition decline from a combined high of 16.6 per cent in 1959, to 14.8 per cent in 1960, and to 13 per cent in 1961. Thus, on the basis of the latest information available to the court, the market share of Alcoa-Rome combined is only 1.4 percentage points above the share held by Alcoa alone in 1958. This approaches *de minimis* (cf. *Tampa Electric Company* v. *Nashville Coal Company*, 365 U.S. 320, 328 (1961)) and certainly does not constitute a percentage increase sufficient to create *prima facie* illegality.

Appellant's claim that the acquisition enhances an already "high degree of concentration" (J.S., 14) has little application to the so-called insulated aluminum wire and cable line. Concentration percentages must be used with some discretion.[7] Here, such percentages have little or no competitive significance for the so-called "industry" excludes numerous fabricators presently making copper but not aluminum insulated products (App. B, Fdg. 81). Since wire and cable manufacturers "switch readily" from one conductor metal to another as market conditions dictate, and are constantly considering whether it would be profitable to do so (App. B, Fdgs. 27, 55 and 56), it is evident that

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[7] As the Senate Subcommittee on Antitrust and Monopoly warned in its publication, *Concentration in American Industry*, 85th Cong. 1st Sess., p. 4 (1957):

> Bare statistics necessarily omit many qualitative factors which are essential to a complete understanding of the competitive structure of the entire industrial economy or of an individual industry.

any anti-competitive effect of undue concentration in this "line" would be promptly offset.[8]

In any event, even taking the statistics at face value, this acquisition has not produced a "significant increase" in concentration. Prior to the acquisition, Alcoa ranked third; after the acquisition, the Alcoa-Rome combination was still third, and still substantially behind Kaiser and Anaconda (Gx 436). Moreover, the aggregate share of the five integrated producers has remained virtually unchanged. Starting at 65.4 per cent in 1958, it rose to 68.1 per cent in 1959, an increase of 2.7 percentage points. By the end of 1961, the same five companies accounted for 66.5 per cent, an increase of only 1.1 percentage points over 1958. Such increases in concentration not only are far below the 33 per cent increase deemed significant in the *Philadelphia Bank* case, but also are substantially below the 7 or 8 percentage point increase suggested by Professor Bok as a possible statistical test. See *United States* v. *Philadelphia National Bank, supra,* footnote 41.

Thus, it is clear that in this crucial alleged line of commerce the statistics fail to show that the merger has produced either "an undue percentage share" or "a significant increase in . . . concentration." Accordingly, there is not presumptive or *per se* illegality.

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[8] The competitive importance of this complete manufacturing interchangeability is demonstrated by the substantial increase in the number of companies supplying aluminum as well as copper products since 1951. The court found that this "gradual decentralization," which has seen the number of fabricators supplying aluminum insulated products increase from four to 29, greatly lessened the significance of the concentration statistics relied on by the Government (App. A, 22a-24a).

(2) Aluminum Conductor Wire and Cable

Appellant's second alleged line of commerce is nothing but a mathematical composite of (1) aluminum wire and cable, insulated or covered, and (2) ACSR and aluminum cable, bare. With respect to item (1), as just shown, the market percentages are not sufficient to establish *per se* or presumptive illegality. As to item (2), appellant is even weaker and does not challenge the district court's conclusion that the prohibited effect on competition has not been shown.[9]

The chief function of the composite line is to conceal the following infirmity in appellant's case: In bare aluminum, where Alcoa, though rapidly declining, was admittedly the leader, Rome was *de minimis;* in insulated aluminum, where Rome was more than *de minimis,* Alcoa, handicapped by its lack of insulating competence and product diversity, was not the leading company. Appellant's attempt to resurrect its statistical case by adding together bare and insulated aluminum shipments is nothing but a numerical trick since bare aluminum products are not even claimed to be competitive with insulated aluminum products, and "aluminum conductor wire and cable" is not recognized in the industry as a separate economic entity or submarket (App. C, Add'l Fdg. 4). In essence, the composite line is simply a device for inflating the

[9] In the bare aluminum line of commerce, Alcoa, with 32.5 per cent of the market in 1958, was the leading supplier. Rome, however, had only a .3 per cent market share and produced only a limited range of sizes (App. A, 30a). Moreover, the evidence shows a steady and substantial decline in Alcoa's position: From 48.4 per cent in 1954, to 32.5 per cent in 1958, and combined with Rome, to 26.1 per cent in 1961 (App. B, Fdg. 45). It was on the basis of these data, together with the market and historical evidence to be discussed below (pp. 17-22), that the court found for appellees.

market shares by capitalizing on Alcoa's position in ACSR and aluminum cable, bare, even though appellant no longer claims any prohibited effect in the bare aluminum line of commerce, itself.

In any event, the statistical evidence makes clear that the district court correctly refused to invalidate this acquisition solely on the basis of market share and concentration data. Such statistics show, first of all, that Alcoa's 27.8 per cent in 1958 was composed predominantly (more than 90 per cent) of ACSR and bare aluminum cable, while Rome achieved its still very minor position, 1.3 per cent in 1958, largely by virtue of its insulated aluminum sales.[10] Since insulated and bare aluminum products are used for different purposes and are not competitive with each other, these percentages clearly do not manifest any "inherently anticompetitive tendency." *Philadelphia Bank,* 31 L.W. at 4663.

Secondly, and even more important, the statistical evidence establishes a continuing and substantial de-

[10] The actual sources of the percentages relied on by appellant are exposed by the following table (based on App. B, Fdg. 45; Gx 434, 435, 436):

1958
(Thousands of Pounds)

		Alcoa		Rome	
	Total	Shipments	% of Total	Shipments	% of Total
ACSR and Aluminum Cable, Bare	175,157	56,990	32.5	537	0.3
Aluminum Wire and Cable, Insulated or Covered	51,346	5,970	11.6	2,411	4.7
Aluminum Conductor Wire and Cable	226,503	62,960	27.8	2,948	1.3

cline in Alcoa's market position which, by a considerable margin, has more than offset the small and purely numerical increase attributable to the Rome acquisition.[11] Thus, the Alcoa-Rome combined share at the end of 1959 was 28.4 percent, which is only .6 of a percentage point above Alcoa's 1958 share and is 14.4 percentage points *below* Alcoa's 1954 share. By 1961, the Alcoa-Rome combined share was 18 percentage points below Alcoa's 1954 share and 3 percentage points below its 1958 share. In sum, by the time of trial the share of this alleged line held by Alcoa and Rome combined was more than 10 per cent below the share held by Alcoa alone in 1958 and more than 40 percent below Alcoa's 1954 share.

In light of this substantial and continuing decline, it cannot even be suggested that this acquisition has produced any significant increase in either market shares or concentration. Accordingly, the court's rejection of a *per se* standard and its unwillingness to give controlling weight to the market share statistics in this spurious "line of commerce" were manifestly correct.

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[11] The extent of the decline is shown by the following table (based on App. B, Fdg. 45):

	Alcoa and Rome Individual Percentages					
	1954		1958		1961	
	Alcoa	Rome	Alcoa	Rome	Alcoa	Rome
ACSR and Aluminum Cable, Bare	48.4	0.2	32.5	0.3	26.1	..
Aluminum Wire and Cable, Insulated or Covered	10.0	6.9	11.6	4.7	7.3	5.7
Aluminum Conductor Wire and Cable	42.8	1.1	27.8	1.3	23.5	1.3

B. The Market and Historical Facts Affirmatively Establish the Absence of a Probable Anti-Competitive Effect

At the trial, appellees did not rest their defense solely on Rome's relatively minor position and Alcoa's steady and significant declines in the alleged aluminum conductor lines. Instead, they offered testimony from informed public utility purchasing agents, competing wire and cable fabricators, and Alcoa and Rome officials. This evidence, and the undisputed findings based thereon, affirmatively establish that this acquisition is not likely to have the prohibited effect on competition.

(1) The Absence of Significant Competition Between Alcoa and Rome

The court found that "prior to the acquisition, there was not substantial or vigorous competition between Alcoa and Rome in the sale of aluminum conductor wire and cable products" (App. B, Fdg. 52; App A, 32a). This finding is supported in part by records systematically maintained by Alcoa which show that while Alcoa lost substantial conductor business to other competitors during the two years preceding the acquisition, "its loss of business to Rome during the same period was insignificant" (App. A, 32a).[12] Furthermore, Alcoa and Rome had only relatively few common customers for the overlapping aluminum conductor products.[13] This virtual absence of competition between Alcoa and Rome is explained primarily by the

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[12] Specifically, out of nearly 80 million pounds of electrical conductor business reported lost to competition, less than 40,000 pounds or about 5/100 of 1 per cent (.05 per cent) was reported lost to Rome (Tr. 1284-1316; AR 29 and 29a).

[13] Appellant concedes that in 1958 only 10 out of the more than 3,300 public utility companies made significant purchases (i.e., more than $1,000) of the overlapping aluminum products from both Alcoa and Rome. (Defts.' Prop. Fdg. 48, agreed to by appellant.)

fact that Rome had only *de minimis* sales of ACSR and bare aluminum cable which constituted more than 90 per cent of Alcoa's wire and cable sales (App. B, Fdgs. 14, 17, 18 and 45).

(2) The Lack of Effect on Competitors

Prior to trial, the Government maintained that this acquisition made it "more difficult for the remaining non-integrated producers to compete and survive" for "[t]hey now must face a competitor whose dominance in the field has been substantially increased . . ." (Trial Brief of the U. S., p. 65). At the trial, this contention was interred by the concrete and unequivocal testimony of nonintegrated fabricators. This testimony, appellant concedes, established that such companies have increased their aluminum wire and cable sales since the acquisition, and have either built new plants or expanded existing plants in order to increase their capacity for making such products (Defts.' Prop. Fdg. 52 (a), (b), (c) and (e), agreed to by appellant). No such manufacturer, the court found, had suffered any adverse effect, nor did any foresee any future adverse effect as a result of this acquisition (App. B, Fdg. 50; App. A, 33a). Statistical evidence showing a marked increase in the nonintegrated producers' aggregate market share since the acquisition confirms the oral testimony and further demonstrates that competition is not likely to be impaired through a withering away of nonintegrated fabricators.[14]

[14] The figures show that in the period from 1958 to 1961, the nonintegrated producers, as a group, have increased their market share in insulated or covered aluminum from 29.8 per cent to 33.5 per cent, during which time the Alcoa-Rome share declined from 16.3 per cent to 13 per cent, and that their share in the composite line has remained substantially unchanged while the Alcoa-Rome share has declined from 29.1 per cent in 1958 to 24.8 per cent in 1961 (App. A, 32a).

(3) Ease of Entry

The court's finding that "no serious impediment or barrier" to entry exists is abundantly supported by the record. (App. A, 24a). Indeed, the term "entry" is a misnomer for, as the court found, fabricators already in the wire and cable business—of which there are upwards of 200, "among them many strong, well financed and highly reputable concerns" (App. B, Fdg. 81)—"switch readily from one product or conductor metal to another in accordance with market conditions . . ." (App. B, Fdg. 56). Since a fabricator of copper products can "readily" make aluminum products "with its existing machinery and personnel" (App. B, Fdgs. 27, 55; App. A, 15a), clearly "entry" is a simple matter. Moreover, this is not just a theoretical possibility, for when the price of copper rose in the early 1950's, creating favorable opportunities for aluminum conductor products, the number of suppliers increased "from four to twenty-nine and most of the new entrants came from the ranks of insulated copper conductor producers . . ." (App. A, 24a). This fact, the court found, is "indicative that entry into the aluminum conductor field is dictated by the status of the competition rather than being controlled by actual economic barriers" (*ibid.*).

(4) The Absence of a Significant Merger Trend

Contrary to *Brown Shoe*, where the district court found definite and substantial acquisition trends in which *Brown Shoe*, itself, was a "moving factor" (370 U.S. at 302), the court here found neither a "significan pattern or trend of mergers" for the industry as a whole (App. B, Fdg. 46), nor any prior "history of acquisitions or mergers" by Alcoa (App. A, 23a).

The court's finding as to the lack of any significant merger trend is strongly supported by the record. Olin Mathieson, a partner in a relatively new primary aluminum producing joint venture, was not even in the wire and cable business prior to its acquisition of Southern Electrical;[15] U. S. Rubber, which was acquired by Kaiser in 1957, was less than a 1 per cent factor in aluminum conductor products; and Roebling, whose wire and cable machinery was acquired by Reynolds, never was more than a .1 per cent factor and is conceded by appellant not to have been a substantial independent competitor (App. A, 23a; App. B, Fdg. 48; J.S. 23). The minor importance of these acquisitions, together with the demonstrated post-acquisition declines of the merging companies (App. B, Fdg. 48), fully supported the court's conclusion.

Appellant's concern about "creeping concentration" is likewise entirely misplaced insofar as Alcoa is concerned. Alcoa has achieved its objective in obtaining insulating know-how, does not contemplate "future expansion through mergers or acquisitions" in the wire and cable field (App. B, Fdg. 11), and, therefore, there is no indication that Alcoa will seek to expand its "power by successive small acquisitions . . ." (S. Rep. 1775, 81st Cong. 2d Sess. 5, quoted J.S. 20).

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[15] The acquisition of Central Cable by Aluminium, Ltd., which is referred to by appellant, though completely *dehors* the record, also did not elminate or lessen competition since Aluminium was not previously in the wire and cable business. The same is true as to Harvey Aluminum Company, which appellant asserts has considered acquiring a wire and cable producer (J.S., 19).

(5) The Lack of Anti-Competitive Purpose

Relying on this Court's assertion in *Brown Shoe* that a most important factor is "the very nature and purpose of the arrangement," 370 U.S. at 329, the court gave weight to the fact that Alcoa acquired Rome in order to diversify its operations, not "to obtain a captive market for its product or to eliminate a competitor" (App. A, 22a), nor because Rome manufactured aluminum products which Alcoa already was selling (App. B, Fdg. 7). Such findings, while not necessarily conclusive, are highly relevant for, as the Court observed in *Brown Shoe,* 370 U.S. at 329, footnote 48,

> evidence indicating the purpose of the merging parties, where available, is an aid in predicting the probable future conduct of the parties and thus the probable effects of the merger.

(6) The Lack of Effect on Consumers

Finally, recognizing that one test of a competitive market is "whether consumers are well served," *Philadelphia Bank,* 31 L.W. at 4663, footnote 43 appellees offered the testimony of purchasing agents for eight of the ten public utilities which bought aluminum conductor products from both companies prior to the acquistion. These witnesses explained the manner in which they purchased these products, identified their suppliers before and after the acquisition, and described Rome's position and practices. As the court found, these witnesses "all testified without exception that the acquisition has not had an adverse effect upon the purchasers of such products"; "that no difficulty has been encountered in expanding their list of suppliers and that competition among such suppliers has not been affected" (App. A, 28a); and that prior to the acquisition, Rome was a follower rather

than an initiator of price reductions and "was not an aggressive price competitor" (App. B, Fdgs. 53 and 61). The court concluded that consumers "have not been and will not be adversely affected by the Rome acquisition" (App. B, Fdg. 59).

II. NO SUBSTANTIAL QUESTION IS PRESENTED BY APPELLANT'S CONTENTIONS ON THE LINE OF COMMERCE ISSUE

Although acknowledging that the line of commerce issue "lies at the threshold of every Section 7 case" (J.S., 24), appellant postpones discussion of that issue until near the close of its Jurisdictional Statement. The confession of weakness so clearly implied by this departure from logic is well founded.

The critical line of commerce question for appellant is whether aluminum wire and cable, insulated or covered, is a proper line of commerce. If it is not, then, as appellant concedes, aluminum wire and cable, composed of bare and insulated aluminum products, also is not a proper line of commerce (J.S., 28-29).[16] Accord-

[16] On the other hand, even if insulated aluminum were a line of commerce it would not necessarily follow that the combination of noncompetitive bare and insulated aluminum products is a proper line of commerce. Contrary to appellant's contention (J.S., 28), the fact that the court found "conductor wire and cable," including both bare and insulated, and aluminum and copper, products to be a line of commerce is no support for giving similar recognition to the combination of noncompetitive bare and insulated *aluminum* products. "Conductor wire and cable," the court found, corresponds to the "generally recognized electrical wire and cable industry" (App. B, Fdg. 31). Here, however, contrary to appellant's assertion, the court rejected the so-called aluminum conductor line not only because it failed to include copper equivalents of insulated aluminum products, but also because the evidence failed to show that the combination of bare and insulated aluminum wire and cable "is generally recognized in the industry as a separate economic entity or submarket" (App. C, Add'l Fdg. 4).

ingly, this argument will focus on the alleged aluminum insulated line.

The Government's basic contention is that the district court, in refusing to segregate insulated wire and cable products made with aluminum conductor from the equivalent copper products, misapplied the guidelines laid down by this Court in *Brown Shoe*. None of the court's underlying findings of fact is challenged as "clearly erroneous."

In *Brown Shoe*, this Court, quoting from the *duPont-General Motors* opinion,[17] declared (370 U.S. at 324):

> [d]etermination of the relevant market is a necessary predicate to a finding of a violation of the Clayton Act because the threatened monopoly must be one which will substantially lessen competition "within the area of effective competition." Substantiality can be determined only in terms of the market affected.

It went on to say that the "area of effective competition" must be determined in part by reference to a product market; that there are broad product markets whose outer boundaries are determined by interchangeability of use or cross-elasticity of demand; and that within such broad markets may be "well-defined" and "economically significant" submarkets within which the probable effects of a merger may be measured. 370 U.S. at 325. The Court made no attempt to establish any rigid formula for determining the boundaries of a submarket. Rather, it indicated that a broad ranging and pragmatic evaluation of market realities

[17] *United States* v. *E. I. duPont de Nemours & Co.*, 353 U.S. 586, 593 (1957).

was required. Courts were admonished to examine (*ibid.*),

> such practical indicia as industry or public recognition of the submarket as a separate economic entity, the product's peculiar characteristics and uses, unique production facilities, distinct customers, distinct prices, sensitivity to price changes, and specialized vendors.

In this case, the district court, after obviously conscientious study of *Brown Shoe,* observed that "no rigid formula exists" for determination of the relevant product market, that "the realities of competition are the ultimate test," and that "the existence or nonexistence of each of the above indicia is not determinative of the problem itself" (App. A, 5a-6a). Contrary to the Government's insinuation that the court carelessly and thoughtlessly considered the line of commerce question, and merely "ticked off" the listed indicia (J.S., 24), the court made numerous and detailed findings of fact supporting its ultimate conclusion. On the basis of these undisputed findings, it is readily apparent that it would have been unrealistic for the court to make the further subdivision sought by appellant.

A. The Court's Line of Commerce Findings

At the trial more than a dozen witnesses with long experience in the business testified as to the relationship between copper and aluminum in the wire and cable industry. On the basis of this testimony, together with supporting documentary evidence, the court found that insulated wire and cable manufacturers regard themselves simply as insulators of wire and cable, not as copper insulators on the one hand, or aluminum

insulators on the other (App. B, Fdg. 26), that the industry defines insulated wire and cable products according to function or type, not according to the metal used as conductor (App. B, Fdg. 25),[18] and that, in general, insulated aluminum wire and cable "is not recognized in the industry as a separate economic entity" (App. A, 15a).

One of the most significant facts for determining "the area of effective competition" is that no unique production facilities are required for making aluminum, as opposed to copper, insulated products. Thus, the industry testimony overwhelmingly established, and the court found, that wire and cable manufacturers can draw, strand, and insulate copper and aluminum interchangeably on the same equipment and with the same personnel (App. B, Fdg. 27); that, in fact, such manufacturers constantly review their product lines, and "switch readily" from one product and conductor metal to another in accordance with market conditions (App. B, Fdg. 56); and that manufacturers not presently making aluminum conductor products have considered doing so and would if profitable orders were obtained (*ibid.*). These competitive realities, which accord with industry usage and understanding, clearly place copper and aluminum insulators within a single "area of effective competition."

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[18] That is, products are designated as "building wire," "power cable," "magnet wire," etc., whether made from copper or aluminum. This finding is amply supported by, among other things, authoritative technical manuals (AR 25-28), the Standard Industrial Classification Manual published by the United States Bureau of the Budget (AR 74), product classifications established by the Bureau of Census (AR 9), and the Wire Buyers' Guide, official publication of the Wire Association (AR 73).

Finally, the court found that aluminum and copper insulated products are sold, "in actual competition" with each other, by the same vendors to the same customers for the same end use (App. A, 15a-16a; App. B, Fdg. 28). This conclusion, the court found, is not destroyed by the existence of a copper-aluminum price differential (App. A, 16a). Cable purchases are not dictated solely by the price of the cable, itself, but involve evaluation of numerous additional economic factors which determine final installed cost (App. B, Fdg. 28). Since such factors—e.g., labor costs, costs of installation materials, costs of connections, salvage value—tend to favor copper,[19] the economic contest is not one-sided. As the court found, "even with respect to" insulated overhead products "where aluminum has gained its greatest acceptance," "substantial quantities are sold using copper as the conductor" (App. B, Fdg. 29).[20]

B. Appellant's Contentions on Line of Commerce Are Without Substance

Appellant contends that the district court erred in making a pragmatic, multi-factor analysis based on all of the *Brown Shoe* indicia. Instead, appellant urges it should have based its determination solely upon the copper-aluminum price differential (J.S., 25, 30), even though, as the court found, such differential does not foreclose "lively," "active," and "actual" com-

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[19] Deft's Prop. Fdg. 30(a), agreed to by appellant. See also Tr. 1345-54, Tr. 383-89, AR 76.

[20] According to the Government's own evidence, 22.8 per cent of new overhead insulated or covered lines added in 1959 used copper conductor. In dollar terms, this amounted to, conservatively, $15,000,000. Tr. 581-86.

petition between aluminum and copper insulated products (App. A, 10a, 16a). This is a startling position for the Government to take, particularly in view of this Court's holding in *Brown Shoe* that "'price/quality' differences" are not sufficient to segment product lines "where, in fact, competition exists," and where, as here, the other "practical indicia" demonstrate the inappropriateness of further subdividing the market. 370 U.S. at 326.

Typical of the Government's disregard of the competitive realities is its contention that the copper-aluminum price differential imposes a competitive disadvantage on "fabricators of insulated copper cable." "Utilizing a high-cost metal," appellant says, such fabricators (J.S., 27)

> are powerless to eliminate the price disadvantage under which they labor and thus are not in a position to compete effectively in the overhead distribution field.

Even leaving to one side the other economic factors which mitigate the alleged price disadvantage (*supra*, p. 26), this wholly misconceives the court's findings as to the nature of competition in the insulating business.

We are not dealing here with competition between different metals, but with competition among fabricators of insulated wire and cable products. Contrary to appellant's assumption, such fabricators are not captives of one particular metal, but move freely between copper and aluminum, using the same machinery and personnel, in accordance with market conditions (App. B, Fdgs. 27, 55, 56). Should any fabricator of

overhead distribution products feel himself at a competitive disadvantage owing to the use of copper, he is not "powerless" for he can and will use aluminum. Since he will still be making the same product[21] on the same machinery and with the same personnel, and will still be selling to the same utility customers for the same end use, it is completely unrealistic to assert that merely by changing raw material, he thereby transfers from one line of commerce to another.

A similar misconception is involved in appellant's claim that (J.S., 28)

> the availability of a copper substitute exerts little, if any, restraint upon the power of the aluminum cable manufacturers to raise the price of their product.

This contention completely ignores the fact that there is no static group of "aluminum cable manufacturers." On the contrary, as the court expressly found, wire and cable fabricators move freely from one conductor metal to another, and, in a continuing dynamic process, re-evaluate their product lines and consider how their insulating capacity should be allocated between copper and aluminum. In these circumstances, "aluminum cable manufacturers" are subject to rigorous competitive forces which affect the pricing of aluminum cable products; for, in addition to the competition which the court found copper insulated products afford, there is the unavoidable prospect that insulating capacity previously devoted to copper will be used on aluminum if the price of aluminum in-

[21] See note 18, *supra*.

sulated products should increase.[22] The effective restraint stemming from the manufacturing interchangeability and other competitive realities found by the court illustrates why this Court, in *Brown Shoe,* included "separate economic entity," "unique production facilities," and "specialized vendors" among the "practical indicia" to be examined in determining the "area of effective competition." 370 U.S. at 325.

Finally, recognizing that the court's finding that there is "lively," "active," and "actual" competition between copper and aluminum insulated products seriously undermines the economic significance of the alleged copper-aluminum price differential, appellant now contends that at the time of the acquisition (J.S., 27)

> "actual competition" between the two metals in the field of overhead distribution was rapidly disappearing—just as it had already disappeared in the field of overhead transmission, where bare aluminum, having almost completely displaced bare copper, was conceded by Alcoa and found by the court to be a distinct line of commerce.

This goes beyond anything the Government even attempted to prove at the trial and fails to take account of important distinctions between the role of aluminum

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[22] The magnitude of the competitive restraint imposed by the existence of insulating capacity not presently used on aluminum is indicated by the court's findings that there are "upwards of 200 companies" in the wire and cable business and that such companies produced in 1958 insulated products valued at more than $1.3 billion, only a small fraction of which represented aluminum products (App. B, Fdgs. 29 and 81).

in bare transmission as opposed to insulated or covered distribution products.[23]

(1) At the trial, the Government offered a report (Gx 468) and expert testimony (Tr. 554-89) based on a survey of 93 electric utilities. This evidence indicated that from 1950 to 1959 the use of aluminum conductor in new insulated or covered overhead lines had increased from 6.5 per cent in 1950 to 77.2 per cent in 1959. In addition to seeking information as to actual use in prior years, the questionnaire used in this survey asked the utilities to state whether they "expect any increase or decrease in 1960 and in subsequent years in the proportion of aluminum to copper used in any classification of . . . (overhead lines)" (App. D to Gx 468).

Varying responses, wholly insufficient to establish the nature of any future trend, were received. Accordingly, the Government's expert, both in his written report and in his oral testimony, refused to make any projection of the trend beyond 1959, and candidly stated that information received regarding expected future use of copper and aluminum was "not susceptible to tabulation and was not tabulated in [the] re-

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[23] In addition, this contention distorts completely the basis of appellee's concession that ACSR and bare aluminum cable may be regarded as a separate line of commerce. That concession was not based solely on the fact that aluminum has substantially displaced copper in the bare transmission field but rested also on a number of additional facts applicable to bare, but not to insulated or covered, aluminum products. Among such additional facts were the technological advantages of bare aluminum over bare copper; that ACSR and aluminum cable, bare, is "generally recognized as a separate product classification"; and that "the manufacture and sale of these products require special stranding equipment and designing skill" (App. B, Fdg. 24).

port" (Tr. 558). Reflecting the absence of probative evidence as to future use of aluminum in insulated or covered distribution products, the Government did not even propose a finding of fact that the trend toward aluminum would continue into the future, let alone that copper-aluminum competition would eventually "disappear" with respect to insulated or covered products.

(2) The Government's claim that copper will be displaced in the insulated or covered field to the same extent as bare copper has been displaced in the overhead transmission field is wholly at variance with the findings and the evidence. In the overhead transmission field, aluminum has positive technical advantages over copper. For example, its lighter weight results in important economies in installation and the larger size required helps to avoid corona loss (e.g., Tr. 282-84). In the insulated field, however, these technological advantages of aluminum do not apply. As the court found, copper and aluminum are "completely interchangeable from a performance standpoint [and] utility companies choose between copper and aluminum insulated or covered overhead products solely on the basis of economics" (App. B, Fdg. 28). In fact, as shown above (p. 26), the nonprice variables tend to favor copper, not aluminum as in the bare transmission field. This explains why a utility company's decision "requires evaluation of numerous economic factors in addition to the cost of the wire or cable itself" (App. B, Fdg. 28), and why, despite the price differential relied on so heavily by appellant, the court found that "substantial quantities" of insulated or covered overhead distribution products are sold using copper conductor (App. B, Fdg. 29).

CONCLUSION

The decision below is correct, and this appeal presents no questions warranting further briefs and oral argument. The judgment of the district court should be affirmed.

Respectfully submitted,

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INDEX

	Page
Opinion below	1
Jurisdiction	1
Questions presented	2
Statute involved	2
Statement	2
Summary of argument	3
1. The merging companies	3
2. The aluminum conductor industry	11
3. The merger	24
4. Proceedings below	30
Argument	37
I. Aluminum conductor and insulated aluminum conductor are appropriate "lines of commerce" within which to appraise the impact of the merger	38
A. Insulated conductor is a "line of commerce"	38
B. Aluminum conductor is a "line of commerce"	47
II. Since Alcoa is one of the few leading firms in the highly concentrated markets for aluminum conductor and insulated aluminum conductor, its acquisition of a significant competitor violates Section 7	49
A. Alcoa is a dominant firm in the markets for aluminum conductor and insulated aluminum conductor where economic power is already highly concentrated	49
B. Any acquisition of a significant competitor by one of the few dominant firms in a market in which economic power is already highly concentrated may substantially lessen competition within the meaning of Section 7	56
1. Such an acquisition may substantially lessen competition because it enhances the power of a concern which has already reached the peril point	58

723-969—64——1

Argument—Continued

2. The competition eliminated by such an acquisition is "substantial" because, in an industry where few firms compete, the competition furnished by each firm has importance beyond its market share ..... Page. 60

3. The competition eliminated by such an acquisition is "substantial" because, in such an industry, independent competitors offer the best hope for future decentralization of economic power. 64

4. The competition eliminated by such an acquisition is "substantial" because, in such an industry, each such acquisition is a major step towards the elimination of all independent concerns and the capture of the whole market by the giant companies 65

Conclusion 72

Appendix 73

CITATIONS

Cases:

A. G. Spalding & Bros. Inc. v. *Federal Trade Commission*, 301 F. 2d 285 52

Aluminum Company of America v. *Federal Trade Commission*, 284 Fed. 401 7

Brown Shoe Co. v. *United States*, 370 U.S. 294 ..... 37, 39, 40, 42, 45, 46, 52, 57, 59, 61, 64, 65, 66

Crown Zellerbach Corp. v. *Federal Trade Commission*, 296 F. 2d 800 57

Foremost Dairies, Inc., Dkt. 6495, CCH Trade Reg. Rep. ¶15,877 59

Procter & Gamble Company, The, Federal Trade Commission Docket No. 6901, decided November 26, 1963, Mimeographed Opinion, p. 38 (Commissioner Elman) 59

Cases—Continued

	Page
Reynolds Metals Co. v. *Federal Trade Commission*, 309 F. 2d 223	44
United States v. *Aluminum Company of America*, Civil No. 61 C 147 (2) (E.D. Mo.)	7
United States v. *Aluminum Company of America*, 153 F. Supp. 132	3, 4
United States v. *Aluminum Company of America*, 148 F. 2d 416	3
United States v. *Aluminum Company of America*, 91 F. Supp. 333	3, 4
United States v. *Aluminum Company of America*, 44 F. Supp. 97	7
United States v. *Bethlehem Steel Corp.*, 168 F. Supp. 576	44, 52
United States v. *Corn Products Refining Co.*, 234 Fed. 964	45
United States v. *Kaiser Aluminum and Chemical Corporation*, Civil No. 2795 (D. R.I.)	22
United States v. *Philadelphia National Bank*, 374 U.S. 321	35, 44, 56, 57, 58, 65, 69
Statutes:	
Act of June 9, 1944, 58 Stat. 272	3
Clayton Act, 38 Stat. 730, as amended:	
Section 7 (38 Stat 731), as amended, (64 Stat. 1125, 15 U.S.C. 18)	2, 3, 7, 30, 33, 34, 35, 37, 42, 49, 56, 57, 60, 65, 70, 72
Surplus Property Act of 1944, 58 Stat. 765	4
Miscellaneous:	
Bok, *Section 7 of the Clayton Act and the Merger of Law and Economics*, 74 Harv. L. Rev. 226	57
Fortune Directory, *The 500 Largest U.S. Industrial Corporations*, August 1961	50
H. Rep. 1191, 81st Cong., 1st Sess	56, 60
Kaysen and Turner, *Antitrust Policy* 101–102	45, 57, 58
Markham, *Merger Policy Under the New Section 7; A Six-Year Appraisal*, 43 Va. L. Rev. 489	58
S. Rep. No. 1775, 81st Cong., 2d Sess	56, 64
Stigler, *Mergers and Preventive Antitrust Policy*, 104 U. of Pa. L. Rev. 176	57, 58

In the Supreme Court of the United States

OCTOBER TERM, 1963

No. 204

UNITED STATES OF AMERICA, APPELLANT

v.

ALUMINUM COMPANY OF AMERICA AND ROME CABLE CORPORATION

ON APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF NEW YORK

BRIEF FOR THE UNITED STATES

OPINION BELOW

The opinion of the district court (R. 1305) is reported at 214 F. Supp. 501.

JURISDICTION

The judgment of the district court was entered on January 28, 1963 (R. 1305), and the notice of appeal was filed by the United States on March 29, 1963 (R. 1337). This Court noted probable jurisdiction on October 14, 1963 (R. 3510; 375 U.S. 808).

The jurisdiction of this Court is conferred by Section 2 of the Expediting Act of February 11, 1903, 32 Stat. 823, as amended, 15 U.S.C. 29.

QUESTIONS PRESENTED

The primary question is whether the acquisition of all of the stock and assets of one of the few significant independent fabricators of aluminum conductor wire and cable (Rome Cable) by the largest producer of primary aluminum and aluminum conductor wire and cable (Aluminum Company of America) in an already oligopolistic market violates Section 7 of the Clayton Act.

A subsidiary question is whether aluminum conductor and insulated aluminum conductor are lines of commerce in which the effect of the acquisition may appropriately be judged.

STATUTE INVOLVED

Section 7 of the Clayton Act, 38 Stat. 731, as amended, 64 Stat. 1125, 15 U.S.C. 18, provides in pertinent part:

> No corporation engaged in commerce shall acquire, directly or indirectly, the whole or any part of the stock or other share capital and no corporation subject to the jurisdiction of the Federal Trade Commission shall acquire the whole or any part of the assets of another corporation engaged also in commerce, where in any line of commerce in any section of the country, the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly.

STATEMENT

This is a civil antitrust action by the United States charging a violation of Section 7 of the Clayton Act (15 U.S.C. 18). The complaint, filed on April 1, 1960,

charged that the effect of the 1959 acquisition by the Aluminum Company of America ("Alcoa") of the Rome Cable Corporation ("Rome") "may be substantially to lessen competition or to tend to create a monopoly" in the production and sale of various wire and cable products and accessories. It asked, *inter alia*, for divestiture by Alcoa of all the assets, business and good will acquired from Rome. After a month-long trial ending March 1, 1962, the district court, on January 28, 1963, held that no violation of Section 7 had been established and dismissed the complaint.

1. THE MERGING COMPANIES

Alcoa.—From its incorporation in 1888 until 1940, Alcoa was the sole domestic producer of virgin aluminum ingot and of aluminum conductor wire and cable, *United States* v. *Aluminum Company of America*, 148 F. 2d 416, 422, 423, 438 (C.A. 2). In a celebrated monopoly case, begun in 1937 and extending in its various phases over a period of twenty years,[1] the Second Circuit,[2] per Learned Hand, J., held that Alcoa had monopolized the aluminum industry in violation of Section 2 of the Sherman Act. Relief, however, was deferred pending disposition by the government of the aluminum facilities it had built during World War II, *id.* at 446–447; see *United*

[1] Litigation was terminated on June 28, 1957, *United States* v. *Aluminum Company of America*, 153 F. Supp. 132 (S.D. N.Y.). Twelve days later, on July 10, 1957, Alcoa made its first attempt to acquire Rome (GX 159, R. 2176).

[2] A quorum was wanting in the Court, so that the circuit court acted as the court of last resort, pursuant to the Act of June 9, 1944, 58 Stat. 272.

States v. *Aluminum Company of America*, 91 F. Supp. 333 (S.D. N.Y.); *United States* v. *Aluminum Company of America*, 153 F. Supp. 132 (S.D. N.Y.). The Surplus Property Act of 1944, 58 Stat. 765 (1944) directed that these facilities be distributed "in such manner, and with such purpose, as would foster competitive conditions in the aluminum industry"; thus the War Assets Administration used the government's aluminum properties "as an instrument to create competition rather than * * * to recover the Government's investment", and established domestic competition for Alcoa in the aluminum business. *United States* v. *Aluminum Company of America*, 91 F. Supp. 333, 339, 351–354 (S.D. N.Y.). As a result, Reynolds Metals Company ("Reynolds") and Kaiser Aluminum & Chemical Corporation ("Kaiser") became integrated producers of aluminum and aluminum products. Judge Knox noted in 1950 that the competition they created for Alcoa was "due, almost entirely, to the disposal program of the War Assets Administration." *Id.* at 380. See also *United States* v. *Aluminum Company of America*, 153 F. Supp. 132 (S.D. N.Y.). Since 1950, three more companies—Ormet, Inc. ("Ormet"), Harvey Aluminum ("Harvey"), and Anaconda Aluminum Company ("Anaconda")—have entered the primary aluminum field, with various forms of government assistance (*ibid.*).

Alcoa, however, has continued to be the largest producer of primary aluminum (R. 1312), accounting for 52 percent of the nation's output of primary aluminum in 1948, 45 percent in 1956, and 36 percent in 1960 (R. 1313). The district court used the following

table to indicate the relative productive capacities of Alcoa and the other primary producers in 1960 (R. 1310):

Aluminum Ingot Capacity Existing or Under Construction at the End of 1960

[Short tons]

Company	Capacity	Percent of U.S. total
United States total	2,655,750	100.0
Aluminum Company of America	1,025,250	38.6
Reynolds Metals Company	701,000	26.4
Kaiser Aluminum & Chemical Corp.	609,500	23.0
Ormet, Inc.	180,000	6.8
Harvey Aluminum	75,000	2.8
Anaconda Aluminum Company	65,000	2.4

In addition to primary aluminum, Alcoa fabricates a wide variety of semi-finished and finished products, including sheet, plate, rod, bar, extrusions, castings, forgings, tubing, foil, rivets, closures, screws, electrical conductors and accessories and conduit (Fdg. 12, R. 1284). It is a fully integrated aluminum producer (R. 1306), owning and operating raw material locations, shipping lines, railroads, water companies, electric power companies, coal properties, gas lines, and numerous manufacturing facilities for converting aluminum ore into primary, semi-fabricated, and finished aluminum products (GX 9, R. 1376–1381; GX 49, R. 1625). In 1960, Alcoa's assets were approximately $1,375 million, its gross revenues $870 million, and its net income $40 million (GX 49, R. 1619–1621).

The lines of commerce upon which the merger would bear most heavily are aluminum conductor wire and cable ("aluminum conductor") and insulated or

covered aluminum conductor wire and cable ("insulated aluminum" or "aluminum insulated"). Conductor wire and cable is a major end use of aluminum. Thus, in 1958 the total United States production of primary aluminum ingot was 3,131 million pounds, while 226 million pounds of aluminum conductor were produced, of which 51 million pounds were insulated wire and cable (AR 49 R. 3403; GX 434, R. 2713, GX 436, R. 2717).

It was Alcoa which pioneered the use of aluminum as an electrical conductor and sold substantially all of the aluminum cable used for electrical transmission in the United States prior to World War II (R. 1313). The company's activity in aluminum conductors began in 1899 when it developed and sold the nation's first aluminum transmission line[3] (GX 235, R. 2309). In 1909 an Alcoa engineer invented ACSR (aluminum cable, steel reinforced), which remains today the most popular type of bare aluminum conductor (R. 1054). Alcoa also was first to develop insulated aluminum conductors (GX 235, R. 2310), although in this product line its initial efforts were directed to promoting fabrication by other wire and cable manufacturers (see R. 1054; R. 1077). One of Alcoa's five research laboratories[4] is devoted entirely to the development of new products and processes for

[3] Electric utility power systems usually distinguish between (1) "transmission lines," which carry electricity at high voltages from generating plants to substations in areas of consumer demand; and (2) "distribution lines," which carry the electricity at reduced voltages from substations to consumers. (See AR 12, R. 3246, and R. 297.)

[4] Exclusive of the Rome Research Center, discussed *infra*, p. 10.

electrical conduction (GX 7, R. 1346), and the company offers "outstanding" technical service to its aluminum conductor customers (R. 187). In addition, Alcoa is the only domestic manufacturer of a full line of aluminum conductor accessory products, an important companion line to aluminum conductor wire and cable (R. 393–397). Other complementary items made by Alcoa include transmission towers, substation structures, conduit, bus conductors, and architectural products (GX 7, R. 1346; R. 1596).

There was testimony that, prior to the acquisition of Rome, Alcoa had never merged with another company and the court below apparently so found (R. 1322, 1108).[5] Subsequent to the Rome acquisition, however, Alcoa acquired Cupples Products Corporation, a fabricator of aluminum architectural products (GX 48, R. 1584);[6] and Rea Magnet Wire Company, Inc., a manufacturer of magnet wire, with sales of $25 million in 1959 (*ibid.*; GX 41, R. 1567; GX 44, R. 1572). Alcoa's unwillingness to duplicate the expertise, facilities, and marketing organization it had acquired from Rome, and also the pendency of this antitrust litigation, discouraged further acquisitions. Thus Alcoa rejected merger proposals it received from other manufacturers of wire and cable.

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[5] But see *Aluminum Company of America* v. *Federal Trade Commission*, 284 Fed. 401 (C.A. 3), and *United States* v. *Aluminum Company of America*, 44 Supp. 97, 106, 188–189 (S.D.N.Y.)

[6] The government is presently attacking this merger as a violation of Section 7 of the Clayton Act. *United States* v. *Aluminum Company of America*, Civil No. 61 C 147(2) (E.D. Mo.).

(R. 959–960; R. 1109–1111; GX 250–254, R. 2352–2357; GX 261, R. 2362; GX 264–266, R. 2373–2375)

In 1958, the last year prior to the merger, Alcoa was the leading producer of aluminum conductor, with 27.8 percent of the market (GX 434, R. 2713). In the field of insulated and covered aluminum conductor, Alcoa ranked third, with 11.6 percent of the market (GX 436, R. 2717). In bare aluminum conductor and ACSR—the other component of the broader aluminum conductor line—Alcoa led the industry with 32.5 percent of the market, (GX 435, R. 2715).

Rome.—Rome Cable Corporation was incorporated in 1936 and began business in Rome, New York, as a fabricator of copper conductor wire and cable. By the time it was acquired twenty-three years later, Rome had acquired two additional plants, at Collegeville, Pennsylvania, and Torrance, California, and had grown into one of the nation's largest and most important independent fabricators of aluminum and copper wire and cable products. One year after its incorporation, Rome reported assets of $1.9 million and annual sales of $1.8 million; on March 31, 1958, a year before its acquisition, Rome's assets had increased to $24 million and its annual sales to $40.6 million (GX 9, R. 1400, 1405, GX 17, R. 1493, GX 47, R. 1577). In the five years preceding the acquisition, Rome's sales averaged $47 million annually (GX 7, R. 1346).

Rome enjoyed an excellent reputation in the trade because of its broad range of high-quality aluminum and copper conductor and accessory products, its

high degree of technical skill, and its substantial achievements in research and development. It was not only a substantial producer of aluminum conductor (GX 436, R. 2717), but also one of the nation's ten largest manufacturers of copper conductor (R. 1314). It produced both bare conductor and "a diversified line" of insulated conductor, both copper and aluminum, as well as companion products such as conduit and cable support devices. This range of conductor and accessory products compared favorably with the offerings of other independent fabricators, was much broader than Alcoa's, and constituted an important competitive asset—one which Alcoa was particularly eager to acquire (R. 33, 393, 473, 666, 1055, 1057, 1077; Fdg. 16, R. 1285; Fdg. 21(a)(b), R. 1286–1287; GX 7, R. 1346; GX 158, R. 2171; GX 161, R. 2179, 2183).

Rome possessed an outstanding marketing organization, with a nationwide network of salesmen, warehouses and distributors. While it was not the company's policy to initiate price-cutting, Rome was, in the words of its president, an "aggressive competitor" (R. 937; see GX 227, R. 2273). Following the merger, the marketing of all electrical conductor and conduit produced either by Alcoa or by Rome plants was assigned to Rome personnel (R. 1063–1064; GX 6, R. 1343, R. 1536; GX 52, R. 1743; GX 370, R. 2533). Thus, all of Alcoa's aluminum conductor products—products in which it had led the industry for a number of years—were henceforth to be distributed by Rome's sales organization.

In other ways, too, Rome was a leading wire and cable company. It began operations as the only independent conductor fabricator with its own copper rod-rolling mill (R. 930; GX 52, R. 1742); and was one of the first fabricators of copper wire and cable to develop facilities for the production of aluminum rod (GX 52, R. 1742). As one of four independent fabricators which were integrated backward through the aluminum rod-making stage (R. 226, 403–404; R. 545; R. 991), Rome produced both aluminum and copper rod for its own use and for resale to others (Fdg. 16, R. 1285). Thus while most independents must buy aluminum rod, an intermediate product, for drawing into wire, Rome was able to buy aluminum ingot, the primary product—a significant competitive advantage (R. 72, 545).

Rome was also noted for its outstanding research activities and technical know-how, particularly in the field of insulated aluminum conductors (R. 1073, 1314, 1321; GX 7, R. 1346). It was Rome which developed the most popular service drop cable in use today (R. 671–673, 936). In the year before the merger, the company opened the Rome Research Center, a $675,000 faciilty, to expand its research program and stimulate the development of new products (GX 7, R. 1346; GX 132, R. 2057).

In 1958, Rome shipped approximately $21.2 million worth of copper conductor wire and cable (Fdg. 68, R. 1296) and $2.2 million worth of aluminum con-

ductor wire and cable (Fdg. 68, R. 1296). It accounted for 1.3% of the market in aluminum conductor (Fdg. 45(a), R. 1292; GX 434, R. 2713), .3% in bare aluminum and 4.7% in insulated aluminum conductor (Fdg. 45(a), R. 1292; GX 435, R. 2715; GX 436, R. 2717). At the time of its acquisition, Rome employed approximately 1,500 persons. Its stock, held by about 2,500 persons, was traded on the New York Stock Exchange (GX 7, R. 1346). In the decade prior to the merger, Rome had acquired the assets of T. J. Cope, Inc., a Pennsylvania manufacturer of cable support devices, and of the Anderson-Carlson Manufacturing Co. of Torrance, California, whose plant Rome subsequently used for the manufacture of electrical conduit (R. 930; GX 23, R. 1511; Fdg. 16, R. 1285; GX 9, R. 1369–1370).

2. THE ALUMINUM CONDUCTOR INDUSTRY

The products.—In 1958, the national output of aluminum conductor wire and cable (aluminum conductor) was 226 million pounds, consisting of 175 million pounds (77 percent) of bare aluminum cable and ACSR (bare aluminum conductor) and 51 million pounds of insulated and covered[7] aluminum con-

[7] In the trade, an "insulated" conductor bears a larger amount of insulating material than a "covered" conductor. The insulating material on a "covered" conductor is primarily designed to fend off external damage, such as might result from contact with trees, although it also provides some degree of protection against the escape of electricity; the thicker insulating material on an "insulated" conductor renders complete protection against the escape of electricity.

ductor wire and cable (insulated aluminum conductor) (GX 434–436, R. 2713–2718). These products are designed almost exclusively for use by electric utilities in carrying electric power from generating plants to consumers throughout the United States. Copper is the only other material utilized commercially for the same general purpose. However, each metal has found, or is in process of finding, those particular utility applications for which it is peculiarly fitted from a commercial standpoint.

The 3,300 operating electrical utilities which presently purchase such wire have developed clear patterns of use for copper cable and for aluminum cable, both in transmission lines (the "wholesale" lines which carry current at high voltages to substations) and distribution lines (the "retail" lines which route the electricity at reduced voltages from the substations to the consumers). Both types of lines are usually strung above ground, except in heavily congested areas, such as city centers, where they are run underground. Underground, where the conductor must be heavily insulated, copper has always been and remains today virtually the only conductor used (GX 468, R. 2746). Overhead, where transmission and some distribution lines are bare and other distribution lines are less heavily insulated, aluminum has "virtually displaced," or is rapidly displacing, copper conductor in all except seacoast areas, where aluminum's vulnerability to corrosion bars its use (R. 65, 173–176, 207–

209, 224, 392–393, 630–632, 997; Fdg. 24, R. 1288; GX 468, R. 2737, 2740; GX 469, R. 3205; GX 474, R. 3206). By 1950, 74.4 percent of all additions to overhead transmission lines were being constructed with bare aluminum conductor or ACSR (aluminum cable, steel reinforced); by 1959, this figure had increased to 94.4 percent (GX 468, R. 2740). As the district court found, bare aluminum conductor "has practically displaced copper for use in overhead transmission lines" (R. 1316). For ease of reference, the rapid changover from copper to aluminum in the two overhead fields is charted in the following table (GX 468, R. 2740):

Percent of Aluminum Conductor in Gross Additions to Overhead Utility Lines

	1950	1955	1959
Transmission Lines (All Bare Conductor)	74.4%	91.0%	94.4%
Distribution Lines, Bare Conductor	35.5	64.4	79.0
Insulated Conductor	6.5	51.6	77.2
Total, Transmission and Distribution Lines	25.0	60.9	80.1

Aluminum conductor has achieved its present stature as the dominant overhead conductor primarily because, in both bare and insulated forms, it is substantially cheaper than comparable copper conductor (R. 63, 160–161, 177–178, 182, 210, 218–219, 297–299, 390–393, 1225–1229). For example, as of January 1, 1961, the prevailing price of a representative insulated aluminum weatherproof conductor was $73.50 per 100 feet, while a copper conductor of equivalent conductivity cost $115.83. Similarly, a representative aluminum service drop cable and its copper equiv-

alent cost $114.00 and $206.00, respectively (R. 1228, 1229). This price differential is a function of the peculiar characteristics and disparate prices of the two primary metals. One pound of aluminum conducts the same amount of electricity as two pounds of copper (R. 182; GX 50, R. 1650; GX 366, R. 2510).[8] Thus, even were the prices of aluminum and copper identical, pound for pound, aluminum is still only half as expensive a conductor metal (R. 160, 182).[9]

In addition to the substantial price advantage of aluminum conductor over copper conductor, the cost of a completed overhead line constructed with aluminum is less than the cost of a comparable line constructed with copper. This is so, whether the overhead line is bare or insulated (R. 210, R. 298–299).[10]

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[8] Aluminum is roughly a third as heavy as copper but possesses about 62 percent of the conductivity of copper; as a result, an aluminum cable will be larger in volume but lighter in weight than a copper conductor of equivalent conductivity (R. 974; GX 32, R. 1543; GX 50, R. 1650; GX 366, R. 2512–2513).

[9] For a comparison of aluminum and copper prices see GX 467, R. 2736. It is notable that the price of aluminum has remained reasonably steady while the price of copper has been subject to rapid and substantial fluctuations (R. 50, 548, 1072; GX 9, R. 1365; GX 373, R. 2546).

[10] A 1959 study by the Consolidated Edison System of New York City concluded that for "relatively short extensions" of 300 to 2000 feet to existing copper overhead lines, and for service drop cable, "there appears to be little, if any difference between the [completed] costs of aluminum extensions

While the price of the aluminum conductor is the measure of its over-all economic advantage in overhead distribution lines, there are additional sources of savings in overhead transmission lines—notably, aluminum's lighter weight (per given conductivity), which allows the use of fewer supporting structures, and its larger area, which reduces corona loss (the escape of electricity into the atmosphere) (R. 161–162, 298).

For a utility to switch from copper to aluminum or vice versa is an expensive undertaking. Aluminum and copper conductors differ in strength, resistance to nicking, tendency to extrude under pressure, flexibility, and other technical characteristics (R. 185–186, 419–420; GX 32, R. 1543; GX 50, R. 1713–1714, 1727, 1729–1731). Because of the galvanic corrosion

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and copper extensions at the current cable prices and with available splicing techniques" (AR. 76, R. 3472). Accordingly, Xenis, an engineer for Consolidated Edison, testified that the company "[was] not saving money" in using aluminum for overhead distribution, despite the lower cost of the conductor itself (R. 712). He went on to say, however, that the system covering New York City is "not exactly typical", that the "little pieces" it adds to its overhead system are shorter than the additions or new construction undertaken by other distribution systems, and that savings in completed line cost resulting from the use of aluminum increase with the length of the new line (R. 713, 714, 716). Moreover, in 1960, a year after this study was made, Consolidated Edison switched to insulated aluminum conductor for service drop cable, to "take advantage of the savings which * * * were in favor of [aluminum] service drops" (R. 712).

between the two metals, it is impossible to connect one to the other without specially designed connectors (R. 176). Accordingly, a shift from one conductor metal to the other requires the retraining of line crews in new installation techniques, the use of special connectors, the warehousing of a new stock of cable replacements, and the redesigning of construction specifications (R. 173, 176, 186, 213–215). Utilities, therefore, do not "flip back and forth from one conductor to another" (R. 212). They would abandon aluminum and return to copper only if the relative prices of the two metals altered sufficiently to reverse the present relationship of completed line costs, and even then only if they were convinced that the reversal would be reasonably permanent (R. 212, 301). No such development is anticipated in the foreseeable future (R. 212–213, 217, 299).

In electrical conductor applications other than overhead transmission and distribution, aluminum has physical disadvantages which prevent it from competing effectively with copper. As one utility executive explained (R. 300):

> [W]here aluminum has advantages aside from price * * * is in transmission overhead. Underground, aluminum, aside from price, has only disadvantages. Because of its greater size for given conductivity it requires more insulation. Insulation is expensive. So the non-conductor part which is a material part in cables [is] where the costs concerned have increased. Its

> greater size tends to require larger ducts which are expensive so it has no inherent advantage in use for underground cable. In fact, it has inherent disadvantages * * *.

Thus, for underground transmission and distribution of electricity, and for communication cable, aluminum is seldom employed (R. 176, 183, 211–212, 997–998, 2741). Moreover, its larger size and greater brittleness discourage its use in magnet wire and fine wire applications (e.g., electrical coils and motor windings (R. 433–435, 998)), shipboard cable (R. 419), switchboard and control cable (R. 420–421), battery cable and other automotive wiring (R. 221), flexible cords (R. 223, 275, 999; GX 267, R. 2380), portable power cable (R. 420; GX 375, R. 2580), or welding cable (R. 420). Because of its larger size and the connection problems it raises, aluminum has gained only limited acceptance in the building wire field (R. 235, 274, 418–419, 539). In short, while aluminum conductor now dominates the overhead field, copper remains virtually unrivaled in all other conductor applications.

As the district court found, aluminum and copper conductors sell at different prices and there is no price sensitivity between them (R. 63, 392, 435–436, 1316; see GX 467, R. 2736). Each conductor responds to changes in the price of its primary metal, but not to changes in the price of the other conductor (R. 391, 435–436, 506; 857–858; GX 354–355, R. 2465).

Differences in the economics of aluminum and copper conductors were reflected in appellees' agency agreements, which employ separate categories, and provide for different sales terms and commission rates for each conductor (GX 233, R. 2302; GX 243, R. 2343; GX 270–274, R. 2383–2398; GX 365, R. 2502; GX 369, R. 2528). Some of appellee's distributors handle only copper conductors while others are primarily concerned with aluminum conductors (GX 370, R. 2533).

Finally, Alcoa and other aluminum conductor fabricators concern themselves with competition from one another but do not follow in the same fashion the sales successes of copper conductor fabricators (R. 412, 683–684, 686; GX 353, R. 2462; AR. 29a, R. 3343).

The structure of the industry.—As previously noted, in 1958, the year prior to the merger, Alcoa was the largest producer of aluminum conductor, with 27.8% of the market, and the third largest producer of insulated aluminum conductor, with a market share of 11.6% (Fdg. 45(a), R. 1292). In the same year, Rome's market shares were 1.3% in aluminum conductor and 4.7 % in insulated aluminum conductor (*ibid.*). Thus, the merging companies together accounted for 29.1% of aluminum conductor and 16.3% of insulated aluminum conductor (*ibid.*). In 1961, three years later, Alcoa-Rome, operating as a single company, accounted for 24.8% of the aluminum con-

ductor market and 13.0% of the insulated aluminum conductor market (*ibid.*).[11]

In 1958 sales of aluminum conductor were distributed as follows. (GX 434, R. 2713):

Alcoa	27.8%
Kaiser	23.1%
Anaconda	15.8%
Reynolds	10.4%
General Cable	6.0%
Olin Mathieson	4.5%
Essex	4.5%
Southwire	2.3%
Rome	1.3%
Total, above nine companies	95.7%
All other producers	4.3%

Thus, the five integrated producers (Alcoa, Kaiser, Reynolds, Anaconda, and Olin Mathieson)[12] accounted for 81.6% of the market (see GX 438, R. 2719; cf. R. 1322), while four fabricators (General Cable, Essex, Southwire, and Rome) shared an additional 14.1%.

[11] In 1954, Alcoa's share was 42.8 percent of aluminum conductor and 10.0 percent of insulated aluminum conductor; in the same year Rome's shares were 1.1 percent and 6.9 percent, respectively (Fdg. 45(a), R. 1292).

[12] Ormet, Inc., a primary aluminum producer, is one-half owned by Olin Mathieson (GX 438, n. 5, R. 2720).

In the field of insulated aluminum conductor, a similar pattern of concentration prevailed, with 1958 sales distributed as follows (GX 436, R. 2717):

Kaiser	26.8%
Anaconda	16.9%
Alcoa	11.6%
General Cable	9.5%
Essex	6.1%
Olin Mathieson	5.3%
Reynolds	4.8%
Rome	4.7%
Southwire	2.5%
Total, above nine companies	88.2%
All other producers	11.8%

The five integrated producers thus accounted for 65.4% of insulated aluminum conductor and the four listed independents for another 22.8%.

While the district court found that there were 29 producers of insulated aluminum conductor in 1961 (Fdg. 54, R. 1294), only 11 of the companies referred to by the court [13] had market shares of 1% or more in 1959, the latest year for which statistics are available: Kaiser (23.8%), Anaconda (18.8%), Alcoa-Rome (16.6%), General Cable (10.4%), Olin Mathieson (4.5%), Reynolds (4.4%), Essex (4.1%), Southwire (3.9%), General Electric (1.5%), Circle (1%), and Central.[14] Of the other listed companies,

[13] The finding of 29 insulated aluminum companies is based upon AR 5 (R. 3229), a Commerce Department directory.

[14] The market shares of all but the last of the listed companies appear in GX 436 (R. 2717). Central, which supplied the government no information concerning its sales, is assumed to have been a substantial producer of both aluminum conductor and of insulated aluminum conductor (R. 75, 387).

three had 1959 market shares of less than one percent;[15] one (Westinghouse) produced less than 100 pounds of insulated aluminum conductor; and another (Western Electric) produced none at all (GX 436, R. 2717–2718). By the time of trial, five more listed companies (Crescent, Triangle, Collyer, Hudson, and Narragansett) were out, or "almost completely out," of the field (R. 242–243, 273, 422–423, 433, 536–537), while another seven (Belden, Electric Auto-Lite, Hatfield, Kerite, National Electric Products, Simplex, and Surprenant) did not make the aluminum conductor products principally used in overhead distribution lines (R. 1245, 1087–1088). The last of the 29 listed companies, Texas Wire and Cable Co., is the defunct subsidiary of Narragansett, *supra* (R. 536–537, 546).

The district court also found that more than 200 companies manufacture and sell electrical wire and cable (Fdg. 81, R. 1299). This total, however, includes all companies engaged in any phase of the business, *e.g.*, the manufacture of enameled magnet wire or submarine cable (AR 71, R. 3425; AR 73, R. 3441). Appellees listed but 21 companies as producers of the aluminum or copper insulated conductors principally used in overhead lines (R. 1245).

In the period 1955–1961, there was a substantial increase in the portion of the aluminum conductor and the insulated aluminum conductor markets shared by integrated producers. In 1955 the three then

[15] Hendrix (.9%), Okonite (.6%), and Walker Bros. (.3%) (GX 436, R. 2717–2718).

existing primary aluminum producers (Alcoa, Reynolds, and Kaiser) accounted for 66.5% of the aluminum conductor market (GX 438, R. 2719). By 1958, five integrated producers (Alcoa, Reynolds, Kaiser, Anaconda, and Olin Mathieson) accounted for 81.6% of that market (ibid.). These same companies shared 82.1% in 1961 (AR 61, R. 3412). In the insulated aluminum conductor field, three integrated companies had 39% of the market in 1955, and five had 65.4% and 66.5% in 1958 and 1961, respectively (GX 440, R. 2723; AR 60, R. 3411). These increases—15.6 percentage points in aluminum conductor and 26.4 percentage points in insulated aluminum conductor—resulted, in part, from (1) the backward integration of Anaconda, a wire and cable fabricator which expanded into primary aluminum production in late 1955 (GX 438, R. 2719); and (2) a series of acquisitions by primary producers of previously independent aluminum conductor fabricators.

In 1957, Olin Mathieson acquired Southern Electrical Corporation, an independent which in the previous year had market shares of 8.1% in aluminum conductor and 6.1% in insulated aluminum conductor (Fdgs. 47–48, R. 1293; GX 434, 436, R. 2713, 2717). Also in 1957, Kaiser acquired the Bristol, Rhode Island, wire and cable plant of the U.S. Rubber Company, which in 1956 accounted for .8% of aluminum conductor shipments and 3.2% of insulated aluminum conductor shipments (*ibid.*).[16] The Alcoa-

[16] The government has filed suit to invalidate this merger under Section 7 of the Clayton Act. *United States* v. *Kaiser Aluminum and Chemical Corporation*, Civil No. 2795 (D. R.I.).

Rome merger came in 1959, and in 1961, partially in response to the Olin-Southern, Kaiser-Bristol and Alcoa-Rome mergers, Reynolds acquired the wire and cable facilities of John A. Roeblings' Sons Division of the Colorado Fuel and Iron Company, a small fabricator (Fdgs. 47–49, R. 1293; GX 387, R. 2606; GX 396, R. 2620). Finally, in February 1963, after the district court had rendered its decision in this case, Aluminium Ltd., a Canadian primary producer, announced the acquisition of Central Cable Corporation, a substantial independent (see n. 14, p. 20, *supra*)."[17]

The independent fabricators have experienced difficulties in competing against the integrated producers. From time to time, they have been affected by shortages of aluminum (R. 384, 387, 492–493, 958) and by "price squeezes," *i.e.*, reductions in the price margin between primary or semi-finished aluminum and fabricated aluminum conductor (R. 69, 389–390, 399–402, 411–412, GX 96, R. 1940; GX 245, R. 2345; GX 422–433, R. 2699–2712; AR 57, R. 3407). Alcoa has been cognizant of "the problem of selling ingot or intermediate products to customers who were also competitors in the sale of the finished product" (R. 1113; see GX 191, R. 2231), and through its pricing policy has attempted, unsuccessfully, to maintain an adequate margin for independent fabricators (R. 1113–1116; see also R. 832–833; cf. R. 1119–1120 and GX 191, R. 2231). Nonetheless, between 1955 and 1961, a number of fabricators discontinued, or materially curtailed,

[17] Another primary aluminum producer, Harvey Aluminum Company is presently considering entry into the aluminum conductor field by acquisition of an existing manufacturer (R. 474).

their aluminum conductor production because of inability to operate profitably within this price margin.[18] During this same period of time, only one new producer [19] entered the aluminum conductor field (other than by acquisition) (GX 442, R. 2727), and three existing independents expanded their production facilities (R. 75, 406, 984–985). One of the three was Central Cable Corporation, since acquired by an integrated producer (*supra*, p. 23).

3. THE MERGER

The Alcoa-Rome merger had its genesis in the early 1950's, when aluminum conductor was first coming into its own (GX 468, R. 2740). In 1950–1951, when both copper and aluminum were scarce, Rome was one of eight producers to receive government allocations of aluminum for the fabrication of insulated conductor (R. 695, 937). Rome thereupon entered the aluminum conductor field and began fabricating covered line wire and service drop cable from bare aluminum cable which it purchased readymade (R. 696; GX 54, R. 1761). As copper prices increased

[18] Collyer, which in 1956 produced 258,145 pounds of aluminum conductor, both bare and insulated, produced 56,463 pounds in 1960 (R. 422). Triangle, which produced 368,000 pounds of aluminum conductor in 1956, entirely discontinued aluminum conductor production in 1961 (R. 242–243). The aluminum conductor production of Essex experienced a substantial decline, beginning in 1959 (R. 225–226). Narragansett, which in 1956 organized and equipped a subsidiary corporation, Texas Wire and Cable Co., to make insulated aluminum conductor, abandoned the enterprise before production even began (R 536–537). See also the experience of Crescent (R. 273).

[19] Hatfield Wire and Cable Division of Continental Copper and Steel Industries, Inc.

(GX 467, R. 2736) and aluminum conductor became more popular (GX 468, R. 2740), Rome expanded its aluminum conductor operations. In 1953 it began drawing its own aluminum wire and stranding its own aluminum cable (R. 696); by late 1953 it was making its own aluminum rod, selling both a full line of covered aluminum line wire and service drop cable, and a limited line of bare aluminum conductor (R. 697; GX 80, R. 1867; GX 86, R. 1901).

Also in the early 1950's Alcoa determined that it was "dragging behind in the parade" because it lacked a line of insulated aluminum conductor (R. 1077). Lacking the technical skills necessary to make this product unassisted, it approached Rome. In late 1951, Alcoa's vice president for sales visited the chairman of Rome's board of directors, and, as he described it:

> * * * told him we were lamentably behind * * * in covered insulated wire and cable and asked him if we could make some arrangement whereby they, Rome Cable, would supply us with technical assistance and know how. (R. 1078.)

Ensuing discussions with Rome convinced Alcoa that the manufacture of insulated conductor was even more difficult than it had assumed (GX 71–72, R. 1836–1847); accordingly, it postponed plans to make insulated aluminum conductor on its own (GX 76, R. 1854). Instead, on March 7, 1952, it entered into a "tolling" arrangement with Rome, under which bare aluminum conductor would be shipped by Alcoa to Rome, fabricated by Rome into polyethylene and

neoprene covered line wire and service drop cable, and returned to Alcoa for sale as an Alcoa product (R. 1078; GX 28, R. 1536). Pursuant to this arrangement, Rome produced all of Alcoa's insulated aluminum conductor until 1955. In that year Rome made 4,349,000 pounds of insulated aluminum conductor (10.8% of the market) for sale by Alcoa and 2,728,000 pounds (6.9%) for its own sales (GX 436, R. 2717).

In 1955, Rome increased its neoprene insulating facilities at Alcoa's request (GX 30–31, R. 1538–1539) and at the same time expanded its own aluminum conductor operations independent of the tolling arrangement. In that year it launched a program to increase its aluminum conductor capacity and to double its aluminum rod-making capacity (GX 52, R. 1750; GX 96, R. 1938; GX 98–99, R. 1943–1944; GX 102, R. 1954; GX 104–105, R. 1977)—a program which was nearly completed two years later (GX 128, R. 2040). In addition to its insulated aluminum activities, Rome produced and actively solicited sales of ACSR (GX 81, R. 1870; GX 85, R. 1899).[*] Moreover, on a number of occasions between its entry

[*] In December 1958, a month before the merger was arranged, Rome applied to the Tennessee Valley Authority for a position on its approved list of ACSR suppliers, and an inspection of Rome's facilities was arranged by T.V.A. (R. 163). The immediate purpose of the request was to enable Rome to become an approved supplier of ACSR to the Knoxville Utilities Board and other southeastern utilities (R. 759–760, 785–786; GX 134, R. 2074; GX 135, R. 2076; GX 136, R. 2077). This request was withdrawn following the merger. (R. 163; GX 183–186, R. 2225–2227).

into aluminum conductor and its acquisition, Rome gave serious consideration to the expansion of its ACSR and bare aluminum cable production (R. 940–941; GX 91, R. 1922, 1924; GX 102, R. 1952; GX 118, R. 2010).

In 1955 Alcoa determined that its insulated aluminum conductor operations should become independent of Rome. As a first step in that direction, it installed equipment to fabricate polyethylene insulated cable and, by 1958, was able to satisfy most of its polyethylene requirements from its own production (R. 1079, 1096–1097; GX 141, R. 2092; GX 146, R. 2097). The second step was to be the installation of neoprene insulating equipment; with both polyethylene and neoprene insulating capacity, Alcoa would have been completely independent of Rome for insulated aluminum conductor. Beginning in 1957, Alcoa made neoprene studies,[11] and by March 1959, when Rome was acquired, it had already allocated funds for neoprene equipment and was considering a further allocation (R. 1079–1080; GX 155, R. 2165; GX 156, R. 2168; GX 269, R. 2382)."

Alcoa's plans for expansion in insulated conductor were not, however, limited to polyethylene and neoprene types. In 1957, as previously noted, Kaiser acquired the Bristol plant and Olin Mathieson acquired Southern Electrical (*supra*, p. 22). With these mergers, Alcoa believed its "No. 1 spot" in aluminum conductors to be endangered, particularly

[11] Following the merger, these expenditures were cancelled (R. 1131–1132; GX 155–156, R. 2165–2168).

by Kaiser, since Alcoa still lacked a full line of aluminum and copper conductors of its own manufacture (GX 150, R. 2127; GX 161, R. 2179; GX 168, R. 2193). It was felt that a full line was necessary (1) to diversify Alcoa's conductor business and allow it to satisfy all of its customers' requirements (R. 1055, 1080); (2) to attract and retain good distribution outlets (R. 1055); and (3) to encourage the expanded use of aluminum in insulated conductors, thereby enlarging the conductor market for primary aluminum (R. 1054, 1080).

Of the two methods by which it could obtain a full line—internal expansion or merger—Alcoa considered the latter to be easier, faster, less expensive, less risky, and less "obnoxious" to its competitors (R. 1056–1058, 1089, 1104; GX 162, R. 2185). Accordingly, Alcoa first attempted merger (R. 1059). Rome, with its excellent personnel and technical know-how was considered to be the best acquisition Alcoa could make and its absorption "the answer to the present Kaiser threat to push Alcoa out of first place in the electrical conductor field" (GX 161, R. 2183; see also GX 158, R. 2171). Thus, in October, 1957, Alcoa offered $24,000,000 in Alcoa stock in an unsuccessful attempt to acquire Rome (R. 951, 952; GX 165, R. 2190). Similar efforts—these, too, unsuccessful—were made to acquire other companies (GX 398–408, R. 2621–2640).

When it appeared that all of Alcoa's merger attempts had failed, it turned its attention to internal

expansion. In October 1958, Alcoa's president ordered that plans begin for—

> * * * a rounded out program well beyond the neoprene stage and a program which * * * would * * * keep us in the No. 1 spot in the aluminum conductor field, and, if necessary, a sufficient factor in the copper field to help maintain the No. 1 position in the aluminum field. (R. 1061; GX 168, R. 2194; see also GX 169, R. 2195.)

An Alcoa task force worked out plans for a new plant to produce insulated aluminum and copper conductor, setting as its target 5% of the insulated wire and cable market (GX 170–173, R. 2195–2206; GX 175, R. 2206; GX 178, R. 2208). It was anticipated that this expansion program would have cost about $35–$40 million and taken five to ten years to accomplish (R. 1089–1090, 1126). These plans, however, were never passed upon by Alcoa management (R. 1064),[22] for merger negotiations were renewed with Rome and this time proved successful (R. 952). On March 31, 1959, 355,226 shares of Alcoa stock, worth about $34 million, were exchanged for all the assets of Rome (Fdg. 6, R. 1284; GX 7, 1345; GX 9, R. 1427).[23] Since that time Rome has been operated as an Alcoa subsidiary (Fdg. 4, R. 1283).

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[22] Alcoa's vice president for sales testified that he would not have recommended approval of this program (R. 1090); Alcoa's president did not testify as to what his decision on the program would have been (R. 1056–1057; but see GX 169, R. 2195).

[23] The transfer was accomplished through the formation by Alcoa of a subsidiary corporation, the Rome Cable Corpora-

4. PROCEEDINGS BELOW

The government's complaint, filed April 1, 1960, charged that the acquisition violated Section 7 of the Clayton Act because of its impact upon competition in various conductor and accessory product lines (R. 1). Pending final adjudication on the merits, the district court enjoined Alcoa from encumbering the stock of its Rome subsidiary, and from further transferring operations from Rome to any other plants of Alcoa. At trial, the government claimed that the forbidden anticompetitive effect would be felt in ten "lines of commerce", only two of which—aluminum conductor (consisting of both bare and insulated types) and insulated aluminum conductor—are involved in this appeal.

After trial, the district court dismissed the complaint (R. 1304). The court concluded that aluminum conductor and insulated aluminum conductor were not appropriate submarkets for assessing the impact of the merger, and that in any event the merger lacked the prohibited anticompetitive effect in any asserted line of commerce (Conc. 3, 8, R. 1302, 1303; R. 1316–1317, 1333).

The court found bare aluminum conductor and ACSR to be a "line of commerce" within the meaning of the statute (Conc. 2, R. 1301–1302; R. 1316). But it denied this status to insulated aluminum conductor, finding that the latter is functionally inter-

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tion of Delaware, to which was transferred all the assets, business and good will of the Rome Cable Corporation of New York. The New York corporation was thereupon liquidated.

changeable with insulated copper conductor, that the purchase and use of insulated aluminum or insulated copper is dictated principally by economic factors, that insulated aluminum conductor and its copper equivalent can be produced by the same facilities, and that insulated aluminum conductor is not recognized in the industry as a separate economic entity, has no distinct customers, and lacks specialized vendors (R. 1316). Although finding that the aluminum and copper products sell at different prices and that these prices are not sensitive to one another, the court concluded that insulated aluminum conductor is "in actual competition with its copper counterpart", and therefore could not be considered a "line of commerce" (*ibid.*). Having so concluded, the court further held that aluminum conductor (the broader product group including both insulated and bare aluminum conductor) "cannot result in a line of commerce" (*ibid.*), since a line of commerce cannot be composed of two parts, one of which independently qualifies as a line of commerce and one of which does not.

Turning to the issue of probable competitive effect, the district court found that Alcoa's purpose in acquiring Rome was to secure the special competence which Rome had developed in the insulated cable field and which Alcoa admittedly lacked (R. 1321); that the concentration of about 80 percent of the aluminum cable market in the five integrated producers "loses its significance when it is realized that the production of aluminum and the fabricating of its products were concentrated to the point of a monopoly

less than twenty years ago and has undergone a gradual decentralization by the entry of new producers and fabricators since that time" (R. 1322); and that acquisitions in the aluminum cable field by other integrated producers, which preceded and followed the Alcoa-Rome merger, do not constitute a "significant pattern or trend of merger," especially in view of the post-merger declines suffered by the merging parties (*ibid.*; Fdg. 46–48, R. 1293).

The court found no serious barriers to entry in the insulated aluminum market, noting that the number of producers had increased in ten years from four to twenty-nine, and that most of the new entrants had come from the copper field (R. 1323). It also relied upon the absence of any complaints concerning the "actual or potential effect of the acquisition upon suppliers and purchasers," and upon testimony from certain aluminum cable competitors and purchasers that no adverse effect had been felt (R. 1326, 1330). Finally, taking into account the declining market shares held by Alcoa, both before and after the Rome acquisition,[24] a decline in the rate of return on Alcoa's invested capital, and the increase in the number and market shares of other primary aluminum producers and cable fabricators, the court concluded that Alcoa does not enjoy a "dominant" position (R. 1327).

[24] See *supra*, pp. 18–19.

SUMMARY OF ARGUMENT

I

If the Alcoa-Rome merger stands, its principal effects will be felt in the aluminum conductor and the insulated aluminum conductor markets. Both product groups are appropriate lines of commerce distinguishable from their copper counterparts largely on the basis of price. For overhead transmission and distribution of electricity, aluminum conductors (both bare and insulated) are substantially cheaper than comparable copper conductors. Moreover, aluminum and copper prices are unrelated and unresponsive to each other. As a result, aluminum has rapidly become the dominant overhead conductor. In all other conductor applications, however, copper remains the dominant conductor. Aluminum's price advantage is restricted to the overhead field and its physical characteristics constitute substantial impediments to its use elsewhere. That aluminum and copper conductors possess such distinct end uses, as a result of these economic differences, is sufficient to distinguish them as separate Section 7 lines of commerce.

II

Taking aluminum conductor and insulated aluminum conductor as the appropriate lines of commerce,

we base our attack upon the merger upon two propositions:

First, Alcoa is a leading firm in markets in which economic power is already highly concentrated.

Second, any acquisition of a significant competitor by one of the few dominant firms in a market in which economic power is already highly concentrated may tend "substantially to lessen competition" within the meaning of Section 7 of the Clayton Act, even though the acquired firm has only a relatively small share of the market.

A. There can be no doubt either as to Alcoa's leading position or as to the highly concentrated character of the relevant product markets. In aluminum conductor, the broader line of commerce, Alcoa led the industry with a premerger market share of 27.8%. With its leading integrated competitor (Kaiser), it controlled 50% of the market; with its three leading competitors, more than 76%; only nine concerns—the five primary aluminum companies plus four independents (including Rome, with 1.3%)—accounted for 95.7% of the output of aluminum conductor. No other company whose statistics appear in the record claimed as much as 1% of the market. In the narrower market—insulated aluminum conductor—a similar pattern prevailed, except that Alcoa's third ranking share was somewhat lower (11.6%) and Rome's somewhat higher (4.7%).

B. The critical proposition upon which the present case turns, is that Section 7 is violated by any acquisition of a significant competitor by one of the leading firms in a market in which economic power is highly

concentrated, even though the acquired company's share of the market is relatively small. That proposition was endorsed in *United States* v. *Philadelphia National Bank*, 374 U.S. 321, 365, n. 42, where this Court stated that "if concentration is already great, the importance of preventing even slight increases in concentration and so preserving the possibility of eventual deconcentration is correspondingly great." That principle is dictated by the basic purposes of the 1950 amendments to Section 7 and is supported by the following reasons:

1. An acquisition such as this threatens competition by enhancing the power of a concern which already controls an undue share of the market. On the eve of the acquisition, Alcoa controlled 27.8% of the aluminum conductor market; the acquisition added 1.3%. In the *Philadelphia Bank* case, this Court observed that a market share of 30% by the combined merging companies clearly represented an undue threat to competition, and it noted, citing the views of economists, that a smaller percentage might also be excessive.

2. In an industry where the number of sellers is few, the competitive significance of each company is correspondingly great and transcends its bare market percentage. In the present case the market shares of the acquired company—1.3% in aluminum conductor and 4.7% in insulated aluminum conductor—may not appear great in absolute terms, but loom larger when it is observed that in the aluminum conductor market there were not more than a dozen companies which could account for as much as 1% of

industry production in any one of the five years for which statistics appear in the record. Rome was consistently one of those companies. In addition, Rome, though not a price innovator, was nonetheless shown to be an "aggressive competitor." Its broad line of high-quality wire and cable products, its special aptitude and skills in the field of insulation, and its "active and efficient research department and sales organization"—all acknowledged by the court (R. 1313)—had earned it an outstanding reputation in the industry. The effectiveness of its marketing organization is testified to by the decision of Alcoa to make Rome the vehicle for distributing not only the insulated conductor in which Rome was the acknowledged specialist, but the entire conductor line of both companies. Enterprises of such demonstrated quality and high repute cannot easily be replaced by new entrants to the market, and their elimination is plainly a substantial loss to competition.

3. The presence in the market of small but significant concerns such as Rome is important not only as a check upon the dominant leaders in a concentrated market, but also because it preserves the possibility of eventual deconcentration. If the leaders can buy up small competitors before they have an opportunity to grow, justifying the purchase on the ground that the statistical change in market shares is quantitatively small, then it is easy to perpetuate oligopoly and preclude any possibility of the restoration of greater competition.

4. If, as *Brown Shoe Co.* v. *United States*, 370 U.S. 294, makes clear, a small acquisition in a highly dispersed industry is banned by the statute on the ground that it might constitute a step on the road to oligopoly, a comparable or more substantial acquisition by a leading company in an industry which is much further along that road plainly stands upon no better footing. Indeed, the more advanced the oligopoly, the more objectionable each step becomes and the more urgent that the policies of the Clayton Act be brought into play. In an oligopolistic industry, moreover, there is an inherent likelihood that an expansionary move by any of the few dominant firms will induce a defensive or retalitory counteraction by its principal competitors. That very process is unfolding in the aluminum conductor fields, where the absorption of Rome by Alcoa was one of the five acquisitions by producers of primary aluminum since 1957.

ARGUMENT

The primary issue in this case concerns the standards to be followed in applying Section 7 of the Clayton Act to a significant acquisition by the industry leader in an already highly oligopolistic product market. At the threshold, however, there is a controversy as to the appropriate product markets—"lines of commerce"—in which to test the impact of the merger upon competition. In Point I, we deal with the threshold question—the scope of the relevant markets. In Point II we come to the question whether, in those markets, the acquisition may have had the anti-competitive effect banned by the statute.

I

ALUMINUM CONDUCTOR AND INSULATED ALUMINUM CONDUCTOR ARE APPROPRIATE "LINES OF COMMERCE" WITHIN WHICH TO APPRAISE THE IMPACT OF THE MERGER

In the district court the government contended that the acquisition of Rome by Alcoa eliminated competition in a number of product markets and submarkets, all within the general field of conductor wire and cable. Some of these markets—including (1) conductor wire and cable (both bare and insulated, aluminum and copper), (2) insulated conductor (both aluminum and copper), and (3) bare aluminum conductor—were conceded by the defendant and found by the court to constitute "line[s] of commerce" within the meaning of the statute, but the requisite anti-competitive effect was found wanting. We do not argue against these conclusions here. In this appeal, our attack upon the merger is confined to two product lines: insulated aluminum conductor and aluminum conductor generally (both bare and insulated). As to each of these, the district court held (a) that the aluminum product was not a "line of commerce" separate and distinct from its copper counterpart, and (b) that in any case there was no reasonable probability that the acquisition would result in a substantial lessening of competition.

A. INSULATED ALUMINUM CONDUCTOR IS A "LINE OF COMMERCE"

In holding that insulated aluminum is not a submarket competitively distinct from insulated copper, the court below misapplied the guidelines laid down

by this Court in *Brown Shoe* v. *United States*, 370 U.S. 294. Ticking off the "practical indicia" listed in *Brown Shoe*, the court noted that producers do not regard the aluminum product as "a separate economic entity"; that the same equipment can be used to produce either the copper or the aluminum product; that both are sold to the same customers (electric utilities); that there are no specialized vendors; and that, as a technical matter, the insulated copper product can be used wherever insulated aluminum is used. On the other hand, the court recognized that in the only application for which insulated aluminum is widely used—overhead distribution lines—the customers make their purchases solely on the basis of economic factors; that aluminum conductors are sold at prices distinct from copper; and that there is little price sensitivity between them. These latter factors, which we regard as decisive, were dismissed by the court on the ground that they did not destroy the conclusion "that covered aluminum wire and cable is in actual competition with its copper counterpart and may not be found as a line of commerce herein" (R. 1316). Apparently, therefore, the court considered that a finding that two products are "in actual competition"—without considering the degree of competition—necessarily precludes a ruling that either constitutes a separate line of commerce. This represents a clear misunderstanding of the *Brown Shoe* decision.

In *Brown Shoe*, the Court carefully pointed out (370 U.S. at 325) that while the outer boundaries of a product market must be broad enough to embrace all reasonably interchangeable substitutes, within those

boundaries there may exist well-defined submarkets which are themselves lines of commerce. This means, obviously, that two or more products—*e.g.*, insulated aluminum cable and insulated copper cable—though sufficiently competitive to be grouped together within a single product market, may at the same time be sufficiently noncompetitive to be treated as distinct submarkets. In other words, the degree of competitiveness which serves to justify the inclusion of several items in the same product line of commerce does not necessarily preclude their division into separate submarket lines. The district court plainly failed to appreciate this point, for it characterized as an "inconsistent position" the government's contention that "insulated aluminum wire and cable is a line of commerce and therefore competitively distinct from insulated copper but * * * that insulated aluminum and insulated copper constitute a single line of commerce" (R. 1317). If the lower court's view were correct, the distinction drawn in *Brown Shoe* between broad product markets and lesser included submarkets would be completely obliterated.

Had the court applied the proper standard, it could not have failed to recognize insulated aluminum conductor as a line of commerce distinct from its copper counterpart. The record establishes that insulated aluminum and insulated copper are competitive only in the general sense that both are used as conductors of electricity. In most applications, insulated aluminum is so intrinsically inferior to insulated copper that it enjoys virtually no consumer acceptance. (See pp. 16–17, *supra*). In the field of overhead dis-

tribution, however, aluminum has rapidly become the dominant conductor. For that purpose it is functionally interchangeable with insulated copper, but enjoys a decisive economic advantage, because primary aluminum is cheaper than primary copper and, pound for pound, will carry twice as much electricity. Consequently, the price of most insulated aluminum conductors is only 50 to 65% of the price of equally conductive copper products (R. 1225–1229), and the installed costs of overhead lines are also substantially less when insulated aluminum conductors are used (R. 210; R. 298–299). Because of this substantial price differential, aluminum has dramatically displaced copper in insulated overhead distribution lines, its share of total annual installations increasing from 6.5% in 1950 to 77.2% in 1959, the last year for which statistics were available at the trial (*supra*, p. 13). As of the date of the merger, therefore, "actual competition" between the two metals in the field of overhead distribution was rapidly disappearing—just as it had already disappeared in the field of overhead transmission, where bare aluminum, having almost completely displaced bare copper, was conceded by Alcoa and found by the court to be a distinct line of commerce.

The district court apparently gave considerable weight to the fact that in 1959 insulated copper conductor still comprised 22.8% of the gross additions to insulated overhead distribution lines (Fdg. 29, R. 1289; R. 1316), and to that extent remained a competitor. Had the change-over from insulated cop-

per to insulated aluminum progressed further by 1959, the court would presumably have recognized the latter as a separate submarket, for it found bare aluminum to be a "line of commerce" largely on the ground that it had "practically displaced copper for use in overhead transmission lines" (R. 1316; Fdg. 24, R. 1288). Yet the only real difference between the two processes of displacement is that the substitution of bare aluminum for bare copper in overhead transmission started much earlier; by 1950 bare aluminum already accounted for 74.4% of all additions to overhead transmission lines, while insulated aluminum amounted to only 6.5% of new overhead distribution lines. The record reveals an unmistakeable trend away from insulated copper in the overhead distribution field, which was just beginning in 1950, and still growing in 1959 (see GX 468, R. 2748), and there is no reason to doubt that it would have continued until aluminium had superseded copper to the same degree (94.4%) as it previously had in overhead transmission.[25] It is axiomatic that Section 7 demands an assessment of future, as well as present, conditions of competition. *Brown Shoe*, 370 U.S. at 332–333.

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[25] That same government exhibit (GX 468, R. 2748) which showed that copper accounted for 22.8% of gross additions to insulated overhead distribution lines in 1959 also showed about the same relative use of copper in bare overhead distribution lines (21%). That the replacement of copper by aluminum had progressed to the same point in distribution line use, without regard to whether the line was bare or insulated, demonstrates that the trend to insulated aluminum was proceeding on a time schedule at least as rapid as that of the previous trend to bare aluminum in transmission lines.

In sum, there is only one area—overhead distribution—in which insulated copper conductors are to any appreciable extent "in competition" with insulated aluminum conductors, and even there the competition is rapidly vanishing. Utilizing a high-cost metal, fabricators of insulated copper cable are powerless to eliminate the price disadvantage under which they labor and thus can do little to make their product competitive (R. 224). Indeed, it is doubtful that they even try to be competitive, for, as the district court found, aluminum and copper conductor prices do not respond to one another. So wide is the price differential between the two insulated products that a relatively large increase in the price of aluminum conductor would be necessary before a significant number of customers would shift back to copper.[28] Moreover, the changeover from one metal to the other is a costly operation, involving a variety of collateral expenses and usually entailing a long range, high-level policy decision. This feature may explain why some utility customers, having had no occasion as yet to make substantial additions to their systems, have not yet abandoned copper for aluminum. The same feature makes it clear that even if the existing price differential between the two conductors were unexpectedly eliminated, there would be no significant return to copper.

[28] As of January 1, 1961, the prevailing price of a representative size of polyethlene insulated aluminum weatherproof wire was $73.50 per thousand feet; polyethelene insulated copper of equivalent conductivity cost $115.83. Comparable figures for a representative polyethelene insulated service cable were: aluminum $114.00; copper $206.00 (R. 1228–1229).

Accordingly, the availability of a copper substitute exerts little, if any, restraint upon the power of aluminum cable manufacturers to raise the price of their product.

Whether the separation of submarkets on the basis of price is economically and legally sound depends, of course, upon the competitive significance of the price differential in question. In *Philadelphia National Bank* this Court affirmed the lower court's finding that commercial banking is a line of commerce, despite the fact that in some services (*e.g.*, the making of small loans) banks compete with other institutions. The Court observed that commercial banks enjoy "such cost advantages as to be insulated within a broad range from substitutes furnished by other institutions" (374 U.S. at 356). In *United States* v. *Bethlehem Steel Corp.*, 168 F. Supp. 576, 593 (fn. 35) (S.D. N.Y., 1958) Judge Weinfeld found hot and cold rolled steel sheets to be separate lines of commerce, distinguishing them from each other and from aluminum and copper sheets in part on the basis of price. For "their predominant uses," he found, they "cannot be economically replaced by other products." In *Reynolds Metals Co.* v. *Federal Trade Commission*, 309 F. 2d 223, 229 (C.A.D.C.), the court of appeals affirmed a Trade Commision finding that "florist foil" was a submarket distinct from other aluminum foil since it sold at 65 to 69% of the price of other foil. "Such a difference in price as appears on this record," the court observed, "must effectively preclude comparison, and inclusion in the same market, of products as between which the differ-

ence exists, at least for purposes of inquiry under Sec. 7 of the Clayton Act." And in *United States* v. *Corn Products Refining Co.*, 234 Fed. 964, 976 (S. D.N.Y.), a Sherman Act case, Judge Learned Hand rejected an argument that the defendant, a wet miller of corn, could not be guilty of monopolizing because of competition from dry millers. He said, "[i]f the wet process is cheaper than the dry, then, although a monopoly of the wet will be limited by the dry, it is improper to consider the production of the dry millers when ascertaining the proportion of production controlled by a supposed monopolist of wet milling." See also Kaysen and Turner, *Antitrust Policy* 101–102.

In the present case there can be no doubt but that the price differential between the aluminum and copper products was so substantial and so stable as to preclude effective competition between the two.

Contrary to the district court's belief, *Brown Shoe* is no barrier to this conclusion. There the appellant's contention was that the district court had erred by delineating the relevant submarkets (men's shoes, women's shoes, and children's shoes) too broadly and should instead have subdivided them further on the basis of price and quality differences. It was in response to that contention that this Court made the statement, cited by the court below (R. 1316), that the boundaries of the relevant market must be drawn with sufficient breadth to include all competing products. By this statement, the Court indicated its approval of broad lines of commerce encompassing all reasonably competitive substitutes, but it did not thereby rule out less inclusive submarkets as well.

This is not to say that the Court would have sanctioned further subdivision of the market in *Brown Shoe* itself; on the contrary, it characterized as "unrealistic" Brown's contention "that, for example, men's shoes selling below $8.99 are in a different product market from those selling above $9.00." (*Id.* at 326.) Thus the Court pointed up the lack of realism in any effort to put shoes into different "lines of commerce" where the difference in price might be as little as one cent per pair. In sharp contrast, insulated aluminum wire and cable, used in overhead distribution, is significantly cheaper than its copper equivalent. In most cases, as we have noted, insulated aluminum distribution cable sells at little more than half the price of its copper equivalent. Moreover, the purchaser of shoes selects among available alternatives with an eye not only to price but also to quality, style, and the intangible factor of how much of his income he chooses to spend on shoes; hence, two consumer products may be highly competitive, though disparate in cost. By contrast, a public utility's selection between insulated aluminum and insulated copper cable for use in overhead distribution lines is based almost exclusively on economic considerations (R. 1316), so that any significant difference in price is bound to reduce drastically the degree of competition, as in fact it did here. To put price to one side, as the district court did, is to ignore the single most important practical factor in this business—a result surely not consonant with this Court's decision in *Brown Shoe*.

B. ALUMINUM CONDUCTOR IS A "LINE OF COMMERCE."

The district court's conclusion that aluminum conductor (both bare and insulated) is not a line of commerce was predicated solely on the ground that insulated aluminum conductor, one of its two component submarkets, was not. We submit that aluminum conductor meets the criteria necessary to constitute a line of commerce and should be found to be such independent of any ruling on the insulated aluminum conductor issue."

Plainly it accords with the commercial realities of the electrical industry to combine bare and insulated types of cable in the same line of commerce, since both are used for the same broad purpose of conducting electricity, and both aluminum types are sold to the same customers, the electric utilities. Indeed, the district court so found (Fdg. 31, R. 1289). There remains only the question whether aluminum conductor and copper conductor are separable for the purpose of analyzing the competitive impact of the merger.

The same physical characteristics and cost considerations which differentiate the two insulated product lines also differentiate the broader conductor lines. Aluminum and copper wire and cable are made of metals having entirely different physical and electrical properties and wholly unrelated supply and

" It is improper to assume that the "whole" cannot be a line of commerce merely because the "part" is not. The steel industry, for example, might reasonably be found to constitute an appropriate line of commerce even if some particular steel product were found to be highly competitive, and therefore in the same submarket, with a particular non-steel product.

price patterns (*supra,* pp. 13–15). These factors determine the electrical uses to which the metals can be put. By virtue of their peculiar properties, aluminum and copper conductors have developed distinctive end uses—aluminum, both bare and insulated, as an overhead conductor, and copper as an insulated conductor for underground, indoor and other enclosed wiring, applications in which aluminum's brittleness and larger size render it impractical (*supra,* p. 15). In overhead transmission and distribution, fields in which aluminum is physically interchangeable with copper, the price differential between the two metals dictates the use of aluminum. And, as we have noted, there is no responsiveness between the price of aluminum conductor and that of copper conductor. It is only in a most restricted sense, then, that aluminum and copper compete with one another as electrical conductors. It follows that aluminum conductor, like aluminum insulated, is an appropriate "line of commerce" in which to appraise the effect of the merger on the structure of competition.

II

SINCE ALCOA IS ONE OF THE FEW LEADING FIRMS IN THE HIGHLY CONCENTRATED MARKETS FOR ALUMINUM CONDUCTOR AND INSULATED ALUMINUM CONDUCTOR, ITS ACQUISITION OF A SIGNIFICANT COMPETITOR VIOLATES SECTION 7.

Taking aluminum conductor and insulated aluminum conductor as the appropriate lines of commerce we base our attack upon the merger upon two propositions:

First, Alcoa is a leading firm in markets in which economic power is already highly concentrated.

Second, any acquisition of a significant competitor by one of a few dominant firms in a market in which economic power is already highly concentrated "may tend substantially to lessen competition" within the meaning of Section 7 of the Clayton Act, even though the acquired firm has only a relatively small share of the market.

If these propositions are sound, as we argue below, then Alcoa's acquisition of Rome violated Section 7.

A. ALCOA IS A DOMINANT FIRM IN THE MARKETS FOR ALUMINUM CONDUCTOR AND INSULATED ALUMINUM CONDUCTOR WHERE ECONOMIC POWER IS ALREADY HIGHLY CONCENTRATED

1. There can be no doubt either as to Alcoa's leading position or the highly concentrated character of the relevant product markets. Prior to the end of World War II, Alcoa was the sole producer of primary aluminum and the sole fabricator of aluminum conductor wire and cable. In 1945, the Second Cir-

cuit held that Alcoa had unlawfully monopolized the aluminum industry in violation of Section 7, and refrained from ordering dissolution only because of the possibility that the government's large wartime production facilities might be disposed of in such a way as to create competition. By the disposition of these surplus facilities, and later by granting subsidies (*e.g.*, accelerated tax write-offs and supply contracts) during the Korean emergency, the government made possible the creation and growth of other aluminum producers—Kaiser, Reynolds, Anaconda, and Ormet—which competed with Alcoa and were integrated on a comparable scale. All of these companies rank among the largest industrial corporations in the United States.[28] All of them are active in the fabrication of aluminum conductor, both bare and insulated.

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[28] The Fortune Directory, *The 500 Largest U.S. Industrial Corporations*, August 1961, shows that in terms of assets and invested capital each of the five (or a parent corporation) was among the Nation's 100 largest, and the rankings in terms of sales, employees and net profits were only slightly lower:

RANK	Assets	Invested Capital
Alcoa	33	57
Anaconda Co.*	22	24
Kaiser	27	22
Reynolds	40	62
Olin Mathieson**	52	81

RANK	Employees	Sales	Net Profits
Alcoa	36	50	56
Olin Mathieson**	52	66	72
Anaconda Co.*	56	70	49
Reynolds	95	108	73
Kaiser	106	177	111

*Anaconda Co. is the parent of Anaconda Aluminum Co., a primary aluminum producer, as well as of Anaconda Wire and Cable Co., which fabricates aluminum conductor.

**Olin Mathieson Chemical Corp. is a half owner of Ormet Inc., an integrated aluminum company.

While Alcoa has lost its monopoly, it remains the largest and strongest competitor both in production of primary aluminum (where it accounted in 1960 for 36% of the nation's output and 38.6% of its capacity) and in the fabrication of aluminum conductor. The remaining power in the conductor markets is largely concentrated in the hands of the other primary aluminum companies. In aluminum conductor, the broader line of commerce, Alcoa led the industry with a pre-merger market share of 27.8%. With its leading integrated competitor (Kaiser), it controlled 50% of the market; with its three leading competitors, more than 76%. Only nine concerns—the five integrated companies [29] plus four independents (including Rome, with 1.3%)—accounted for 95.7% of the output of aluminum conductor. No other company whose statistics appear in the record [30] claimed as much as 1% of the market.

In the narrower market—insulated aluminum conductor—a similar pattern prevailed, except that Alcoa's third ranking share was somewhat lower (11.6%) and Rome's somewhat higher (4.7%). The five integrated companies controlled 65.6% of the

[29] In addition to these five, General Cable—which accounted for 6% of the market—might also be classified as an integrated producer. Thirty percent of its stock is held by American Smelting and Refining Company, and that company also owns 30% of the stock of Revere Copper and Brass Co. American Smelting and Refining also has interlocking directors with both Revere and General Cable, and Revere, in turn, is a full partner with Olin Mathieson in Ormet, a producer of primary aluminum. See GX 396, R. 2620; cf. R. 982, 983–984.

[30] See fn. 14, at p. 20, *supra*.

market and the top four independents (including Rome) whose production statistics are in evidence added another 22.8%. Again, no other firm with statistics of record produced as much as 1%.[31]

In sum, at the time of the merger, the lines of commerce involved were highly concentrated markets dominated by a handful of aluminum companies, but also served by a small and diminishing group of significant independents.

2. The court below did not dispute the underlying data presented by the government, *e.g.*, that five integrated producers controlled more than 80% of the aluminum conductor market. It held, however, that these data were without significance because production of aluminum and fabrication of its products

[31] These figures take on an added significance when compared with figures for other industries which the courts have found to be concentrated. Thus, in *United States* v. *Bethlehem Steel Corp.*, 168 F. Supp. 576, 584, 605 (S.D. N.Y.), Judge Weinfeld found the iron and steel industry "already highly concentrated" when twelve integrated producers possessed 83 percent of the total industry capacity. In *A. G. Spalding & Bros. Inc.* v. *Federal Trade Commission*, 301 F. 2d 585, 612, 617 (C.A. 3), the Third Circuit affirmed the FTC's finding that "there was a high degree of concentration" in the athletic goods industry where the four general line companies accounted for 46.4% of the business and the top nineteen companies accounted for 81.1%. And in *Brown Shoe*, 370 U.S. 294, 300, this Court noted the district court's findings that a small number of shoe manufacturers "occupied a commanding position" in that the top four produced approximately 23% of the nation's shoes.

"were concentrated to the point of monopoly less than twenty years ago" and have "undergone a gradual decentralization by the entry of new producers and fabricators since that time" (R. 1322). This conclusion overlooks completely the fact that it was action by the federal government, not the forces of the market, which broke Alcoa's monopoly and brought about this "decentralization". Prior to the end of World War II Alcoa was the sole producer of primary aluminum and the sole fabricator of aluminum conductor, wire and cable. It would be a remarkable outcome if Alcoa's long history as a monopolist—a status which was judicially terminated only two years before this acquisition—were now deemed a mitigating factor. The establishment of a few new firms as a result of government intervention neither shows that decentralizing forces are at work in the aluminum industry nor disproves the fact that Alcoa is one of a few dominant firms in these highly concentrated markets.

Similarly, the court noted that whereas there were four fabricators of insulated aluminum conductor in 1951, the number had risen to twenty-nine as of April 1, 1961 (R. 1322). This statistic loses significance, however, when it is observed that in 1959, the latest year for which figures are available, only eleven of the twenty-nine companies referred to by this court (AR 5, R. 3229) produced as much as 1% of the insulated aluminum total; five others were, by

the time of trial, out or "almost completely out," of the field; and another five did not make the aluminum conductor products principally used in overhead distribution (*supra*, pp. 20–21). A directory of producers shows only one fabricator in 1961 which was not also listed in 1955, other than those which acquired existing firms (GX–442, R. 2727). The presence of these insignificant concerns cannot reasonably affect the conclusions stated above.

Furthermore, in selecting the years 1951 and 1961 as its points of reference, the district court obtained an extremely misleading picture of the industry trend. If, instead of 1951, it has used 1955 as the earlier coordinate, it would have found a somewhat different, and more meaningful, pattern. Except for Olin Mathieson (which gained entry by buying out Southern Electrical in 1957) and Hatfield Wire and Cable Division of Continental Copper and Steel Industries, Inc. (which accounted for less than .4 percent of insulated aluminum conductors in 1959) GX 436, fn. 1, R. 2718), all of the companies which now occupy the two relevant markets gained entry sometime prior to 1955.

The fact is that there was a sudden surge of new entries into the market in the early days of the Korean War, partly because of shortages of copper and government allocations of aluminum for making aluminum conductor. Of the thirteen concerns important enough to command as much as 1% of either the insulated aluminum or aluminum conductor markets in 1959, one (Alcoa) had been a producer before 1951; four (Kaiser, Reynolds, Olin and Southern Electrical) began to make aluminum conductor in 1951 and seven

(General Cable, Anaconda, Nehring, Essex, Southwire, Central and Rome) had received government allocations and were about to commence production (R. 937–938). The other two, General Electric and Circle, whose market shares are in insulted aluminum, amounted to only 1.5 and 1%, respectively (GX 436, fn. 1, R. 2718). After that early surge a few small companies entered the market but, since 1955, it has gained only one new concern while losing five. These developments neither justify the district court's conclusion that there has been a "gradual decentralization" nor discount the proof that these are highly concentrated markets dominated by a few giant integrated producers.

The same facts dispel the significance of the court's finding that there is "ease of entry" into the industry. The possible entry of new firms is meaningful only if the character of the industry is such that new firms are likely to appear, and to become as important competitors as the firm being eliminated. In this industry, however, most of the newcomers have been able to acquire only inconsequential shares of the market. Indeed, no company which has entered the market (other than by acquisition) since the Korean emergency has obtained a market share approaching that of Rome—the company lost to the market—in either product line. In such circumstances, it would seem that: (1) substantial firms are unlikely to venture into a field which holds such slim prospects of success; and (2) even if they do, they are unlikely to develop to a point where they will be effective substitutes for the firm whose independence has been terminated.

B. ANY ACQUISITION OF A SIGNIFICANT COMPETITOR BY ONE OF THE FEW DOMINANT FIRMS IN A MARKET IN WHICH ECONOMIC POWER IS ALREADY HIGHLY CONCENTRATED MAY SUBSTANTIALLY LESSEN COMPETITION WITHIN THE MEANING OF SECTION 7

This critical proposition, upon which the present case turns, was laid down by this Court in *United States* v. *Philadelphia National Bank*, 374 U.S. 321, 365, n. 42:

> It is no answer that, among the three presently largest firms (First Pennsylvania, PNB, and Girard), there will be no increase in concentration. If this argument were valid, then once a market had become unduly concentrated, further concentration would be legally privileged. On the contrary, if concentration is already great, the importance of preventing even slight increases in concentration and so preserving the possibility of eventual deconcentration is correspondingly great.

We submit that the principle thus noted in the *Philadelphia Bank* case is indispensable to the achievement of the basic purposes of the 1950 amendments to Section 7. The cardinal objective was to halt the rising tide of concentration in the American economy

by preventing accretions of power which "are individually so minute as to make it difficult to use the Sherman Act test against them" (S. Rep. No. 1775; 81st Cong., 2d Sess., p. 5). The House Report noted that "the outstanding characteristic of the merger movement has been that of large corporations buying out small companies, rather than smaller companies combining together in order to compete more effectively with their larger rivals" (H. Rep. No. 1191, 81st Cong., 1st Sess., p. 3). It is difficult to think of a more typical example of these undesirable acquisitions than the giant Alcoa's buying up the small but vigorous Rome Cable Company.

We discuss below in some detail the reasons which commend such a common-sense approach to the issue, but we note first that it is one which offers industrialists and the government manageable standards that can be administered in the statutory terms of probability without endless study of the particularities of every merger with a view to forecasting its individual long-range consequences."

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[32] See *Crown Zellerbach Corp.* v. *Federal Trade Comm.*, 296 F. 2d 800, 826–827 (C.A. 9); Stigler, *Mergers and Preventive Antitrust Policy*, 104 U. of Pa. L. Rev. 176, 182 (1955); Bok, *Section 7 of the Clayton Act and the Merger of Law and Economics*, 74 Harv. L. Rev. 226, 371 (1960).

1. Such an acquisition may substantially lessen competition because it enhances the power of a concern which has already reached the peril point

On the eve of the acquisition, Alcoa controlled 27.8% of the aluminum conductor market. The acquisition added 1.3%. Both before and after the merger, Alcoa's market percentage was so great as to pose a substantial threat to competition. In the *Philadelphia Bank* case, 374 U.S. 321, 364–365, this Court invalidated a bank merger on the ground, in part, that it "will result in a single bank's controlling at least 30% of the commercial banking business" in the relevant geographical market. While (at p. 364) disclaiming any attempt to specify the smallest market share which would threaten undue concentration, the Court had no doubt "that 30% presents that threat" and cited the views of several economists that even less should suffice to condemn a merger: "Kaysen and Turner * * * suggest that 20% should be the line of prima facie unlawfulness; Stigler suggests that any acquisition by a firm controlling 20% of the market after the merger is presumptively unlawful; Markham mentions 25%" (374 U.S. at p. 364, fn. 41).[23] We submit, therefore, that the present merger—from which Alcoa emerged with 29.1% of the aluminum conductor market—presumptively gave rise to a reasonable probability that competition will be substantially

[23] See Kaysen and Turner, *Antitrust Policy*, p. 133, n. 38 (1959); Stigler, *Mergers and Preventive Antitrust Policy*, 104 U. of Pa. L. Rev. 176, 182 (1955); Markham, *Merger Policy Under the New Section 7: A Six-Year Appraisal*, 43 Va. L. Rev. 489, 521–522 (1957).

lessened. Experience shows that such preponderant economic power nearly always depresses competition.

It is true, as the district court noted, that the market share of the merged companies declined subsequent to the acquisition (R. 1313, 1322, 1324). However, except in the unusual case where "the structure of the market has changed radically since the merger," changes in the merging company's post-acquisition share of the market are entitled to little, if any, significance, since "so long as the merger is the subject of an investigation or proceeding [the merging company] may deliberately refrain from anti-competitive conduct—may sheathe, as it were, the market power conferred by the merger—and build, instead, a record of good behavior to be used in rebuttal in the proceeding." *The Procter & Gamble Company,* Federal Trade Commission Docket No. 6901, decided November 26, 1963, Mimeographed Opinion, p. 38 (Commissioner Elman). Thus, it is not uncommon "for the market share of merging companies to decline for a time after the merger for reasons not related to the ultimate effect of the merger." *Foremost Dairies, Inc.*, Dkt. 6495, CCH Trade Reg. Rep., ¶ 15,877 at p. 20,684. And this Court has pointed out that the sum of the pre-existing shares of the merging companies, while they need not remain stable in the future, nonetheless "provide a graphic picture of the immediate impact of a merger, and, as such, also provide a meaningful base upon which to build conclusions of the probable future effects of the merger." *Brown Shoe Co.* v. *United States,* 370 U.S. 294, 343, n. 70.

2. The competition eliminated by such an acquisition is "substantial" because, in an industry where few firms compete, the competition furnished by each firm has importance beyond its market share.

The most obvious anticompetitive effect of any horizontal acquisition is that it eliminates the competition which would have been offered by the acquired company had it remained independent. The "elimination in whole or in part of the competitive activity of an enterprise which has been a substantial factor in competition" was cited by the House Report on the amended Section 7 as a prime example of effects which the bill would prohibit (H. Rep. No. 1191, 81st Cong., 1st Sess., p. 8). What makes a company a "substantial factor" obviously depends upon a number of considerations, including its absolute and relative size, the vigor with which it competes, the quality of its goods and services, and the degree to which it introduces innovations.

Another highly important consideration—which is decisive here—is the number of effective firms in the industry. In an industry where a great many compete, the loss of a company with a relatively small market share may be of little consequence. On the other hand, in an industry where the number of sellers are few, the competitive significance of each company is correspondingly great and transcends its bare market percentage. This is not to say that in a highly concentrated industry a firm having a small market percentage may not be acquired even by another firm of

the same size. Such an acquisition, by enabling the companies to compete more effectively with their larger rivals, may in some circumstances enhance the prospect of eventual deconcentration and thereby escape the prohibition of the statute. See (*Brown Shoe*, 370 U.S. at 331). But where the loss of one of the few significant competitive factors serves no economic purpose other than to augment the market position of the firm which already leads, its effect upon competition is necessarily adverse and substantial.

It is a basic premise of the antitrust laws that competition will be most vital "when there are many sellers, none of which has any significant market share." *Philadelphia Bank*, 374 U.S. at 363. The more firms there are, the less each firm need fear that its competitive efforts will immediately be nullified by the retaliation or imitation of its rivals. Conversely, the fewer the firms, the greater the likelihood that all of them, by tacit agreement or otherwise, will pursue parallel policies of mutual advantage and refrain from aggressive competition. In a concentrated industry, no less than in a fragmented one, the character of competition may be greatly affected by the number and type of competing entities; the tendency of oligopolists to abstain from competition may be tempered by the presence of their smaller, but still significant, rivals. The more competitors they must reckon with, the less confident they can be that their lead will be followed (*e.g.*, in price increases) or that sluggishness in improving their prod-

ucts will cause no loss of business. Thus the smaller companies may serve as an important stimulus to the market leaders. The fewer small companies there are, the more important each becomes as a check upon the market leaders.

In the present case, the market shares of the acquired company—1.3% in aluminum conductor and 4.7% in insulated aluminum conductor—may not appear great in absolute terms. They loom larger, however, when it is observed that in the aluminum conductor market there were not more than a dozen companies which could account for as much as 1% of industry production in any one of the five years (1955–1959) for which statistics appear in the record. Rome was invariably one of those companies. In 1958, the year preceding the acquisition, Rome ranked ninth among all firms and fourth among the independents (GX 434, R. 2713). In the insulated aluminum field, Rome was an even more significant factor, ranking eighth among all companies and third among the independents (GX 436, R, 2717).[34] Even in quantitative terms, therefore, the competition which Rome offered was, in the context of this industry, substantial.

The role which small companies may play even in a highly concentrated market is also illustrated by the evidence in the present case. Two of the independents—Central and Nehring—engaged, from time to time, in price-cutting (R. 163–164, R. 892). And while Rome apparently was not a price innovator, it was nonetheless shown to be an "aggressive competitor" (R. 937).

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[34] These rankings do not include Central, whose statistics are not of record. See, *supra*, p. 20, fn. 14.

A pioneer in the field of aluminum insulation, Rome was credited with the development of one of the most widely used insulated conductors. Its broad line of high-quality wire and cable products, its special aptitude and skills in the field of insulation, and its "active and efficient research department and sales organization"—all acknowledged by the court below (R. 1314)—had earned it an outstanding reputation in the industry. A year prior to the merger, it had constructed a $675,000 facility designed to expand its research efforts and stimulate development of new products. The effectiveness of its marketing organization is testified to by the decision of Alcoa to make Rome the vehicle for distributing not only the insulated conductor in which Rome was the acknowledged specialist, but the entire conductor line of both companies (*supra*, pp. 8–10).

It was for these qualitative assets that Alcoa was willing to trade stock worth $34 million. Thus, the president of Rome testified:

> * * * when we talked with the Alcoa people that January, there was more time spent on discussing personnel and organization than there was on balance sheets and figures and things of that nature * * * (R. 955).

Enterprises of such demonstrated quality and high repute cannot easily be replaced by new entrants to the market, and their elimination is plainly a substantial loss to competition.

The presence of independents such as Rome, even in a market dominated by giants, is desirable also as part of the "economic way of life sought to be

preserved by Congress" (*Brown Shoe*, 370 U.S. at 333). By limiting the further growth of oligopoly, Congress hoped to "aid in preserving small business as an important competitive factor in the American economy" (S. Rep. No. 1775, 81st Cong., 2d Sess., p. 3). There is no reason to believe that this policy or the views of Congress respecting the "desirability of retaining 'local control' over industry and the protection of small businesses" (*Brown Shoe*, 370 U.S. at 315–316), were intended not to apply to small firms operating within the framework of an oligopolistic industry. And Rome, while a substantial competitive factor, was at the same time the prototype of the relatively small, locally controlled business which Congress aimed to preserve.

3. The competition eliminated by such an acquisition is "substantial" because, in such an industry, independent competitors offer the best hope for future decentralization of economic power

The aggressiveness and innovation of small concerns are important not only as a competitive check upon the dominant leaders in a concentrated market but also because their presence preserves the possibility of eventual deconcentration. If the leaders can buy up small competitors before they have an opportunity to grow, justifying the purchase on the ground that the statistical change in market shares is quantitatively small, then it is easy to perpetuate oligopoly and preclude any possibility of the restoration of greater competition. The importance of this element

was emphasized by the Court in the *Philadelphia Bank case*, 374 U. S. 321, 365, n. 42 (quoted p. 55, *supra*). It furnishes a strong additional reason for barring all such acquisitions by a dominant firm.

4. The competition eliminated by such an acquisition is "substantial" because, in such an industry, each such acquisition is a major step towards the elimination of all independent concerns and the capture of the whole market by the giant companies

The paramount purpose of the amended Section 7 was to prevent the piecemeal growth of oligopoly by an accumulation of individually small acquisitions. Congress feared that

> Where several large enterprises are extending their power by successive small acquisitions, the cumulative effect of their purchases may be to convert an industry from one of intense competition among many enterprises to one in which three or four large concerns produce the entire supply (S. Rep. No. 1175, 81st Cong., 2d Sess. 5, quoted in *Brown Shoe*, 370 U.S. at 333–334; and see H.R. No. 1191, 81st Cong., 1st Sess. 8).

In *Brown Shoe*, this Court gave effect to the congressional policy against creeping concentration by striking down a merger in the retail shoe industry, a highly fragmented line of commerce composed of 70,000 retail outlets of which 22,000 were "shoe stores" in the ordinary sense (370 U.S. at 300). Although the combined market share of the acquired and acquiring companies did not exceed 5%, and the effect of the acquisition was to give the acquiring company

control over only 7.2% of the nation's retail "shoe stores" (*id.*, at 343, 345), the Court held that to approve the merger might require it to approve comparable acquisitions by Brown's competitors seeking similar market shares (pp. 343–344), thus permitting this fragmented market to become, little by little, an oligopoly.

If, in a highly dispersed industry, a small acquisition is banned by the statute on the ground that it might constitute a step on the road to oligopoly, a comparable or more substantial acquisition by a leading company in an industry which is much further along that road plainly stands on no better footing. Indeed, the more nearly an industry approaches all-out oligopoly, the more objectionable each step becomes and the more urgent it is that the policies of the Clayton Act be brought into play. In such an industry it should not be necessary to demonstrate a pronounced merger "trend"—*i.e.*, a past history of acquisitions or a deliberate merger policy on the part of the leading companies—in order to justify immediate action to head off further acquisitions. For by the time such a trend is established, it is likely that all of the acquirable companies of more than marginal significance will have been removed from the market. In the present case, for example, one further acquisition by four of the six integrated aluminum companies now in the conductor field (see, *infra*, p. 68) could eliminate virtually all of the significant independents. And if Alcoa is permitted to acquire a vigorous competitor

such as Rome for the purpose of preserving its "No. 1" position (*supra,* p. 29), it is difficult to see how Kaiser or Reynolds could be barred from purchasing comparable independents (Essex, Southwire or Nehring) in order to protect their relative positions or to overtake Alcoa. Within a relatively short time, all of the significant independents would be extinguished and the market occupied exclusively by integrated giants.

Moreover, in an oligopolistic industry there is an inherent likelihood that an expansionary move by any of the few dominant firms will induce a defensive or retaliatory counteraction by its principal competitors. That very process is unfolding in the aluminum conductor fields. The absorption of Rome by Alcoa was one of five acquisitions by producers of primary aluminum since 1957. In that year Olin Mathieson acquired the Southern Electrical Corporation, then the largest independent manufacturer of aluminum conductor (GX 434, R. 2713); and Kaiser acquired the Bristol, Rhode Island, plant of the U.S. Rubber Company, one of the top ten in the insulated aluminum field. These moves, and the threat they were thought to pose, were specifically identified as factors influencing Alcoa's 1959 decision to acquire Rome (GX 150, R. 2127; GX 161, R. 2179–2184). And it was partly in response to the three prior acquisitions, that Reynolds, in 1961, acquired the wire and cable facilities of John A. Roebling's Sons Division of the Colorado Fuel and Iron Company, a small fabricator

(GX 387, R. 2606; GX 396, R. 2620). Finally, in February 1963, too late to be noted in the record below, Aluminium Ltd., of Canada announced the acquisition of Central Cable Corporation, one of the largest of the independents (see p. 20, *supra*, fn. 14). As a result of this series of mergers, there now remain only four non-integrated fabricators of aluminum conductor whose individual shares of total industry production (based on 1959 figures, the latest in the record) amounted to more than one percent (Southwire, Essex, General Cable, and Nehring). And since Harvey Aluminum Company, another primary producer, is presently considering entry into the conductor field through the acquisition of an existing manufacturer (R. 474), it seems likely that the ranks of the independents will soon be further depleted, if the decision below is allowed to stand.

For the integrated aluminum companies, therefore, acquisition has apparently become a preferred method by which to enter the aluminum conductor markets and, once having entered, to expand and diversify their operations. We do not wish to overdraw the picture. Two of the acquisitions (Olin-Mathieson—Southern Electrical and Aluminium, Ltd.—Central Cable) resulted in the replacement of the acquired company by an integrated company which had not previously been active in the conductor field. The court found, moreover, that two of the other acquisitions (Kaiser-Bristol and Reynolds-Roebling) involved small market shares (.8% and .1%, respectively) and that in both cases there was a decline in

the post acquisition market shares of the acquired and acquiring companies. On the basis of these facts, the court concluded that there was "no significant pattern or trend of mergers with respect to the manufacture and sale of aluminum conductor, wire and cable products." (Fdg. 46, R. 1293).

While we concede the underlying facts, we dispute the conclusion which the court below drew from them—a legal and economic conclusion which this Court is free to reject. In the first place, the significance of this series of acquisitions does not lie in short-run increases in the market shares of the particular acquiring companies, or even of integrated companies generally, but in the fact that each combination (except Reynolds-Roebling) removed from the market one of the few substantial non-integrated competitors. In an industry such as this, if five acquisitions within a three-year period—eliminating nearly half of the substantial non-integrated fabricators—does not constitute a "significant pattern or trend," it is difficult to see how such a trend could be established short of the extinction of all the independents.

Second, even where the acquiring company merely replaces an existing independent fabricator, potential competition may be foreclosed. For if the merger device had been unavailable, the acquiring company might in any event have entered the conductor field by means of internal expansion, the "socially preferable" means of corporate growth. *United States* v.

Philadelphia National Bank, 374 U.S. 321, 370.[34] There can be no doubt but that these enormous enterprises possess the financial resources to undertake such expansion and that the electrical conductor field is one to which they would naturally gravitate. The record shows that Alcoa, feeling its supremacy threatened by the Kaiser-Bristol merger, was prepared to embark upon a large program of internal expansion in

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[34] Compare the statement of the district court that "[e]xpansion from within rather than by acquisition may be preferable from the economist's point of view but the statute makes no such prohibition" (R. 1330).

One of the unfortunate consequences of mergers such as the one here is that they deny to the consuming public, and to the national economy, the benefits of the investment in new plant and equipment which the acquiring company might otherwise make. In discussing the Rome merger, an Alcoa official stated that:

"The acquisition by any of the integrated producers of any of the independent wire and cable companies or various combinations of mergers are not nearly as obnoxious to the people who are already active in the wire and cable industry as is the entrance of a newcomer with bright, shiny new equipment. Acquisitions and mergers have the common denominator of not adding to existing capacity in the industry, and everybody in the industry is very conscious of the fact that the entire industry would be much more healthy if each manufacturer were to toss about two-thirds of his equipment into the Atlantic Ocean" (GX 162, R. 2185).

But a response to new and expanding industrial demands by the production of "bright, shiny, new equipment" is an obvious requisite of a growing economy. One function of antitrust legislation in general, and Section 7 in particular, is to encourage new productive capacity even when the members of the industry would be most happy to restrict existing capacity.

the event its merger efforts failed (GX 168, 169, R. 2193–2195), and had already completed plans to build new insulating facilities of its own in place of those formerly supplied by Rome under the tolling arrangement (*supra*, p. 27). Similarly, Reynolds, drawn to the aluminum conductor market by the presence there of its two principal rivals, gave consideration to the possibility of expanding its own facilities before deciding instead to acquire Roebling (GX 387, R. 2606). By the same token, it is entirely likely that Olin-Mathieson (or Aluminium, Ltd.), confronted by a situation in which its three major competitors were leading fabricators in the aluminum conductor field, would have felt pressure to develop its own fabricating capability had the merger avenue been closed. In sum, the entry of these two large primary producers into the aluminum conductor market need not have been gained at the expense of the substantial competition which Southern Electrical and Central Cable would have continued to provide as independents.

In view of the sequence of acquisitions since 1957, there is reason to apprehend that the remaining independents will eventually be absorbed and the market occupied exclusively by the integrated giants. The policy considerations which prompted the enactment of Section 7 demand that this transformation of the market into an even more intensive oligopoly be halted at its incipiency.

CONCLUSION

The judgment of the district court should be reversed, and the cause should be remanded with directions that the court enter a judgment of divestiture.

Respectfully submitted.

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MARCH, 1964.

APPENDIX

The exhibits in the record were admitted as follows:

Government Exhibit:	Original Transcript Page
GX 1–50	52–61
52–70	511
71–78	524
79–137	534
138–156	536
157–167	550
168–179	552
180–187	552
189–202	553
203–206	1028
207	1035
208–210	1029
221	1030
223–225	1030
227	1032
228–231	590
232–243	591
245–246	591
248–254	591
256–259	591
261–274	591
275–347	591
348–360	592
362–386	592
387–397	593
398–408	593
409–410	1063
412	1064

Government Exhibit—Continued	Original Transcript Page
GX 421A	1076
421B	1076
421C	1076
422	109
423	115
424	684
425	687
426	687
427	687
428	689
429	689
430	691
431	693
432	695
433	696
434–440	138
441	149
442	*
443	164
444	171
445	184
446	184
447	182
448–452	184
454	238
455	191
456	205
457	205
458	206
459–461	207
462	220–221
463	221A

* By Stipulation filed with the Court on November 6, 1963 the parties agreed that GX 442 was admitted into evidence by the district court.

Government Exhibit—Continued	Original Transcript Page
GX 464	229
465–467	230
468	562A
468A	562A
469–471	306
472	371
492	621
493–494	681
495	859
496	1062
497	1474
498	2229
499	2230
500	1975
501	2283
502	2211
503	2284
504	2285

Alcoa-Rome Exhibit:	Original Transcript Page
AR 4	1657
5	1792
6	1922
7	1504
9	1809
12	1204
13, 13A	1208
14, 14A	1213
15, 15A	1216
16, 16A	1221
17, 17A	1223
18, 18A	1227
19, 19A	1234

Alcoa-Rome Exhibit—Continued	Original Transcript Page
AR 20, 20A	1236
21-24	1238
25	1243
26	1244
27	1247
28	1249
29	1295
29A	1315
30	1435
31	1436
32	1444
33	1472
34	1451
35	1453
36	1454
37	1455
38	1457
39	1459
40	1473
41	1463
42	1465
43	1507
44, 44A	1567
45	1571
46	1575
47	1576
48	1578
49	1578
50	1579
51	1580
52	1581
53	1583
54	1727

Alcoa-Rome Exhibit—Continued	Original Transcript Page
AR 55	1730
56	1731
57	1585
58	1607
59	1667
60	1670
61	1673
62	1684
63	1688
64	1726
65	1733
66	1734
67	1735
68	1736
68A	1771
69	1554
70	1795
71	1804
72	1805
73	1806
74	1811
75	2004
76	1345
77	2080
78	2082
79	2187
80	2187
81	1546
82	2172
83	2095
84	2290

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Supreme Court of the United States

OCTOBER TERM, 1963

No. 204

UNITED STATES OF AMERICA, *Appellant*,

v.

ALUMINUM COMPANY OF AMERICA and ROME CABLE CORPORATION

On Appeal from the United States District Court for the Northern District of New York

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INDEX

	Page
Questions Presented	1
Appellees' Counterstatement	3
1. The Background of the Acquisition	4
(a) Alcoa's Declining Market Position	4
(b) Alcoa's Market Disadvantage	7
(c) The Contrast Between Alcoa and Rome	11
2. Copper and Aluminum in the Wire and Cable Industry	14
3. The Proceedings in District Court	19
Summary of Argument	21
Argument	26
I. The District Court Correctly Rejected Insulated Aluminum Conductor and Aluminum Conductor as "Lines of Commerce"	27
A. The District Court Properly Rejected Insulated Aluminum Conductor as a Line of Commerce	27
(1) The District Court Properly Applied the Pragmatic Test Established in Brown Shoe	28
(2) The Government's Single-Factor Test Is Inconsistent With Brown Shoe and Would Exclude Critical Elements from the Relevant "Area of Effective Competition"	30
(a) Submarket Boundaries Are Determined by the Existence of Substitution at Either the Product or Production Levels	30
(b) The District Court's Finding That Insulating Fabricators Move Freely Between Copper and Aluminum Insulated Products Is Controlling on the Line of Commerce Issue	34

Page

(3) There Is Substantial Competition Between Copper and Aluminum Insulated Products 38

(a) Copper and Aluminum Are Substantially Competitive in the Overhead Distribution Field 39

(b) It Has Not Been Shown That Copper-Aluminum Competition in the Insulated Field Will Disappear 43

B. The District Court Properly Rejected Aluminum Conductor as a Line of Commerce 46

II. The Government Has Failed to Show the Required Anticompetitive Effect in Either of the Alleged Aluminum Conductor Lines of Commerce 48

A. Anticompetitive Effect Has Not Been Shown With Respect to Insulated Aluminum Conductor 52

(1) Alcoa Was Not And Is Not The "Largest Producer" of Insulated Aluminum Conductor 52

(2) Insulated Aluminum Conductor Is Not "Highly Concentrated" or "Oligopolistic" 53

(a) Concentration Percentages Are Not A Reliable Measure of the Structure or Competitiveness of a Market 54

(b) There Is Unparalleled Ease of Entry 57

(i) Existing Firms Do Not Have Any Absolute Cost Advantage 58

(ii) There Is No Product Differentiation In Insulated Aluminum Conductor 59

(iii) Economies of Large Scale Do Not Inhibit Entry 61

(iv) Uncertainty as to Market Conditions Does Not Impede Entry .. 62

(v) The Effectiveness of Easy Entry Is Not Impaired by Entry Lag .. 62

Page

(c) Easy Entry Assures Vigorous Competition Among Existing Firms 63

(d) Market Performance Demonstrates the Effectiveness of Competition in Insulated Aluminum Conductor 65

(i) There Is Active Price Competition 65

(ii) There Have Been Significant Shifts in Market Shares 67

(iii) There Has Been Significant Entry 67

(3) The Acquisition of Rome Will Not Affect Market Structure or the Vigor of Competition in the Manufacture and Sale of Insulated Aluminum Products 70

(a) The Acquisition of Rome Did Not and Will Not Change Pre-existing Market Structure 70

(b) Rome Was Even Less Important Than Its Small Market Share Would Indicate 72

B. The Required Anticompetitive Effect Has Not Been Shown With Respect to the Alleged Aluminum Conductor Line of Commerce 75

(1) The Lack of Anticompetitive Effect as to Each Component Demonstrates the Absence of Such Effect as to the Alleged Composite Line 75

(2) The Market Percentages on Which the Government Relies Are Devoid of Economic Significance 76

C. Market and Historical Factors Found by the Court Affirmatively Establish That Anticompetitive Effect Has Not Been Shown 78

(1) There Has Not Been, and Will Not Be, Any Adverse Effect on Competitors 79

Page

(2) Alcoa's Purpose Was to Obtain Insulating Capability, Not to Expand Its Aluminum Conductor Facilities 79

(3) There Is No Significant Merger Trend 80

(4) There Has Not Been, and Will Not Be, Any Adverse Effect on Consumers 83

Conclusion 84

Appendix 85

CITATIONS

Cases:

Brown Shoe Co. v. *United States*, 370 U.S. 294, (1962) 2 *et passim*

Crown Zellerbach Corp. v. *Federal Trade Commission*, 296 F. 2d 800 (9th Cir. 1961), cert. denied 370 U.S. 937 (1962) 29

Procter & Gamble, FTC Dkt. 6901, 3 CCH Trade Reg. Rep. ¶ 16,673, p. 21,568 .....53 *et passim*

Transamerica Corp. v. *The Board of Governors*, 206 F. 2d 163 (3d Cir. 1953) 33

United States v. *Aluminum Company of America*, 148 F. 2d 416 (2d Cir. 1945) 4

United States v. *Aluminum Company of America*, 153 F. Supp. 132 (S.D.N.Y. 1957) 5

United States v. *Bethlehem Steel Corp.*, 168 F. Supp. 576 (S.D.N.Y. 1958) 33, 34

United States v. *Brown Shoe Company*, 179 F. Supp 721 (E.D. Mo. 1959) 31

United States v. *E. I. duPont de Nemours & Co.*, 353 U.S. 586 (1957) 2, 32, 33

United States v. *Philadelphia Bank*, 374 U.S. 321 (1963) 24 *et passim*

Miscellaneous:

Bain, *Barriers to New Competition* (1956) 57, 58, 59, 62

Bain, *Industrial Organization* (1959) 56, 59, 60, 64, 65

Bock, *Mergers and Markets* (1960) 33

Business Concentration and Price Policy (1955) ..31, 54, 55

Page

Chamberlin, *Monopoly and Competition and Their Regulation* (1954) 54
Concentration in American Industry, Senate Subcommittee on Antitrust and Monopoly, 85th Cong., 1st Sess., (1957) 55
Kaysen and Turner, *Antitrust Policy* (1959) ..54, 55, 56, 57, 60, 64, 70, 74
Machlup, *The Economics of Sellers' Competition* (1952) 56, 57, 62
Markham, "Economic Analysis," *Proceedings*, Section of Antitrust Law, American Bar Association (April 1954) 61
United States v. *Penn-Olin Chemical Company*, No. 503, this term, (Brief for the United States) 63
Wall Street Journal, November 18, 1963 68
Weston, *The Role of Mergers in the Growth of Large Firms* (1953) 64

IN THE

Supreme Court of the United States

OCTOBER TERM, 1963

No. 204

UNITED STATES OF AMERICA, *Appellant*,

v.

ALUMINUM COMPANY OF AMERICA and
ROME CABLE CORPORATION

On Appeal from the United States District Court for the Northern District of New York

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BRIEF FOR APPELLEES

QUESTIONS PRESENTED

The Government's statement of the Questions Presented is argumentative and misleading.

First. The Government's characterization of the competitive effect issue as "primary" and the line of commerce question as only "subsidiary" is presumptuous and unwarranted. Both are equally important in a Section 7 case; as this Court has said, "[d]eter-

mination of the relevant market is a necessary predicate to a finding of a violation of the Clayton Act . . . Substantiality can be determined only in terms of the market affected.'"[1] The district court, relying on extensive industry testimony and supporting documentation, found that the Government had not sustained its burden of proof on line of commerce. The Government's task on appeal cannot be lessened by calling this crucial threshold question "subsidiary."

Second. The Government's statement of the alleged "primary question" distorts and obscures the facts pertaining to this acquisition. While Aluminum Company of America (Alcoa) is the largest producer of aluminum conductor wire and cable, it is such solely by virtue of its leading, though steadily declining, position in the manufacture of *bare* aluminum wire and cable.[2] Rome Cable Corporation (Rome) was primarily (more than 90 per cent) a manufacturer of copper products. Far from being a "significant" fabricator of bare aluminum conductor, it was *de minimis*, with a .3 per cent market share, and the Government does not appeal from the district court's conclusion that the required anticompetitive effect was not shown with respect to bare aluminum conductor. With regard to insulated aluminum wire and cable,

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[1] *United States* v. *E.I. duPont de Nemours & Co.*, 353 U.S. 586, 593 (1957); quoted in *Brown Shoe Co.* v. *United States*, 370 U.S. 294, 324 (1962).

[2] It should also be noted that the fact that Alcoa may be the largest producer of primary aluminum is not germane to the issues raised by this appeal. The Government's claim that this acquisition may substantially lessen competition in the sale of aluminum ingot used in the production of wire and cable was rejected by the district court (Concl. 7, R. 1303), and no appeal has been taken from that ruling.

Alcoa was not the "largest producer" but ranked third, with 11.6 per cent in 1958. Rome, with 4.7 per cent, ranked eighth or ninth. In short, in the bare field, where Alcoa was "largest," Rome was not "significant"; in the insulated field, where Rome was not *de minimis*, Alcoa was not "largest." Finally, the Government's assumption that this acquisition occurred in "an already oligopolistic market" is contrary to the court's finding that there is vigorous competition in the sale of aluminum wire and cable products (Fdg. 62, R. 1295).

More objectively stated, the questions presented are these:

1. Whether the district court erred in finding that (a) insulated aluminum wire and cable and (b) aluminum conductor wire and cable were not proper lines of commerce within the meaning of Section 7 of the Clayton Act.

2. Whether the district court erred in finding that the Government had failed to prove that Alcoa's acquisition of the assets of Rome may substantially lessen competition or tend to create a monopoly in the manufacture and sale of either (a) insulated aluminum wire and cable, or (b) aluminum conductor wire and cable, assuming each to have been established as a proper line of commerce.

APPELLEES' COUNTERSTATEMENT[3]

This is a direct appeal from the judgment of the district court holding that Alcoa's acquisition of Rome did not violate Section 7 of the Clayton Act (15 U.S.C.

[3] Where appropriate, assertions in the Government's Statement that we believe to be inaccurate or misleading will be dealt with in the Argument rather than in this Counterstatement.

18). The Government does not challenge the district court's findings of fact as "clearly erroneous" (Rule 52(a) F.R. Civ. P.), but urges that its ultimate findings on the line of commerce and competitive effect issues involve an erroneous interpretation of the statute. The appeal is limited to two alleged aluminum conductor lines of commerce: (1) insulated aluminum conductor, and (2) aluminum conductor, which is a composite of bare and insulated aluminum conductor products.

1. THE BACKGROUND OF THE ACQUISITION

The district court found that this acquisition was undertaken by Alcoa "in the face of its declining market" (Opin., R. 1333), for the purpose of obtaining insulating know-how and diversification needed "to overcome a market disadvantage . . ." (Opin., R. 1321). It described the acquisition as "the combination of an aluminum and an essentially copper manufacturing company" (Opin., R. 1333), and found that Alcoa and Rome had competed in the sale of only three aluminum conductor products (Opin., R. 1314), that "there was not substantial or significant competition between [them] in the sale" of these products (Fdg. 52, R. 1294), and that Rome's manufacture of aluminum products "did not induce [the] acquisition" (Fdg. 7, R. 1284). These facts, not challenged by the Government, provide the background for the acquisition.

(a) Alcoa's Declining Market Position

Alcoa's pre-World War II monopoly, Judge Hand's landmark decision,[4] and the Government's post-war policies that fostered competition in the aluminum business, all are acknowledged historical facts. But

[4] *United States* v. *Aluminum Company of America*, 148 F. 2d 416 (2d Cir. 1945).

the Alcoa monopoly ended nearly a quarter of a century ago. Since then, Kaiser and Reynolds have "removed all reasonable doubts as to their capacity to effectively compete with Alcoa . . .,"[5] three additional primary producers—Ormet, Inc. (Ormet), Harvey Aluminum (Harvey), and Anaconda Aluminum Company (Anaconda)—have entered the field, and Aloca's position has shrunk significantly. In short, the Alcoa of the 1960's is not the Alcoa of 25 years ago.

In terms of percentage of primary aluminum production, the court found that Alcoa had "declined sharply" and with reasonable consistency, from 52 per cent of domestic output in 1948, to 45 per cent by 1956, and, by an additional 9 percentage points, to 36 per cent in 1960 (Opin., R. 1312-13).[6] In addition, there are substantial quantities of foreign aluminum, including Canadian production, which "in 1960 amounted to more than 1.5 billion pounds, or more than 35 per cent of total U.S. primary aluminum production" (Fdg. 64, R. 1295; Opin., R. 1312). Alcoa's post-war decline is also reflected in the drop in its return on invested capital, which fell from 9.3 per cent in 1950 to 3.7 per cent in 1961 (Opin., R. 1321; R. 1066).[7]

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[5] *United States* v. *Aluminum Company of America*, 153 F. Supp. 132, 171 (S.D.N.Y. 1957). If the Government's gratuitous statement that Alcoa made its first attempt to acquire Rome twelve days after this decision (Govt. Br., p. 3, n. 1) is intended as a statement of cause and effect, it is wholly without support in the record.

[6] The court found a substantially similar decline with respect to capacity (Opin., R. 1313).

[7] Comparable declines were experienced in Alcoa's return on gross revenue, which declined from 9.7 per cent in 1950 to 5 per cent in 1961, and in its return on shareholders' equity, which declined from 13.7 per cent in 1950 to 5.6 per cent in 1961 (R. 1065-66).

Alcoa has suffered at least equally substantial declines in aluminum wire and cable. It pioneered the use of aluminum as a substitute for copper in the electrical wire and cable field, and sold substantially all of the bare aluminum cable used for electrical transmission in the United States prior to World War II (Opin., R. 1313). While Alcoa is still the number one producer of bare ACSR and aluminum cable,[8] it now faces competition from 10 or 11 other suppliers and "its relative participation in the [bare aluminum conductor] market has declined materially" (Opin., R. 1313, 1323). This decline was "reasonably consistent" beginning in 1954, the first year for which data are available, "and continuing since the acquisition" (Opin., R. 1313). Thus, Alcoa's percentage declined from 48.4 per cent in 1954, to 32.5 per cent in 1958, and, combined with Rome, to 26.1 per cent in 1961, more than 6 percentage points less than Alcoa alone in 1958 (*Ibid.*). Overall, the 7-year period from 1954 to 1961 saw the Alcoa percentage fall by more than 45 per cent.

On the basis of these downward trends in Alcoa's market position and rate of return, and the increase in number and size of its competitors, the district court found that Alcoa did not occupy a dominant position in either primary aluminum or aluminum wire and cable (Opin., R. 1326-27).

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[8] ACSR consists of a high tensile strength steel core, surrounded by hard drawn aluminum wires. Aluminum cable, bare, is generally similar to ACSR but does not have the high tensile strength steel core. Both products are sold for use by electric utility companies in the overhead transmission and distribution of electric power and energy (R. 630-36; AR 12, R. 3246; AR 13-13a, R. 3247-48; AR 14-14a, R. 3249-50).

(b) Alcoa's Market Disadvantage

Alcoa's pioneering role, its continued—though steadily declining—leadership, and the research activities, "outstanding" technical service, and line of accessory and complementary products referred to by the Government (Govt. Br., pp. 6-7), all pertain exclusively to *bare* aluminum conductor products. Alcoa has never even approached a position of leadership with respect to *insulated* products.

As recently as 1952, Alcoa was totally without insulating capability and thus was "in an unfavorable market position" to meet the increase in demand for covered or insulated aluminum products (Opin., R. 1313; R. 1077-78). As a partial solution, it entered into a tolling arrangement under which Rome made two comparatively simple products, aluminum covered line wire and multiplex cable,[9] for Alcoa's account (R. 1078, GX 28, R. 1536-37). Selling exclusively products insulated for it by Rome, Alcoa, in 1955, accounted for 10.8 per cent of insulated aluminum shipments, ranking third behind Kaiser, with 26.5 per cent,

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[9] Covered line wire (also referred to as weatherproof) consists of a conductor (copper or aluminum) covered with a synthetic rubber (neoprene), thermoplastic (polyethylene), or fibrous covering. It is used in the distribution of electric power and energy in primary and secondary overhead lines and in service drops from the utility pole to a building (See R. 636-40; AR 12, R. 3246; AR 14-14a, R. 3249-50; AR 15-15a, R. 3251-52; AR 25, R. 3267-81; AR 26, R. 3282-3304).

Multiplex cable consists of one, two or three insulated conductors (copper or aluminum) twisted around an uninsulated conductor which acts as a neutral and also provides mechanical support. It is used as a self-supporting secondary distribution line and as a service drop from the utility pole to a building (See R. 636-40; AR 12, R. 3246; AR 14-14a, R. 3249-50; AR 15-15a, R. 3251-52; AR 27, R. 3305-21; AR 28, R. 3322-43).

and Anaconda, with 18.2 per cent (Gx 436, R. 2717). Its percentage remained at about this level until the acquisition.

Alcoa's interest in acquiring Rome did not arise from a desire to increase its capability or capacity for the manufacture of aluminum covered line wire and multiplex cable (R. 1083-1123). In 1956, it had begun to make its own polyethylene covered line wire and multiplex (Gx 146, R. 2097-98), and by the time of the acquisition, although it had not yet installed neoprene facilities, Alcoa was in a position to satisfy its requirements of polyethylene and neoprene covered line wire and multiplex (R. 1122-23). It, however, still "lacked the 'know-how' to manufacture the more complicated types of insulated wire and cable" (Opin., R. 1321) and, therefore, as the Government concedes, "could not offer customers a full line of its own insulated products, both aluminum and copper, as could certain of its competitors" (Juris. State. 9-10).

Alcoa attributed its sharp decline in bare aluminum, in part, to its inability to supply a full line of insulated products including copper products. Many of the companies which had entered the bare aluminum cable field had broad wire and cable experience, e.g., Anaconda, General Cable, Essex, Southwire, Nehring and Central, and thus, were "in the more healthy position, being able to produce both bare aluminum and the insulated copper" (R. 1055-56; R. 1080). Kaiser's acquisition of the Bristol plant of United States Rubber created another "dual roler," i.e., a company with the capability of producing both bare aluminum and insulated copper products (R. 1081; Gx 161, R. 2179). It was Alcoa's need for comparable product diversity, not "Rome's manufacture of aluminum products," that

induced the acquisition (Fdg. 7; R. 1284; Opin., R. 1321).

Alcoa first approached Rome in October 1957, offering Alcoa stock valued at about $24 million (R. 951-52; Gx 165, R. 2190). When this was rejected, Alcoa sought advice from Ebasco Services, Inc., a management consulting and engineering firm with special competence in the utility field (R. 1103-04). Ebasco confirmed the correctness of Alcoa's decision to diversify its line of electrical conductors (R. 1060), advised Alcoa against trying to establish its own insulating division (R. 1104-05), and made approaches on Alcoa's behalf to six companies (R. 1106), none of which was more than a *de minimis* producer of aluminum conductor products (R. 1087-88).

When it looked as if a suitable acquisition could not be made, Alcoa began to consider what would be involved in developing it own insulating organization (R. 1088-89, 1061; Gx 168, R. 2194). A preliminary study indicated that a "rounded out program" covering a reasonably broad range of insulated products would require a minimum of $35 to $40 million and would take at least 5 to 10 years (R. 1089-90, 1124-26, 1064). Alcoa's sales vice-president testified that he would not have approved this expenditure (R. 1090; see R. 1064), and the court found that the "time required . . . and the expense involved seemed to foreclose" Alcoa's obtaining insulating competence from within (Opin. R. 1321).[10]

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[10] The Government's Statement implies that Alcoa, prior to acquiring Rome, had definitely decided to go forward on its own (Govt. Br., pp. 28-29). This is not supported by the record, and is contrary to the findings. The President's letter, relied on by the Government (Gx 168, R. 2194), as well as his testimony at the

It was against this background that Alcoa reopened negotiations with Rome (R. 1061-62, 1091), and, on March 31, 1959, acquired the assets of Rome in exchange for 355,226 shares of Alcoa stock, with a market value of approximately $34 million (Gx 7, R. 1345; Gx 9, R. 1427; R. 1102). "Alcoa's purpose," the court found,

> was to acquire the ability to manufacture the more complicated insulated wire and cable products and diversify its operations. Rome's manufacture of aluminum products did not induce said acquisition. (Fdg. 7, R. 1284).

In short, its objective was "to overcome a market disadvantage rather than to obtain a captive market . . . or to eliminate a competitor" (Opin., R. 1321).[11]

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trial (R. 1061), make clear that he had a twofold purpose in asking for study of internal expansion: first, to enable Alcoa better to evaluate any offer it might want to make in the future, and, second, to develop for the first time the picture as to "what we are headed into if we are going on our own . . ." Nor is it correct to say that Alcoa had "worked out plans for a new plant . . ." (Govt. Br., p. 29). "It was a very preliminary look, possibly as a place to start from, with a more detailed study" (R. 1126). At the time of the acquisition, Alcoa had no "definite plans to expand its aluminum wire and cable production" (Fdg. 67, R. 1296).

[11] The Government's Brief may leave the impression that Alcoa has acquired other producers of aluminum conductor in addition to Rome, or that it was deterred from making additional acquisitions by the pendency of this litigation. (Govt. Br., pp. 7-8). The court found, however, that "aluminum wire and cable products were not involved" in Alcoa's other acquisitions (Opin., R. 1322), and that the Rome acquisition was not shown to have been "part of a continuing program contemplating future expansion through mergers or acquisitions in wire and cable . . ." (Fdg. 11, R. 1284). Having acquired insulating know-how, Alcoa had no interest in buying it twice (R. 1109-11).

(c) The Contrast Between Alcoa and Rome

As would be expected in the case of a diversification acquisition, Alcoa and Rome had essentially different interests and capabilities in the wire and cable business.

Rome's corporate history, assets and sales are set forth with reasonable accuracy in the Government Brief (p. 8).[12] The Government, however, fails to make clear that "Rome was primarily the manufacturer of copper products . . ." (Opin., R. 1314), and substantially overstates the importance of aluminum in its pre-acquisition operations.

The Government states that Rome enjoyed an excellent reputation "because of its broad range of high quality aluminum and copper conductor and accessory products, its high degree of technical skill, and its substantial achievements in research and development" (Govt. Br., pp. 8-9). The implication that aluminum and copper products were of the same or comparable importance to Rome is contrary to the court's finding that "copper was by far the predominant metal used by Rome in its wire and cable operations," accounting for more than 90 per cent of its combined copper and aluminum purchases and for from 90.3 per cent to almost 94 per cent of its total wire and cable sales revenue (Fdg. 18, R. 1286; Fdg. 68, R. 1296).

It is also misleading to imply that Rome had a "broad range" or "diversified line" of insulated alumi-

[12] The Government's Statement, however, could be read as indicating that Rome had three wire and cable plants. In fact, all of Rome's wire and cable products were manufactured in Rome, New York; the Collegeville, Pennsylvania, and Torrance, California, plants produced only cable accessory and conduit products, respectively (Fdg. 16, R. 1285), products not included in the lines of commerce involved in this appeal.

num products, and that its technical skill and research achievements pertained thereto. Aluminum has gained acceptance principally in overhead distribution products, such as weatherproof line wire and multiplex cable[13] (Fdg. 29, R. 1289). These products are among the "simplest" of all insulated wire and cable products (Fdg. 84, R. 1299; Fdg. 55, R. 1294), and even Alcoa, with its limited experience and insulating capability, possessed sufficient "technical skill" to make them (R. 1122-24). The fact is that Rome's "diversified line" consisted overwhelmingly of products chiefly made from copper, including complex, multiconductor cables, such as those shown in AR 18, R. 3257-58; and it is to these more sophisticated copper products that Rome's admitted technical skill and research facilities apply.[14]

Especially glaring is the Government's statement that Rome was noted "for its outstanding research activities and technical know-how, *particularly in the field of insulated aluminum conductors*" (Govt. Br., p. 10, emphasis added). Each record reference cited in support of this proposition clearly refers to Rome's insulating ability in general; nowhere in the record is there support for the notion that Rome possessed special insulating know-how with respect to aluminum conductors.[15] Rome's insulating competence may be

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[13] Weatherproof and service drop accounted for 91.1 per cent of Rome's total shipments of insulated or covered aluminum wire and cable in 1959 (Gx 443, R. 2728).

[14] These products unlike weatherproof and multiplex, require the use of varied and sophisticated insulations and protective coverings (R. 651-53; AR 21-24, R. 3263-66), a wide variety of testing equipment and techniques, and engineering and research capability for the design of cables and customer service (R. 658-60).

[15] Significantly, the service drop cable cited as an example of Rome's development work in the insulated conductor field was originally developed as a copper product (R. 936).

used on either copper or aluminum. In fact, however, Rome's "relatively full line of insulated wire and cable products [was] chiefly made from copper" (Fdg. 78, R. 1299).

In contrast to Rome, Alcoa made no copper conductor products and lacked the know-how to make the more complicated insulated constructions that were Rome's forté (Fdg. 78, R. 1299; Opin., R. 1313, 1321). Moreover, where Rome specialized in insulated products, the court found that "bare wire and cable products constituted the great preponderance of Alcoa's sales," amounting to "more than 90 per cent" of its total conductor wire and cable shipments in 1958 (Fdg. 14, R. 1285).

Because of their fundamentally different interests and capabilities, the court found that the two companies were not substantially competitive with respect to either bare aluminum conductor products, Alcoa's chief area of interest, or in the sale of insulated products, chiefly copper, which were Rome's specialty (Fdg. 52, R. 1294; Fdg. 78, R. 1299). With respect to bare aluminum cable, Alcoa, in 1958, had shipments amounting to $23 million, and accounted for 32.5 per cent of total shipments (Fdg. 21, R. 1286; Fdg. 45, R. 1292). Rome's sales of bare aluminum wire and cable in that year amounted to $240,000, which was approximately 1 per cent of its total wire and cable sales and only .3 per cent of total shipments (*ibid.*).

In the insulated field, Alcoa's 1958 shipments of aluminum weatherproof and multiplex cable were valued at $4.2 million and represented 11.6 per cent of total shipments of insulated or covered aluminum conductor (*ibid.*). Rome's sales of insulated or covered

aluminum products in the same year amounted to $2.2 million and represented 4.7 per cent of total shipments of insulated or covered aluminum conductor (AR 52, R. 3405; Fdg. 45, R. 1292).[16] As a percentage of total 1958 insulated wire and cable shipments, both copper and aluminum, Alcoa's market share was .3 per cent and Rome's 1.3 per cent (Fdg. 76, R. 1298). Sales of insulated aluminum products represented less than .6 per cent of Alcoa's, and approximately 5 per cent of Rome's total 1958 sales (Gx 16, R. 1484; Gx 22, R. 1496).

2. COPPER AND ALUMINUM IN THE WIRE AND CABLE INDUSTRY

Differences in the physical and electrical properties of copper and aluminum influence their use in the wire and cable industry. The court found, however, that such differences do not establish, and that the industry, itself, does not recognize, separate economic entities confined to insulated aluminum conductor or a combination of bare and insulated aluminum products (Opin., R. 1316; Fdgs. 25-29, R. 1288-89; Add'l. Fdg. 4, R. 1336-37). Thus, the Government's reference to "the aluminum conductor industry" presupposes a separate identity which the district court rejected (Govt. Br., pp. 11, 18).

The most significant differences between copper and aluminum are that aluminum has only about 62 per cent the conductivity, and is only about 1/3 the weight, of copper. This means that pound-for-pound aluminum will provide more conductivity than copper, mak-

[16] Rome's sales of aluminum weatherproof and multiplex cable, the only insulated products also sold by Alcoa, amounted to $1.7 million. It made the same products out of copper in the amount of $2 million (AR 56, R. 3406).

ing it appreciably cheaper as a conductor metal (R. 182; Gx 50, R. 1650). At the same time, because an aluminum cable of conductivity equal to copper must be larger in cross-sectional area, this economic advantage begins to disappear as one moves from bare conductor to insulated cables, "the more so as insulations and coverings become thicker and more complex" (Gx 50, R. 1650; R. 216). Moreover, in some situations, even where the cost of insulated or covered aluminum conductor is cheaper than copper, the final installed cost may be greater owing to other economic factors, such as the higher cost of connectors used with aluminum (Gx 50, R. 1650; AR 76, R. 3472).

In the bare cable field, the industry recognizes important distinctions between copper and aluminum. Bare aluminum is not only cheaper than copper, but its physical and electrical properties give it positive technical advantages.[17] For these reasons, bare aluminum has virtually displaced copper (except in seacoast areas) in overhead transmission (Fdg. 24, R. 1288). Moreover, the industry differentiates between bare copper and bare aluminum, manufacturers reporting them to the Bureau of the Census under separate product classifications (Fdg. 24, R. 1288; R. 947).[18] Finally, the manufacture and sale of bare aluminum cable require special stranding equipment, and the engineering skill needed to design long-span, high

[17] For example, aluminum's lighter weight permits the erection of fewer supporting structures and the larger size required to achieve equal conductivity with copper reduces corona loss (R. 161-62).

[18] Products Codes 33571 and 33521 "Aluminum and aluminum-base alloy wire and cable (including ACSR)"; Product Code 33572, "Copper and copper-base alloy wire (including strand and cable, bare and tinned, for electrical transmission)."

voltage transmission lines (Fdg. 24, R. 1288; R. 663, 697-98). For all of these reasons, appellees agreed, and the court found, that bare aluminum cable and ACSR might properly be considered a separate line of commerce (Fdg. 24, R. 1288). The court, however, found no anticompetitive effect in that line, and the Government has not challenged this conclusion on appeal (Concl. 7, R. 1303; Govt. Br. p. 38).

The insulated products which comprise most of the Government's alleged insulated aluminum line of commerce are only two of many produced by the wire and cable industry. This industry "is characterized by vigorous competition" and includes more than 200 companies, among them "many strong, well-financed and highly reputable concerns" (Fdg. 81, R. 1299). In 1958, the industry produced insulated products valued at $1.3 billion, of which copper conductor products accounted for more than 95 per cent (Fdg. 29, R. 1289).

Insulated aluminum wire and cable, unlike bare, is not recognized by the industry "as a separate economic entity" (Opin., R. 1316). Insulated products are identified and defined by the industry, and reported to Census, in accordance with their function or type, "not according to the metal used as conductor" (Fdg. 25, R. 1288),[19] and manufacturers regard themselves simply as "insulators of wire and cable products, not as insulators of copper wire and cable on the one hand, or of aluminum wire and cable on the other"

[19] For example, authoritative technical manuals (AR 25-28, R. 3267-3343), Rome product bulletins (AR 30-32, R. 3345-60), and the Wire Buyers' Guide, official publication of The Wire Association (AR 73, R. 3439), all define and classify insulated wire and cable products according to their function or type, e.g., building wire, power cable, covered line wire, self-supporting service drop cable, rather than by the metal employed as conductor.

(Fdg. 26, R. 1288). As this implies, and as the court found, there is complete manufacturing interchangeability between copper and aluminum (Fdgs. 27, 55, 56, R. 1289, 1294-95; Opin., R. 1316).[20] In addition, wire and cable insulators have flexibility in the products they can make, and a company able to make more complicated products, such as building wire, power cable, control cable, etc., "can readily" make line wire and multiplex cable, "using either copper or aluminum conductors, with its existing machinery and personnel" (Fdg. 55, R. 1294; Fdg. 84, R. 1299). Such interchangeability among products and conductor metals is of practical competitive importance, for the court found that manufacturers "constantly review their product lines and switch readily from one product or conductor metal to another in accordance with market conditions" (Fdg. 56, R. 1294-95; Fdg. 85, R. 1300).

The larger size aluminum wire required to achieve equal current carrying capacity with copper, tends to make aluminum economically unacceptable in more sophisticated heavily insulated constructions and in applications where space is important (R. 216; Gx 50, 1650). In overhead distribution lines, where cable size is not a limiting factor, the use of aluminum has increased appreciably since about 1950. With the acceptance of aluminum as a copper substitute, the number of manufacturers making insulated aluminum products increased from 4 to 29, "most of the new

[20] The only change required from a manufacturing standpoint is the use of different lubricants and a clean-up of the equipment if both copper and aluminum are used on the same drawing machine. It is customary to draw copper and aluminum in separate cycles of production, or, where volume permits, to use one machine on copper and another on aluminum (Fdg. 27, R. 1288; e.g., R. 73-74, 251, 280, 379-80, 661, 982-83).

entrants [coming] from the ranks of insulated copper conductor producers . . ." (Opin., R. 1323).

Contrary to the Government's contention, aluminum has not "virtually displaced," and is not in the process of "rapidly displacing," copper in insulated or covered overhead distribution lines (Govt. Br., p. 12). This contention will be dealt with more fully in the Argument (*infra*, pp. 38-45), but it should be noted that the district court found that copper and aluminum are functionally interchangeable in these applications; that buyers consider other economic factors that may offset the lower cost of aluminum cable (Fdg. 28, R. 1289; Opin., R. 1316); that in areas where aluminum has gained "increasing use," there is a "lively competition between aluminum and copper products" (Opin., R. 1312); that the copper-aluminum price difference, and the lack of price sensitivity between them, do not foreclose "actual competition" (Opin., R. 1316); and that, in fact, "substantial quantities" of the copper versions of overhead distribution products are sold (Fdg. 29, R. 1289).[21]

In its Statement, the Government has a section captioned "The structure of the industry," in which it sets forth market share statistics, alleges that a pattern of concentration prevails, and refers to competitive difficulties allegedly experienced by nonintegrated fabricators (Govt. Br., pp. 18-24). We dispute both that there is an "industry" and that numerical data as to market shares and concentration can adequately describe the "structure" of a market; however, to avoid undue repetition, we shall defer discussion of

[21] In dollar terms, 1953 sales of copper weatherproof and service drop amounted to more than $15 million (R. 319-22).

the Government's concentration contentions until the Argument portion of this Brief (*infra*, pp. 53-70).

As to the alleged competitive difficulties of independent fabricators, it should be noted that the district court found that this acquisition "will not bring about, enhance or aggravate any so-called 'price squeeze' . . ." (Fdg. 66, R. 1296); that "no shortage in primary aluminum is foreseeable" (Opin., R. 1312); and that independent manufacturers testified that "in the three years since the acquisition, there had been no adverse effect," and that none foresaw any future adverse effect (Fdg. 50, R. 1294). The abandonment of insulted aluminum products by certain nonintegrated companies, the court attributed to "the existence of a vigorous competition in the products involved" (Opin., R. 1330). In fact, during the post-acquisition period, other nonintegrated companies substantially increased their sales of aluminum conductor products, and expanded, or planned to expand, their capacity for producing such products (R. 75-76, 228, 381, 404-06, 984-85, 990).

3. THE PROCEEDINGS IN DISTRICT COURT

On February 5, 1962, after approximately 22 months of extensive pre-trial discovery, the four-week trial of this action commenced. At the trial, the court received more than 500 documentary exhibits and heard and observed more than 50 witnesses, among them engineers and purchasing agents for public utilities, experienced wire and cable technical, sales and managerial personnel, and appellees' executive officers chiefly responsible for the acquisition and operation of Rome.

On January 28, 1963, the court filed its Opinion and Findings of Fact and Conclusions of Law and dis-

missed the Complaint. With respect to the two alleged lines of commerce involved in this appeal—aluminum conductor and insulated aluminum conductor—the court held (1) that they were not proper lines of commerce, and (2) even assuming that they were proper lines, the prohibited anticompetitive effect had not been shown.

The court's line of commerce determinations were based on the findings as to industry understanding and practice, manufacturing interchangeability, and copper-aluminum competitiveness which have been reviewed above (pp. 14-18). In concluding that the Government failed to prove the prohibited effect on competition, the court refused to condemn the acquisition solely on the basis of market share statistics, since such data not only showed Rome's shares to be comparatively small but demonstrated continuous and substantial declines in Alcoa's pre-acquisition market share and in the Alcoa-Rome combined share after the acquisition (Opin., R. 1324, 1329; Fdg. 45, R. 1292-93). The nonstatistical evidence established, *inter alia*, that Alcoa's purpose was to overcome the market disadvantage resulting from its lack of insulating capability (Opin., R. 1321, 1333; Fdg. 7, R. 1284); that there had not been substantial or vigorous competition between Alcoa and Rome (Opin. R. 1329; Fdg. 52, R. 1294); that there is complete and demonstrated ease of entry (Opin., R. 1323; Fdgs. 54-58; R. 1294-95); that neither competitors nor purchasers have been, or expect to be, adversely affected in any way by the acquisition (Opin., R. 1326, 1330; Fdgs. 59-66, R. 1295-96); and that there has been and continues to be vigorous competition in the manufacture and sale of aluminum wire and cable products (Opin., R. 1330; Fdg. 69, R. 1297).

SUMMARY OF ARGUMENT

The district court found that the Government failed to sustain its burden of proof on either line of commerce or competitive effect. Accordingly, this appeal must fail if the district court can be sustained as to either necessary element of a Section 7 case.

I

The district court ruled that the Government failed to prove (A) that insulated aluminum wire and cable products comprise a line of commerce separate from their copper counterparts; and (B) that a meaningful line of commerce can be created by adding together noncompetitive bare and insulated aluminum conductor products. These determinations are challenged solely as a matter of law, the court's underlying findings of fact being undisputed.

A. (1) Applying the practical indicia set forth in *Brown Shoe Company* v. *United States,* 370 U.S. 294 (1962), the district court found that the industry does not differentiate between copper and aluminum insulated products, that copper and aluminum products are functionally interchangeable, and that there are no unique production facilities, distinct customers or specialized vendors for insulated aluminum conductor products. Though recognizing that the prices of copper and aluminum insulated products are "generally distinct" and not sensitive to each other, the court found that this did not foreclose "actual competition." Accordingly, making a practical judgment based on the great preponderance of the submarket indicia, it concluded that insulated aluminum conductor had not been established as a proper line of commerce.

(2) The Government argues that the district court should have based its line of commerce determination solely on aluminum's price advantage in two simple insulated products. This one-sided approach to market definition ignores entirely the district court's undisputed finding that insulating fabricators can and do "switch readily" from copper to aluminum conductor products in accordance with market conditions. The importance of such interchangeability as a determinant of market boundaries is firmly established in economic theory and is reflected in the supply-oriented submarket indicia—unique production facilities, distinct customers and specialized vendors—endorsed by this Court in *Brown Shoe*. Here, the absence of "distinct customers" and the court's undisputed findings as to industry practice establish that it would have been unrealistic to confine the relevant "area of effective competition" to the relatively small portion of total insulating capacity (less than 5 per cent) that at the time of trial happened to be allocated to aluminum.

(3) Reinforcing and confirming the court's line of commerce determination, though not essential to it, are its findings that "substantial quantities" of insulated copper products are sold in "active," "lively," and "actual" competition with their aluminum counterparts. Seeking to minimize these findings, the Government argues that such competition will ultimately disappear. The record, however, does not support this contention, and, indeed, the Government did not even request such a finding in its Proposed Findings and Brief submitted to the district court.

B. The alleged aluminum conductor line of commerce is the mathematical sum of bare and insulated aluminum conductor shipments. If the insulated com-

ponent is not, itself, a proper line, then the composite, too, must fall, since, as to the insulated segment, important competitive elements are excluded. In any event, this grouping of noncompetitive bare and insulated products is not recognized in the industry as a separate economic entity or submarket, and appears to be simply a numerical trick calculated to give this acquisition an appearance of substantiality. Such appearance is deceiving for the composite line consists predominantly of Alcoa's bare aluminum conductor shipments. Rome was *de minimis* with respect to such products, and no appeal has been taken from the district court's ruling that no anticompetitive effect was shown with respect to bare aluminum conductor.

II

Prior to the acquisition, the only products sold by both Alcoa and Rome to more than a *de minimis* extent were two simple insulated aluminum conductor products, and as to these, competition between them was found not to be substantial. The district court found that market share and concentration statistics, standing alone, did not condemn the merger, and, relying on numerous economic and historical factors, concluded that the Government had not sustained its burden of proof on the competitive effect issue.

Though not disputing the court's findings of fact, the Government argues that the acquisition violates Section 7 because Alcoa, "the industry leader in an already oligopolistic product market," has acquired a "significant" competitor. This theory has no relation to the facts of this case.

A. (1) With respect to insulated aluminum conductor, Alcoa was far from the "industry leader," rank-

ing third, more than 60 percent behind the first ranking supplier, and lacking insulating capability and product diversity possessed by many of its competitors.

(2) The Government's glib assumption that insulatel aluminum conductor is an "oligopolistic" market rests entirely on market share and concentration percentages. It is, however, common ground among economists that such simple numerical and statistical measures cannot afford the "firm understanding of the structure of the relevant market" that is required in Section 7 cases. *United States* v. *Philadelphia, Bank,* 374 U.S. 321, 362 (1963). Concentration percentages are particularly meaningless where, as here, the alleged "market" is so narrowly drawn. But even where the market may be properly delimited, its structure is not determined by simple statistical measures. Rather, a coordinated examination of important market structure variables, such as condition of entry and product differentiation, and the actual record of market performance over a period of time, is required. Here, such an examination confirms the court's finding that the alleged insulated aluminum conductor "market" is characterized by active and vigorous competition. Thus, the Government's assumption that the acquistion occurred in an already "oligopolistic" market cannot be sustained.

(3) The Rome acquisition will not affect market structure or impair the vigorous competition in insulated aluminum conductor. There are numerous strong and capable firms which are either already making insulated aluminum conductor products or are "waiting in the wings." Rome, itself, was even less important in the so-called insulated aluminum "market" than its small market share would indicate. It adhered to a

"policy of not going below the prices of its competitors" and had declined significantly in market percentage from 1955 to 1958.

B. (1) As noted, the alleged aluminum conductor line is simply a mathematical composite of bare and insulated aluminum conductor products. The Government concedes that this acquistion does not have the prohibited effect with respect to bare aluminum conductor products. Since such effect cannot be shown as to the insulated component, it follows that the Government has also failed in its burden of proof as to the composite line.

(2) The only purpose of the composite aluminum conductor line is to show a market percentage of the magnitude deemed significant by this Court in *Philadelphia Bank*. In this case, however, such percentage has no competitive significance whatever since it primarily reflects Alcoa's pre-acquisition position in bare aluminum conductor. The small portion contributed by Rome, 1.3 per cent, consisted predominantly of insulated aluminum conductor which is not even claimed to be competitive with bare. Moreover, this percentage is actually just a point on a steady, downward curve reflecting the continuing erosion of Alcoa's position as a supplier of bare aluminum wire and cable, a decline that began long before the acquisition and has continued thereafter.

C. Where, as here, market share statistics are not conclusive, determination of the competitive effect issue requires "an examination of various economic and historical factors . . ." *Brown Shoe*, 370 U.S. at 329. Here, such factors, to a degree unprecedented in Section 7 cases, affirmatively establish that this acquisition will not have the prohibited anticompetitive effect.

Especially important are the following: The unparalleled ease of entry; the absence of product differentiation; the substantial market share declines experienced by Alcoa before, and by Alcoa-Rome after, the acquisition; the fact that Rome was not an aggressive price competitor; the absence of substantial competition between Alcoa and Rome; the fact that competing manufacturers have not been and will not be adversely affected by the acquistion; the post-acquisition expansion of nonintegrated competitors; the uncontradicted testimony of utility purchasers formerly buying from both Rome and Alcoa that this acquisition had not had, and will not have, any adverse effect; the fact that it was Alcoa's objective to acquire insulating capability and diversification rather than to expand its aluminum conductor facilities; the absence of a history of mergers on the part of Alcoa or a significant merger trend in the alleged industry as a whole; and the continued vigor of competition.

ARGUMENT

This appeal challenges the district court's application of amended Section 7 to two alleged aluminum conductor lines of commerce. Since the court found that the Government had failed to sustain its burden of proof on both the line of commerce and competitive effect issues, the appeal must fail if the district court can be upheld as to either issue. In Part I, we will show that the district court's line of commerce determinations comport fully with standards established by this Court in *Brown Shoe Co.* v. *United States*, 370 U.S. 294 (1962), and other cases. In Part II, we will show that the district court correctly applied Section 7 in finding that the Government had not proved the required anticompetitive effect.

I.

THE DISTRICT COURT CORRECTLY REJECTED INSULATED ALUMINUM CONDUCTOR AND ALUMINUM CONDUCTOR AS "LINES OF COMMERCE"

In district court, both parties agreed that conductor wire and cable, corresponding to the wire and cable industry,[22] and insulated wire and cable (copper and aluminum), corresponding to the insulating subindustry, were proper lines of commerce (Fdgs. 31, 33, R. 1289-90). Appellees opposed, and the court rejected, the Government's attempts to further divide the insulating subindustry into an insulated aluminum subsubmarket, and to establish a composite aluminum conductor line consisting of bare and insulated aluminum products (Fdgs. 23, 25-29, R. 1288-89; Opin. R. 1316-17). We shall take up first the Government's alleged insulated aluminum conductor line since the court's findings with respect thereto are pertinent to the composite aluminum conductor line.

A. The District Court Properly Rejected Insulted Aluminum Conductor as a Line of Commerce

The district court has found that insulated products made from aluminum do not comprise a product market, or submarket, separate and distinct from their copper counterparts. The Government does not challenge the court's underlying findings of fact, but claims that it erred in failing to give controlling weight to the price differential between copper and aluminum insulated products (Govt. Br., pp. 39, 46). The Gov-

[22] Industry No. 3357 of the Standard Industrial Classification is entitled "drawing and insulating of nonferrous wire" and includes establishments which manufacture either bare or insulated products, using either copper or aluminum as the conductor metal (AR 74, R. 3451, 3460).

ernment's single-factor approach to market definition is inconsistent with this Court's *Brown Shoe* decision; in this industrial context, excludes critical elements from the relevant "area of effective competition"; and disregards the court's findings that the copper-aluminum price difference does not foreclose "lively," "active," and "actual" competition between copper and aluminum insulated products (Opin., R. 1312, 1316).

(1) The District Court Properly Applied the Pragmatic Test Established in Brown Shoe

In *Brown Shoe,* this Court held that there are broad product markets within which there may be "well-defined" and "economically significant" submarkets. 370 U.S. at 325. It did not attempt to formulate any rigid standard for determining submarket boundaries, but indicated that a broad-ranging, pragmatic evaluation of market realities was required. Courts were admonished to examine (*ibid.*)

> such practical indicia as industry or public recognition of the submarket as a separate economic entity, the product's peculiar characteristics and uses, unique production facilities, distinct customers, distinct prices, sensitivity to price changes, and specialized vendors.

The district court, relying on industry testimony and supporting documentation, concluded that the Government had not sustained its burden of proof since the alleged insulated aluminum line does not satisfy the great preponderance of the listed indicia. Insulated aluminum "is not recognized in the industry as a separate economic entity" (Opin., R. 1316; Fdgs. 25, 26, R. 1288); insulated wire and cable products are desig-

nated by their function or type, e.g., weatherproof, multiplex, building wire, control cable, etc., whether made from copper or aluminum, and product classifications used by the Bureau of the Census conform to this practice[23] (Fdg. 25, R. 1288; R. 946); copper and aluminum insulated products "are completely interchangeable from a performance standpoint" (Fdg. 28, R. 1289; Opin., R. 1316); both are made interchangeably on the same equipment and with the same personnel (Fdg. 27, R. 1288; Fdg. 56, R. 1295); the same customers, i.e., utility companies, purchase copper and aluminum insulated products (Opin., R. 1316; Fdg. 28, R. 1289); and there are no "specialized vendors" of insulated aluminum wire and cable (Opin., R. 1316; Fdg. 26, R. 1288). Though recognizing that copper and aluminum wire and cable prices are "generally distinct" and not sensitive to each other, the court found that this did not foreclose "actual competition" between aluminum products and their copper counterparts (Opin., R. 1316).

Thus, the court's conclusion that insulated aluminum conductor is not a self-contained "area of effective competition" rests on a pragmatic examination of market realities. The Government's contention that it should have disregarded all but the two indicia that seemed to favor its position is, we submit, wholly at variance with the balanced appraisal called for by *Brown Shoe*. Moreover, because of the nature of competition in the insulating business, the indicia prin-

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[23] While not necessarily controlling on the line of commerce question, the census classifications are not without significance. See *Crown Zellerbach Corp.* v. *Federal Trade Commission*, 296 F. 2d 800, 813 (9th Cir. 1961), cert. denied 370 U.S. 937 (1962).

cipally relied on by the district court have special and compelling importance in this case.

(2) The Government's Single-Factor Test Is Inconsistent with Brown Shoe and Would Exclude Critical Elements from the Relevant "Area of Effective Competition"

As noted, the Government urges that the court should have determined the line of commerce issue solely on the basis of the copper-aluminum price difference. Though conceding that copper and aluminum insulated products are competitive, it claims that they are "sufficiently noncompetitive to be treated as distinct submarkets" (Govt. Br., p. 40). The implicit assumption in this argument is that the only valid criteria for determining the "area of effective competition" in Section 7 cases are the "distinct prices" and "sensitivity to price changes" indicia. This approach to market definition is not only incompatible with *Brown Shoe* but, in this case, would lead to an artificial and unrealistic line of commerce.

(a) *Submarket Boundaries Are Determined by the Existence of Substitution at Either the Product or Production Levels*

Where the issue is whether products of different industries, made in wholly different manufacturing establishments, must be joined in a single product market, the distinct prices and price sensitivity indicia will be largely determinative. On the other hand, where, as in both *Brown Shoe* and this case, the issue is whether products of the same industry, made in the same plants and on the same equipment, should be broken down into separate product markets, other criteria—e.g., industry recognition, unique production facilities, distinct customers, specialized vendors—be-

come of critical importance.[24] This is recognized by economists as well as by this Court's *Brown Shoe* opinion.

Economists specializing in problems of competition and monopoly emphasize that a market must be defined in light of *either* product or supply substitution. Professor Stigler, in the introduction to a series of essays concerning business concentration, formulates this as follows:

> An industry should embrace the maximum geographical area and the maximum variety of productive activities in which there is strong long-run substitution. If buyers can shift on a large scale from product or area B to A, then the two should be combined. If producers can shift on a large scale from B to A, again they should be combined.
>
> Economists usually state this in an alternative form: All products or enterprises with large long-run cross-elasticities of either supply or demand should be combined into a single industry.[25]

Professor Kaysen makes the same point:

> To delimit the market in terms of products requires examination of both the chain of potential substitutes at various prices as seen by buyers and the widening circle of potential rival suppliers at various prices as seen by sellers.[26]

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[24] The Government, itself, stressed the importance of interchangeability of productive facilities in *United States* v. *Brown Shoe Company*, 179 F. Supp. 721, 729 (E.D. Mo. 1959), where it urged the court to adopt lines of commerce including different types and grades of shoes on the ground that "the same machinery is used to produce shoes of different types and grades and . . . production is often converted between types and grades."

[25] *Business Concentration and Price Policy* 4 (1955).

[26] *Business Concentration and Price Policy* 117.

The Government's line of commerce argument is, of course, diametrically opposed to the economists' concept of a product market.

In *Brown Shoe*, as in *duPont-General Motors*, this Court made clear that a line of commerce is not just one or two reasonably homogeneous products. Rather, it is a "relevant market" or "area of effective competition," with reference to which "substantiality" can rationally be determined.[27] With specific reference to a submarket, this Court has emphasized that in order to qualify as a line of commerce, it must be "well-defined" and "economically significant," and should be recognized as a "separate economic entity," not simply as a separate product.

Moreover, the "practical indicia" to be considered in determining submarket boundaries, though referring to short-run rather than long-run substitutability,[28] express in practical terms the basic economic concept that markets are to be defined in terms of close substitution of either product or production facilities.[29] Indeed, these indicia are most meaningfully applied when broken down into demand (product) and supply (production) indicia. This can be illustrated by two examples: (1) If products A and B have no peculiar characteristics and uses and have similar and mutually sensitive prices, there will be substantial and rapid product substitution, and both must be placed in

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[27] *United States* v. *E.I. duPont de Nemours & Co.*, 353 U.S. 586, 593 (1957); *Brown Shoe Co.* v. *United States*, 370 U.S. 294, 324 (1962).

[28] The distinction between broad markets and submarkets having antitrust significance might well be expressed in terms of the difference between long-run and short-run substitutability.

[29] Compare Stigler, *op. cit.*, at 4-5.

the same submarket. (2) Where no manufacturing specialization or unique production facilities are required, and the same vendors sell products A and B to the same customers, there will be substantial and rapid supply (or production) substitution, and, again, A and B must be placed in the same market.

The rationale for such a bilateral approach to market definition is that where either type of substitution exists, market power cannot be measured by reference to A alone, for suppliers of A face effective competition from product B, itself, in example (1), and from production facilities used on B, but readily applicable to A, in example (2). In either case, the existence of effective substitution prevents the achievement or exercise of market power.[30]

The "distinct customers" indicium is important to this argument, for the technical ability to shift productive facilities from one product to another may be rendered competitively meaningless if "continuing relationships between buyers and sellers . . . make such shifts unlikely." *United States* v. *Bethlehem Steel Corp.*, 168 F. Supp. 576, 592 (S.D.N.Y. 1958).[31] Here,

[30] The term "area of effective competition" which this Court uses synonymously with "'relevant market" or "line of commerce" derived from *Transamerica Corp.* v. *The Board of Governors*, 206 F. 2d 163, 169 (3d Cir. 1953), where Judge Maris stated that "the area or areas of effective competition in which monopoly power might be exercised" must be determined before an acquisition's competitive effect can be ascertained. Quoted in *United States* v. *E. I. duPont de Nemours & Co.*, 353 U.S. 586, 593 (1957).

[31] The close relationship between the "distinct customers" indicium and supply substitution as a determinant of market boundaries is noted in Bock, *Mergers and Markets*, An Economic Analysis of Case Law 30 (1960), which was cited by this Court in *Brown Shoe*, 370 U.S. at 325, n. 43.

in contrast to *Bethlehem Steel*, there are no "distinct customers" for copper and aluminum insulated products, and manufacturers "switch readily from one product or conductor metal to another in accordance with market conditions" (Fdg. 56, R. 1295).

We respectfully submit, therefore, that in appropriate cases, productive capacity devoted to products A and B must be combined in a single submarket, whether or not A and B are closely competitive in use.[32] This conclusion, not only comports with economic analysis but gives meaning to the supply-oriented indicia —unique production facilities, distinct customers, specialized vendors—which would be nullified by the Government's one-sided approach.

(b) *The District Court's Finding That Insulating Fabricators Move Freely Between Copper and Aluminum Insulated Products is Controlling on the Line of Commerce Issue*

As noted, we do not suggest that the mere theoretical possibility that productive capacity may be shifted from one product to another requires that all products that can be made interchangeably must necessarily fall within the same submarket. Here, however, the court has found that it is the regular practice in the industry for wire and cable insulators to shift from one conductor metal to another.

The court's findings depict a single insulating entity consisting of producers who regard themselves simply as insulators, "not as insulators of copper wire and cable on the one hand or of aluminum wire and cable

[32] Here, of course, as will be argued below, there is also substantial competition at the product level (*infra*, pp. 38-45).

on the other" (Fdg. 26, R. 1288). Such insulating fabricators move freely from one product and one conductor metal to another and, in a continuing, dynamic process, re-evaluate their product lines and consider how their insulating capacity should be allocated among copper and aluminum products[33] (Fdgs. 56, 85, R. 1294-95, 1300). Since there are neither "specialized vendors" nor "distinct customers" for insulated aluminum conductor products, the court found that insulators presently using only copper would also make aluminum products "if profitable orders were obtained" (Fdg. 56, R. 1295).

The Government's oversimplified line of commerce argument wholly ignores the dynamics of competition in the insulating business. Its error is clearly revealed in the following excerpts from its Brief (Govt. Br., p. 43):

> Utilizing a high-cost metal, fabricators of insulated copper cable are powerless to eliminate the price disadvantage under which they labor and thus can do little to make their product competitive (R. 224).
>
> * * *
>
> [T]he availability of a copper substitute exerts little, if any, restraint upon the power of aluminum cable manufacturers to raise the price of their product (Govt. Br., p. 44).

First of all, it is fallacious to refer to "fabricators of insulated copper cable" and "aluminum cable

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[33] This process is especially significant in this case since products where aluminum is principally used are among the simplest of all insulated products, and the shift to such products, in either copper or aluminum, can readily be made by the numerous manufacturers already making more sophisticated products (Fdgs. 55, 84, R. 1294, 1299).

manufacturers" as if these were two separate and static entities (Fdgs. 26, 56, R. 1288, 1295).[34] Indeed, the very witness relied on by the Government testified that his company makes insulated products, using either copper or aluminum; that the amount made with each metal depends on "what the customer wants"; and that both copper and aluminum products are made interchangeably on the same equipment (R. 223, 228-29). And, as another Government witness testified, he began to make aluminum conductor products "as soon as the first customer asked us, about 1950" (R. 73; see also e.g., R. 946, 982).

Thus, it is obvious that if a fabricator should feel himself at a competitive disadvantage owing to the use of copper, he is not "powerless," for he can readily use aluminum. Since he will still be making the same product on the same machinery and with the same personnel, and will still be selling to the same utility customers for the same end use, it would have been unrealistic for the district court to hold that merely by changing raw material, a fabricator shifts from one line of commerce to another.

The competitive importance of the dynamic factors that the Government ignores is strikingly illustrated by recent events. In the early 1950's, as the Government acknowledges, an increase in copper prices made aluminum conductor products more popular. (Govt.

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[34] With the exception of the three primary aluminum producers, all but one of the 29 companies listed by the Business and Defense Services Administration (BDSA) as manufacturers of aluminum insulated products (AR 5, R. 3211) were also listed by that agency in 1958 as producers of insulated copper wire and cable (AR 71, R. 3425). Significantly, each of the three primary aluminum producers, Alcoa, Kaiser and Reynolds, is now also bi-metallic since the insulating companies they acquired are listed as manufacturers of insulated copper wire and cable (*ibid.*).

Br., pp. 24-25). Only four companies were then making insulated aluminum products. The increased demand for aluminum, however, generated "a sudden surge of new entries" (Govt. Br., p. 54), virtually all of which came from existing insulating companies which previously had used only copper (Opin., R. 1323).[35] Thus, (1) the so-called copper fabricators were not "powerless" to compete, and (2) the availability of insulating capacity, theretofore, used solely on copper, exerted profound restraint upon the "aluminum cable manufacturers' " power to achieve any sort of market advantage.

More recently, insulated aluminum prices have declined (R. 1228-29; see also R. 243, 399), and insulators have had little economic incentive to move in that direction. The court's findings make clear, however, that if aluminum cable prices were to rise above a competitive level, insulating capacity presently used on copper would be allocated to aluminum. Among the companies to do so would be such substantial insulating firms as Anaconda, General Cable, Essex, Southwire, General Electric, Circle, etc., which already are devoting a relatively small portion of their total capacity to aluminum.[37] Other companies, e.g., Phelps

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[35] The record is clear that this did not involve "entry" in the normal sense of that word. Rather, manufacturers already in existence simply used some of their existing machinery and personnel to make aluminum as well as copper conductor products (e.g., R. 73, 242, 250-51, 280, 735-36, 942-43, 985-86).

[37] Precise figures as to the comparative importance of aluminum and copper for each of the companies presently using both are not available. However, the court's findings as to the limited role of aluminum in the insulating business overall (Fdg. 29, R. 1289) and evidence relating to Rome (AR 52, R. 3405), Essex (R. 231-34) and General Cable (R. 996-97), clearly indicate that aluminum presently occupies only a small portion of an insulator's total capacity.

Dodge, Kennecott, Simplex, Triangle, would do likewise, for, as the court found, manufacturers not presently making insulated aluminum conductor products consider whether to do so, and would make such products if it could be done profitably (Fdg. 56, R. 1294-95; see, e.g., R. 250-51, 280). It is no answer that not all of the more than 200 insulating companies presently make the simple products chiefly used in overhead distribution lines,[38] for companies able to make more complicated products can readily make the simpler ones, such as line wire and multiplex cable (Fdg. 55, R. 1294; Fdgs. 84, 85, R. 1299-1300).

For all of the reasons just discussed, "substantiality" cannot be determined in terms of a "market" restricted to the manufacture and sale of insulated aluminum products. This conclusion, which we believe is compelled by the court's findings as to industry recognition and production substitution, is reinforced by the competition found to exist between copper and aluminum insulated products.

(3) There Is Substantial Competition Between Copper and Aluminum Insulated Products

The Government does not dispute the district court's findings that the copper and aluminum versions of insulated products are "completely interchangeable from a performance standpoint" (Fdg. 28, R. 1289; Govt. Br., p. 41), and that they are sold in "actual competi-

[38] While the Government claims that only 21 companies produced "the aluminum or copper insulated conductors principally used in overhead lines" (Govt. Br., p. 21), the Wire Buyers' Guide, official publication of the Wire Association lists approximately 45 manufacturers of weatherproof line wire (AR 73, R. 3439). In accordance with the usual industry practice, it does not differentiate between copper and aluminum.

tion" with each other (Opin., R. 1316). It contends, however, that because of the "substantial" and "stable" price differences, copper-aluminum competition in overhead distribution products is not effective and, in any event, is "rapidly vanishing" (Govt. Br., pp. 43, 45). These contentions are contrary to the findings and the evidence.

(a) *Copper and Aluminum Are Substantially Competitive In The Overhead Distribution Field*

In *Brown Shoe,* where, as here, the lines of commerce found by the court satisfied a preponderance of the submarket indicia, this Court ruled that price differences between medium and low-priced shoes were not decisive, pointing out that "it would be unrealistic to accept Brown's contention that, for example, men's shoes selling below $8.99 are in a different product market from those selling above $9.00" 370 U.S. at 326. The Government seeks to distinguish this case on the ground that the price differential between copper and aluminum insulated products is so great as to foreclose the possibility of only a 1¢ difference as in *Brown Shoe* (Govt. Br., p. 46). In fact, however, competition between copper and aluminum insulated products in overhead distribution is, if anything, closer than between low and medium-priced shoes.

In terms of the current price of the wire or cable, itself, aluminum weatherproof line wire and multiplex cable are cheaper than their copper counterparts. This advantage, however, is not necessarily determinative, for when all economic factors are taken into account, the net advantage of aluminum in terms of final installed cost is reduced, and may disappear (Fdg. 28, R. 1289; *supra,* p. 15). Thus, for example, Consoli-

dated Edison has determined that copper was more economical than aluminum in its overhead primary and secondary distribution mains in New York City, reversing a previous decision in favor of aluminum (AR 76, R. 3472; R. 712).[39] One of the reasons copper prevailed was that Consolidated Edison, being interested in relatively short extensions to an existing system, required frequent connections. Admittedly, this may not be "exactly typical of national conditions," but, in varying degree, other utilities serving congested areas encounter comparable conditions (R. 713).

Other utilities, too, scrutinize carefully the over-all economics of copper versus aluminum in overhead distribution products. Alternate quotations are requested for copper and aluminum versions of such products (Gx 270, R. 2383; Gx 271, R. 2385; Gx 272, R. 2387; R. 774), and the purchaser may choose copper even though the aluminum cable, itself, is cheaper (R. 768; AR 41, R. 3396; R. 890-91). Moreover, as a Government witness testified, even companies presently using aluminum in their overhead lines appraise the pros and cons of copper and aluminum whenever substantial purchases are made, taking into account, in addition to the cost of the cable, "the labor, the installation which may vary depending upon the areas" where the conductor is to be installed, cost differentials in other components, such as connections, and other considerations based on the "characteristics of the two metals." "Sometimes [these factors] are favorable to copper

[39] A 1959 study determined that copper was also more economical than aluminum in service drops from the utility pole to buildings. This determination was reversed the following year because of technological developments that gave aluminum a net advantage (R. 712).

under certain applications and sometimes they are favorable to aluminum" (R. 214-15). The court found that this type of evaluation was required in the purchase of insulated overhead distribution products (Fdg. 28, R. 1289).

Furthermore, electric utilities do not use only weatherproof line wire and multiplex cable in their overhead distribution lines, but may also purchase other, more complicated products. When this occurs, copper will frequently be cheaper, since "the more sophisticated the conductor is away from the bare conductor, the less the differential is between copper and aluminum" (R. 216; *supra*, p. 15). The record shows that utilities have requested alternative quotations from Rome on more complicated overhead distribution products. In many instances, the copper alternate was cheaper; in others, aluminum prevailed.[40] While the more sophisticated constructions are not as widely used in overhead distribution systems as the simpler products, they are not insignificant.[41]

That copper conductor products are a significant factor in the overhead distribution field, notwithstanding aluminum's apparent price advantage in the simpler products, is indicated by the court's finding that even as to such products "substantial quantities are sold with copper as the conductor" (Fdg. 29, R. 1289).

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[40] R. 760-66, 773-74; AR 34, R. 3361; AR 35, R. 3365; AR 36, R. 3373; AR 37, R. 3375; AR 38, R. 3381; AR 39, R. 3388; AR 40, R. 3394.

[41] Figures as to total usage of pre-assembled aerial cable and other more sophisticated constructions in overhead distribution are not available. Rome's sales of these products in 1958-1960 for use in low-voltage (secondary) and high-voltage (primary) distribution systems (R. 1280-1282) amounted to nearly $1 million.

This finding, not challenged by the Government, is fully supported by the record. The Government's own survey shows that on a footage basis, copper represented 22.8 per cent of gross additions to insulated overhead distribution lines in 1959 (Gx 468, R. 2740). In dollar terms, this would amount to well over $15 million.[42] Moreover, data available for several manufacturers show that their copper weatherproof and service drop cable sales in 1958 equalled or even exceeded in value their sales of the aluminum counterparts (AR 65, 66, 67, R. 3416-18). With respect to weatherproof alone, copper exceeded aluminum by as much as two or three to one (*ibid.*).

The substantial sales of copper in overhead distribution products, the purchasers' practice of comparing copper and aluminum on the basis of overall economics, and the close price relationship in the case of more sophisticated constructions, all sustain the court's finding that copper-aluminum competition is "lively" and "active," and refute the Government's contention that close competition, such as may exist between medium and low-priced shoes, cannot occur with respect to copper and aluminum insulated products. The existence of such competition, though not necessary to sustain the court's line of commerce determination in light of the industry's practice and usage, and the absence of unique production facilities, distinct customers, and specialized vendors, nevertheless, reinforces the conclusion that it would be unrealistic to hold that

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[42] The 1958 Census of Manufactures shows a total dollar value of $66 million for weatherproof and service drop cable (copper and aluminum combined) (AR 67, R. 3418). 22.8 per cent of this would be $15 million, but this understates the dollar value of the copper versions of these products by a "fairly large" amount since they tend to be more expensive than their aluminum counterparts (R. 320).

the manufacture and sale of insulated aluminum conductor is a separate "area of effective competition."

(b) *It Has Not Been Shown That Copper-Aluminum Competition in the Insulated Field will Disappear*

Recognizing that the above findings imperil its line of commerce position, the Government argues that copper-aluminum competition is rapidly disappearing, and that it is only a matter of time until copper is displaced in the insulated field to the same extent as in bare transmission. Had such displacement progressed further, it argues, the court would presumably have recognized insulated aluminum conductor as a separate submarket, "for it found bare aluminum to be a 'line of commerce' largely on the ground that it had 'practically displaced copper for use in overhead transmission lines' " (Govt. Br., pp. 41-42).

The fallacies in this argument are manifold. First of all, it is simply not true that bare aluminum was found to be a line of commerce "largely" because it had virtually displaced copper in overhead transmission; equally important were the facts that (i) it is "generally recognized as a separate product classification," and (ii) "the manufacture and sale of these products require special stranding equipment and designing skill" (Fdg. 24, R. 1288; *supra*, p. 15). Thus, not only is there virtually no product competition, but manufacturing processes cannot readily be converted between copper and aluminum, as is true in the insulated field. There can, therefore, be no presumption that further, or even complete, displacement of copper in the field of insulated conductors would have altered the court's line of commerce determination.

In any event, the Government is mistaken in asserting that the record establishes "an unmistakable trend

away from insulated copper in the overhead distribution field" which "would have continued until aluminum had superseded copper to the same degree (94.4 per cent) as it previously had in overhead transmission" (Govt. Br., p. 42). Not only did the court make no such finding, but the Government, in its Proposed Findings and Brief, did not even ask the court so to find. The Government's failure to seek such a finding is easily explained by the record.

First. Sales figures for Alcoa-Rome and other companies whose figures were available to the court do not demonstrate the "unmistakable," continuing trend now urged by the Government. In fact, the figures as to the dollar value of Rome's weatherproof sales show that throughout the 1956-1960 period, copper actually *exceeded* aluminum by a margin of at least 3 to 1. In percentage of total dollar value, copper ranged from 76.7 per cent in 1956 to 87.5 per cent in 1960 (AR 54, R. 3405).[43] General Cable's sales figures for the years 1958 and 1959 show copper weatherproof more than three times as great in value as aluminum weatherproof, and by a greater margin in 1959 than 1958 (AR 65, R. 3416). Its President, testifying in February 1962, stated that General Cable expected to maintain the same balance between copper and aluminum in the future as in the past (R. 996).

Second. It is wholly specious to argue that "the only real differences between the two processes of displacement is that the substitution of bare aluminum for bare copper in overhead transmission started much earlier" (Govt. Br., p. 42). As noted, in the overhead transmission field, aluminum has important technical advantages over copper whereas in the insulated field,

[43] In 1961, this percentage dropped to 77.5 per cent, which still exceeded the 1956 percentage (R. 933).

copper and aluminum are "completely interchangeable from a performance standpoint" and aluminum's cheaper cost as a conductor metal may be offset by any of a number of factors (*supra*, p. 15). These undisputed facts clearly differentiate the two situations.

Third. In arguing that copper is completely disappearing from the overhead conductor field, the Government here seeks to show by argument and inference more than its own report on utility buying practices even purported to establish. In conducting this survey, the Government asked each utility to state whether it "expect[ed] any increase or decrease in 1960 and in subsequent years in the proportion of aluminum to copper used in any classification of . . ." overhead lines (Gx 468, R. 2737, 2774). Varying responses, wholly insufficient to establish any future trend, were received (Gx 468 A, R. 2775-3203). Accordingly, the Government's expert, both in his written report and in testimony, refused to make any projection of the trend beyond 1959, candidly stating that responses as to future use of aluminum were "not susceptible to tabulation and [were] not tabulated in [the] report" (R. 307).

For all of the foregoing reasons, it would be completely speculative to say that competition between copper and aluminum insulated products would ultimately vanish. Certainly, the district court's failure so to find cannot be error, where the Government, itself, did not ask it to find that the 1950-1959 trend would continue, let alone that copper-aluminum competition in the insulated field would disappear. In any event, as argued earlier, even if there were far less product competition than has been shown to exist, the court's unchallenged findings, based on the great preponderance of the *Brown Shoe* indicia, would sustain its ultimate line of commerce determination.

B. The District Court Properly Rejected Aluminum Conductor as a Line of Commerce

The alleged aluminum conductor line is nothing but a mathematical composite of (1) bare ACSR and aluminum cable and (2) insulated aluminum wire and cable (see e.g., Gx 434, R. 2714). If, as argued above, insulated aluminum conductor is not a proper line, this alone should foreclose considering the composite "line" as a separate "area of effective competition," for, as to the insulated segment, important competitive elements are excluded (Add'l. Fdg. 4, R. 1336-37). The analogy to the steel industry advanced by the Government (Br., p. 47, n. 27) is wholly inapplicable, since the court expressly found that the combination of bare and insulated conductor is not "generally recognized in the industry as a separate economic entity or submarket" (Add'l. Fdg. 4, R. 1336-37).[44]

Moreover, even if insulated aluminum conductor were a proper line of commerce, there is no basis in logic or in the competitive realities of the market place for consolidating bare and insulated products. The bare and insulated components have nothing in common, except that aluminum is used as conductor and both are used by utilities for "the same broad purpose of conducting electricity" (Govt. Br., p. 47). They are not even claimed to be competitive with each other (no utility will pay for insulated conductor where bare will suffice; compare R. 1227 and 1228), different equipment and engineering skills are required for their manufacture and sale (Fdg. 24, R. 1288), and, as noted,

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[44] The Government is incorrect in stating that the district court concluded that aluminum conductor is not a line of commerce "solely on the ground that insulated aluminum conductor, one of its two component submarkets, was not" (Govt. Br., p. 47).

the combination is not recognized as a separate economic entity. In these circumstances, this alleged line of commerce is without competitive significance, and cannot qualify as a "well-defined," "economically significant" product market. *Brown Shoe,* 370 U.S. at 325.

The indisputable effect, if not the purpose, of this synthetic composite line is to obscure the fact that Alcoa and Rome had essentially different interests and strengths in the wire and cable business. In bare aluminum, where Alcoa, though rapidly declining, was still the leader, Rome was *de minimis*; while, in insulated aluminum, where Rome was more than *de minimis,* Alcoa, handicapped by a lack of insulating competence and product diversity, ranked third, far behind two of its competitors (Gx 435, R. 2715; Gx 436, R. 2717). These differences, which the Government seeks to conceal by lumping together noncompetitive bare and insulated products, are revealed by the following table:[45]

1958
(Thousands of Pounds)

		Alcoa		Rome	
	Total	Shipments	% of Total	Shipments	% of Total
ACSR and Aluminum Cable, Bare	175,157	56,990	32.5	537	0.3
Aluminum Wire and Cable, Insulated or Covered	51,346	5,970	11.6	2,411	4.7
Aluminum Conductor Wire and Cable	226,503	62,960	27.8	2,948	1.3

[45] Based on Fdg. 45, R. 1292; Gx 434, R. 2713; Gx 435, R. 2715; Gx 436, R. 2717.

As the above table makes plain, Alcoa's 27.8 per cent derived predominantly (more than 90 per cent) from bare aluminum cable, while Rome achieved its still very minor 1.3 per cent largely by virtue of its insulated aluminum conductor shipments. In essence, therefore, the alleged aluminum conductor line of commerce serves to inflate Alcoa's market share by capitalizing on its position in bare aluminum cable, even though the Government no longer claims any prohibited effect in the bare aluminum conductor line of commerce, itself (Govt. Br., p. 38). The mere fact that the combination of bare and insulated aluminum conductor produces percentage figures resembling those discussed in the *Philadelphia Bank* case (Govt. Br., p. 58) is hardly sufficient to convert the composite line into a meaningful "area of effective competition."

II.

THE GOVERNMENT HAS FAILED TO SHOW THE REQUIRED ANTICOMPETITIVE EFFECT IN EITHER OF THE ALLEGED ALUMINUM CONDUCTOR LINES OF COMMERCE

The essential differences between Alcoa and Rome in the wire and cable field have already been described (*supra,* pp. 11-14). Rome was primarily a manufacturer of insulated copper products, Alcoa was chiefly a producer of bare aluminum cable, and, prior to the acquisition, the only perceptible competitive overlap was in the sale of two simple insulated aluminum conductor products. As to these products, Alcoa ranked third in 1958, with 11.6 per cent of total shipments, and Rome was eighth or ninth, with 4.7 per cent of total shipments (Gx 436, R. 2717). In these circumstances, having examined statistics as to market shares and concentration, evidence as to the historical and commercial background of the acquisition, and, the testi-

mony of approximately 30 industry witnesses, both competitors and consumers, the court concluded that the Government had not sustained its burden of proof on the competitive effect issue, even assuming that each of the alleged aluminum conductor lines had been established (Concl. 8, R. 1303).

Market share and concentration statistics, standing alone, the court found, did not condemn the merger, particularly when viewed in light of Rome's "comparatively small percentages" (Opin., R. 1328), the significant increase in the number of suppliers (Opin., R. 1322), the substantial and continuing market share declines suffered by Alcoa prior to the acquisition and, thereafter, by the Alcoa-Rome combination (Opin., R. 1324),[46] and the unparalleled ease of entry which it found to be "closely related to the question of trends of or concentration in the aluminum conductor lines of commerce . . ." (Opin., R. 1323). Nonstatistical evidence, to a degree unusual, if not unprecedented, in a Section 7 case, affirmatively established the absence of probable anticompetitive effect:

(1) Non-integrated fabricators of aluminum conductor products, most of them called as Government

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[46] These declines are summarized in the following table (based on Fdg. 45, R. 1292-93):

	1954		1958		1961	
	Alcoa	Rome	Alcoa	Rome	Alcoa	Rome
ACSR and Aluminum Cable, Bare	48.4	0.2	32.5	0.3	26.1	..
Aluminum Wire and Cable, Insulated or Covered	10.0	6.9	11.6	4.7	7.3	5.7
Aluminum Conductor Wire and Cable	42.8	1.1	27.8	1.3	23.5	1.3

witnesses, increased their sales of such products after the acquisition, expanded their facilities for the manufacture thereof, and testified that this acquisition had not adversely affected their businesses (Opin., R. 1330; R. 75-78, 228-31, 380-81, 404, 984-85, 990). No such manufacturer foresaw any future adverse effect from this acquisition (Fdg. 50, R. 1294; Fdg. 62, R. 1295).

(2) Utility purchasing agents, representing 8 of the 10 significant common customers, testified, without exception, that their position as purchasers of aluminum conductor products had not been, and will not be, adversely affected (Fdg. 59, R. 1295).

(3) The increase from 4 to 29 in the number of producers of insulated aluminum products in a ten year period established "that entry into the aluminum conductor field is dictated by the status of the competition rather than being controlled by actual economic barriers" (Opin., R. 1323; Fdgs. 54-57, R. 1294-95).

(4) There was not substantial or vigorous competition between Alcoa and Rome; for example, business records systematically maintained by Alcoa for two years prior to the acquisition established that only 5/100 of 1 per cent of aluminum conductor business lost to all competitors was lost to Rome (AR 58, R. 3409; Fdg. 52, R. 1294; Opin., R. 1329).

(5) The uncontradicted testimony of utility purchasing agents, and other witnesses, established that Rome was not an aggressive price competitor (Fdgs. 53, 61, R. 1294-95).

(6) Alcoa's purpose was to secure insulating capability and diversify its operations; it was not moti-

vated by Rome's manufacture of aluminum conductor products (Fdg. 7, R. 1284).,

(7) There is vigorous competition in the manufacture and sale of aluminum wire and cable products, which has not diminished since the acquisition (Fdgs. 62, 69, R. 1295, 1297).

The Government does not challenge these findings, and admits that Rome's market shares "may not appear great in absolute terms" (Govt. Br., p. 62). Nevertheless, it argues, Section 7 is violated because Alcoa, "the industry leader in an already oligopolistic product market," has acquired a "significant" competitor (Govt. Br., p. 37; and pp. 2, 49). Whatever might be the validity of this test as a proposition of law, it has no application to the facts of this case. In products where Alcoa was the "leader," Rome was not "significant"; and the glib assumption that this case involves "an already oligopolistic product market" is wholly without support in the record and contrary to the court's express finding that there is vigorous competition.

In formulating the Questions Presented, and throughout its argument on the merits, the Government floats and slides from bare aluminum conductor, to insulated aluminum conductor, to a composite of the two, and for good measure intersperses irrelevant observations concerning the primary aluminum industry. In order more clearly to show the true facts and circumstances of this case, we shall discuss separately each of the alleged aluminum conductor lines.

A. Anticompetitive Effect Has Not Been Shown With Respect to Insulated Aluminum Conductor

(1) Alcoa Was Not And Is Not The "Largest Producer" of Insulated Aluminum Conductor

Although frequently throughout its Brief, the Government refers to Alcoa as "the largest producer," the "industry leader," or "a dominant firm" (e.g., Govt. Br., pp. 2, 37, 49), these epithets do not fairly describe Alcoa's position with regard to insulated aluminum conductor. In this field at the time of the acquisition, Alcoa, with 11.6 per cent of 1958 shipments, ranked a poor third, more than 60 per cent behind Kaiser, with 26.8 per cent, and more than 30 per cent behind Anaconda, with 16.9 per cent (Gx 436, R. 2717). Moreover, it lacked insulating capability and product diversity possessed by many of its competitors. For these reasons, the court's finding that Alcoa did not occupy a dominant position is clearly pertinent to insulated aluminum conductor field (Opin., R. 1326-27).

The Government makes no claim that the simplified test enunciated by this Court in *United States* v. *Philadelphia Bank*, 374 U.S. 321, 363 (1963), is applicable to insulated aluminum conductor (see Govt. Br., p. 58).[47] Rather, its argument as to this line appears to focus upon the allegedly "concentrated" and "oligopolistic" character of the "market" and Rome's "significance" as a competitor. The findings and the evidence, however, make clear (1) that there is vigorous

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[47] This Court there created a rebuttable presumption of illegality applicable to "a merger which produces a firm controlling an undue percentage share of the relevant market, and results in a significant increase in the concentration of firms in that market . . ." 374 U.S. at 363. The Government attempts to invoke this test only with respect to its alleged composite aluminum conductor line. (Govt. Br., p. 58).

and effective competition in the sale of insulated aluminum conductors, and (2) that Rome's significance as a competitive force was even less than its admittedly small market share would indicate (see Govt. Br., p. 62).

(2) Insulated Aluminum Conductor Is Not "Highly Concentrated" or "Oligopolistic"

The Government claims that a "pattern of concentration prevails" in insulated aluminum conductor because in 1958 five integrated producers accounted for 65.4 per cent of total shipments, and because in 1959, 11 companies had market shares of 1 per cent or more (Govt. Br., pp. 20, 52). Solely on the basis of these figures, it describes the alleged insulated aluminum "market" as "highly oligopolistic" and "highly concentrated" (Govt. Br., pp. 37, 52, 62). The Government's basic misconception is to assume that concentration percentages, which may be significant when speaking of an industry, such as banking, where barriers to entry are high, can be applied mechanically to a few wire and cable products using aluminum instead of copper as conductor.

Such an oversimplified, numerical approach ignores this Court's admonition in *Philadelphia Bank* that the competitive effect question is not "susceptible of a ready and precise answer in most cases," since it requires a prediction of future competitive conditions which must be "based upon a firm understanding of the structure of the relevant market. Yet, the relevant economic data are both complex and elusive" 374 U.S. at 362. And, as exemplified by the analysis of market structure undertaken by Commissioner Elman in *Procter & Gamble*, FTC Dkt. 6901, 3 CCH Trade Reg.

Rep. ¶16,673, p. 21,568, the plaintiff's burden under Section 7 "is not met, in any case, by invocation of a talismanic *per se* rule by which to dispense with the need for adducing evidence of probable anti-competitive effect . . . . In every case the determination of illegality, if made, must rest upon specific facts." Such a determination cannot be made "solely on the basis of concentration data or other simple statistical materials."[48]

(a) *Concentration Percentages Are Not A Reliable Measure of the Structure or Competitiveness of a Market*

In part, the Government approach is fallacious because the alleged insulated aluminum conductor line of commerce excludes entirely the enormous insulating capacity presently used on copper, but which can "readily" be allocated to aluminum (Fdgs. 55, 56, R. 1294-95). The irrelevance of concentration percentages in these circumstances is recognized by economists. As stated by Kaysen and Turner:

> Where producers can and do produce several products interchangeably, the capacity currently devoted to one of those products understates the amount that should fairly be deemed to be "in" the market. Without a minimally reasonable definition of markets, criteria based on quantitative shares become whimsy.[49]

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[48] Kaysen and Turner, *Antitrust Policy* 24 (1959).

[49] *Antitrust Policy* 134. Professor Chamberlin makes the same point:

> . . . Concentration ratios and similar measures are of little significance because they are predominantly the result of how broadly the categories are defined. Chamberlin, "Measuring the Degree of Monopoly and Competition," in *Monopoly and Competition and Their Regulation* 262. See also Kaysen, *Business Concentration and Price Policy* 117.

We think "whimsy" fairly describes the Government's reliance on concentration percentages in this case.

Furthermore, even when the relevant market is properly delimited, concentration measures alone do not explain the economic behavior of a market.

> It seems vain to expect that numbers and size distribution alone will explain market behavior and therefore equally vain to hope for more from concentration measures than that they should provide a preliminary basis on which resources for further study should be allocated.[50]

And, as the Senate Subcommittee on Antitrust and Monopoly has warned:

> Bare statistics necessarily omit many qualitative factors which are essential to a complete understanding of the competitive structure of the entire industrial economy or of an individual industry.[51]

Thus, seller concentration is only one aspect of what economists term market structure, i.e., "those conditions external to the firm which are relatively per-

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[50] Kaysen in *Business Concentration and Price Policy* 118. In their more recent study of antitrust policy, Kaysen and Turner make the same point: "In general, the application to individual markets of any criterion we choose requires a fairly thorough industry study and cannot be done solely on the basis of concentration data or other simple statistical materials" *Antitrust Policy*, 25. Similarly, Professor John Perry Miller of Yale has stated: "... it appears both on a priori grounds and on the basis of such empirical evidence as we have that the extent of concentration is only one of several important variables to be examined, whether the interest is in economic analysis or public policy" *Business Concentration and Price Policy* 135.

[51] *Concentration in American Industry*, 85th Cong., 1st Sess., p. 4 (1957).

manent or which change only slowly, and which affect, if they do not determine, the way the firm operates."[52] Although an important variable, concentration "is not the only such variable and it cannot be adequately understood apart from others" *Procter & Gamble, supra*, p. 21,570. Other factors that must be considered in order to achieve the "firm understanding" of market structure required in Section 7 cases are the condition of entry into the market, and the degree of product differentiation.[53] Moreover, prediction of future market conditions also requires consideration of market performance.

> Since we are interested in the future as well as in the past, we look at structure as well as performance, in order to correlate as well as we can the observed performance with the observable features of market structure, and thus be able to predict the probable relation of future to past performance.[54]

Here, an examination of the alleged insulated aluminum line in light of relevant market structure and per-

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[52] Kaysen and Turner, *Antitrust Policy* 59.

[53] See Bain, *Industrial Organization* 8 (1959); Kaysen and Turner, *Antitrust Policy* 71-75; Machlup, *The Economics of Sellers' Competition* (1952); *Procter & Gamble, supra*, pp. 21,570-21,572. Another market structure variable sometimes cited by economists is strength of buyers, *Industrial Organization* 8, 138-143; *Procter & Gamble, supra*, p. 21,570, n. 24. While this factor is often discussed in terms of buyer concentration (oligopsony), the fact that buyers are large and well-informed will affect the vigor of competition, even though oligopsony may not exist. Here, the fact that many utilities buying insulated aluminum products are extremely large organizations with skilled engineering staffs contributes significantly to the vigor of competition (*infra*, p. 60).

[54] Kaysen and Turner, *Antitrust Policy* 75.

formance criteria will show that it is effectively and vigorously competitive, not "concentrated" or "oligopolistic."

(b) *There is Unparalleled Ease of Entry*

Condition of entry refers to the relative ease or difficulty with which new sellers may enter the market, as determined generally by the advantages which established sellers have over potential entrants. It is deemed a structural variable so important as to be "a co-regulator of business conduct and performance" along with actual competition among existing sellers.[55] With easy entry, a situation exists:

> in which there is no impediment to the entry of new firms, in which established firms possess no advantages over potential entrant firms, or in which, more precisely, established firms cannot persistently elevate price by any amount above the competitive minimal-cost level without attracting sufficient new entry to bring price back to that level.[56]

Kaysen and Turner foresee the same consequences where condition of entry is easy:

> [I]n the long run, the maintenance of market power, whether by a single firm or by a group, implies the existence of significant barriers to entry into the market by new sellers. Without such barriers, the attempt to exercise power would in general attract new sellers . . .[57]

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[55] Bain, *Barriers to New Competition* 3 (1956).

[56] Bain, *Barriers to New Competition* 11.

[57] *Antitrust Policy* 77; Professor Machlup regards condition of entry as such an important structural concept that he formulates a separate economic model and calls it pliopoly (the Greek *plio* or "more" plus *polein* or "to sell," hence *pliopoly*) for the ready appearance of "more sellers" in the market. *The Economics of Sellers' Competition* 102-109.

Economists are careful to distinguish between the true determinants of entry and transitory factors that may influence the current record of accomplished entry.

> The true determinants are the things that determine for established firms the possible price-cost relations which would and would not induce entry; they are not those things determining whether or not actual entry takes place at a particular time.[58]

Generally regarded as among the most critical "true determinants" of entry are (i) absolute cost advantages, (ii) product differentiation, (iii) economies of large scale, (iv) uncertainty, and (v) entry lag. Analysis of these factors is important not only because they determine the condition of entry, but also because they strongly influence "the competitive vigor of the existing firms in the market . . ." *Procter & Gamble, supra,* p. 21,571, n. 27. As will now be shown, not a single one of these entry (and competition) retarding factors operates in the alleged insulated aluminum conductor field.

(i) Existing firms do not have any absolute cost advantage

Existing firms in an industry will enjoy an absolute cost advantage over potential entrants where

> the entrant either must use inferior production techniques or must pay higher prices for productive factors such as labor, materials, plant, and money capital.[59]

In the present context, it at least approaches "whimsy" even to discuss "absolute cost advantages" since there

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[58] Bain, *Barriers to New Competition* 17.

[59] Bain, *Barriers to New Competition* 144.

are numerous experienced and capable wire and cable fabricators already using equipment and techniques which can be applied interchangeably to either copper or aluminum products (Fdgs. 55, 56, R. 1294-95). Moreover, products chiefly made from aluminum are among the simplest of all insulated constructions. No patents or secret processes are involved, and surely there is no reason to believe that Kennecott, Phelps Dodge, American Steel and Wire Division of U.S. Steel, and other existing manufacturers must pay more for labor, materials, plant and capital than their fellow insulators who happen, at this moment, to be using both aluminum and copper.

(ii) There is no product differentiation in insulated aluminum conductor

> [T]he most important barrier to entry discovered by detailed study is probably product differentiation.[60]

Product differentiation is based generally on the susceptibility of buyers to persuasive appeals, usually through advertising, concerning the alleged superiority of the products of individual sellers. It flourishes where buyers are relatively uninformed as to the merits of alternative products, and where there is the opportunity for producing significantly different designs and qualities of goods in question.[61] "Such preferences need not, and frequently do not, rest on real or substantial differences in terms of quality or usefulness" *Procter & Gamble, supra*, p. 21,571. The existence of product differentiation will "make entry for a new firm

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[60] Bain, *Barriers to New Competition* 216.

[61] Bain, *Industrial Organization* 219.

difficult in that it must overcome the established good will of existing sellers."[62]

It is beyond question that no product differentiation exists in the alleged insulated aluminum line of commerce. The few simple insulated wire and cable constructions in which aluminum is used are manufactured according to standardized technical requirements (AR 25-28, R. 3267-3343), and can be produced by virtually any insulating firm (Fdg. 55, R. 1294; Fdg. 84, R. 1299). Appeals to buyers, usually in the form of product bulletins and catalogues, are not made in terms of "differentiating" the products but of *conforming* them to the accepted standards (AR 30-31, R. 3345-56). The only purchasers of such products—electrical utility companies—are large, well-informed buyers who can and do purchase these products from any producer meeting the industry's standards (e.g., R. 801, 806, 813, 899).[63]

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[62] Kaysen and Turner, *Antitrust Policy* 74. Product differentiation may also protect the market shares of established firms, making it difficult for other existing firms to expand, and, therefore, as noted, *supra*, p. 56 is regarded as a prime market structure variable as well as a determinant of condition of entry (*infra*, pp. 64-65). See also *Procter & Gamble*, *supra*, p. 21,571.

[63] The lack of product differentiation is not surprising since it is more likely to prevail with respect to consumer goods than industrial commodities, such as wire and cable. "Producer buyers tend in general to make it their business to be well-informed as to the qualities and properties of the goods they buy, and are thus less susceptible to the persuasive appeals of sellers. In addition, their task is frequently simplified by the fact that numerous producer goods are standardized, uniform raw materials, the suppliers of which find little opportunity for introducing physical product differentiation among their outputs" Bain, *Industrial Organization* 219.

(iii) Economies of large scale do not inhibit entry

Economies of the large plant or firm refer to a decline in unit costs as the scale of the plant or firm is increased. Where significant scale economies are present, an entrant must add a significant fraction to industry output in order to operate at the minimum optimal scale. The result of entry on such a scale may be a decline in prices, making it uneconomic to continue, or established firms may retaliate against the entrant by lowering prices. In these circumstances,

> the entrant is not only being made to play the competitive game for high stakes, but, by being forced to enter on a large scale, he is virtually ensuring a swift competitive response by the established firms. *Procter & Gamble, supra,* p. 21,571.

On the other hand, if the entrant comes in at a scale small enough to be "unnoticed," he would be operating at a suboptimal level and have higher costs than established firms.[64]

No such barriers are present as to insulated aluminum. Existing insulating companies can enter on a small scale or on a large one, depending on market conditions, with no capital investment whatever (Fdgs. 55, 56, R. 1294-95; e.g., R. 73-74, 251, 280-81, 379-80, 661-62, 983). Their efficiency is determined by their existing scale of operation and production techniques, not by the amount of aluminum used as conductor.

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[64] The significance which economists attach to economies of scale is indicated by Professor Markham's statement that "[t]he most important single determinant of the degree of competition in a given industry is the shape of the long-run cost curve confronting the prospective entrant." "Economic Analysis," *Proceedings*, Section of Antitrust Law, American Bar Association (April 1954), p. 149.

(iv) Uncertainty as to market conditions does not impede entry

Uncertainty refers to a potential entrant's lack of knowledge of the industry he might enter, and particularly lack of knowledge as to whether a profit can be made.

> The more uncertain the prospects appear in an industry, the more imperfect will entry be and the greater may be the profits of the firms established in the industry, sheltered by the deterrent uncertainty.[65]

No such difficulty besets existing insulators who may wish to "enter" the alleged insulated aluminum line of commerce. Since they are already in the insulating business, they know the cost and efficiency of the machinery and personnel to be used, and are fully conversant with customer requirements, there being no "distinct customers" for copper and aluminum insulated products (Opin., R. 1316; see e.g., R. 73).

(v) The effectiveness of easy entry is not impaired by entry lag

Even where there are no significant entry barriers, the time required to effect entry (i.e., "lag,") may limit the effectiveness of easy entry as a guarantor of vigorous competition. Thus:

> [t]he longer the lag period in question, the less influence any given threat of entry will be likely to have on established sellers. . . . The *effect* of any given condition of entry on market behavior will therefore be likely to vary with the length of the entry lags which accompany it.[66]

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[65] Machlup, *The Economics of Sellers' Competition* 231; see 107, 228-230.

[66] Bain, *Barriers to New Competition* 11; See also Machlup, *The Economics of Sellers' Competition* 108.

Here, lag is nonexistent because "entry" is not only easy, but virtually instantaneous (e.g., R. 73-74, 379-80, 661-62, 982-83).

(c) *Easy Entry Assures Vigorous Competition Among Existing Firms*

As the foregoing makes plain, insulated aluminum is characterized by an extraordinarily easy condition of entry. One consequence of this is the high probability that in the future additional manufacturers will allocate part of their insulating capacity to aluminum.[67] But this is not the only significance of easy entry, for where this condition prevails, vigorous and effective competition is assured even where no actual entry occurs.

First of all, where, as here, potential entrants exist and the market structure is favorable to entry, these conditions will bring about vigorous and effective competition among the existing firms (*supra,* p. 58). This very point is now being urged by the Government in *United States* v. *Penn-Olin Chemical Company,* No. 503, this term, where it argues:

> The presence of a potential entrant—waiting in the wings and capable of moving into the market—may be an indispensable source of protection for purchasers and ultimately the consuming public. Its readiness to enter the market whenever the existing manufacturers charge excessive prices, limit production, or fail to exploit economic opportunities (e.g., to develop more efficient productive techniques) can act as a spur to insure the competitive vigor of those already in the market. "If

[67] As will be discussed below, this process is already under way (*infra,* pp. 68-69).

> economic superiorities of some kind are not possessed by the existing few, entry of new rivals is a continuing threat, likely to enforce behavior approaching the competitive norm." Weston, *The Role of Mergers in the Growth of Large Firms* (1953) 109; Brief, p. 25.

Here, to a far greater extent than in the *Penn-Olin* situation, these conditions are satisfied, for there are numerous potential entrants, each able to "enter" the market with far greater ease than could the chemical concerns involved in that case.

Secondly, as Commissioner Elman has observed, "factors making for high entry barriers also make for domination of small competitors by large and so tend to eliminate actual as well as potential competition" *Procter & Gamble, supra,* at p. 21,572. Conversely, where entry retarding factors are absent, the market structure will favor effective competition among existing firms. Particularly important in this regard is product differentiation which is generally regarded as both an entry determinant and a market structure variable in its own right.[68]

Where product differentiation is lacking, sellers will be forced to match the price reductions of rivals in order to hold their customers, and market shares will be determined not by systematic buyer preferences,

> but at random or as a result of a past sequence of historical developments in the establishment and growth of firms. The individual firm is generally not well protected in its going share of the market by any specific structural conditions, and is potentially vulnerable to losses in proportionate con-

[68] E.g., *Procter & Gamble, supra,* 21,571; Kaysen and Turner, *Antitrust Policy* 74; Bain, *Industrial Organization* 210-221.

trol of the market because of the growth of other firms, their pricing policies and so forth.[69]

As will now be shown, because of the absence of product differentiation and other competition retarding market characteristics, there is aggressive price competition with respect to insulated aluminum conductor products and suppliers of such products have been "vulnerable to losses in proportionate control of the market because of the growth of other firms . . ."

(d) *Market Performance Demonstrates the Effectiveness of Competition In Insulated Aluminum Conductor*

As noted, prediction of future economic conditions requires a coordinated evaluation of both market structure and performance. Here, examination of actual performance confirms what is so clearly indicated by the foregoing analysis of market structure, namely, that competition is vigorous and effective.

(i) There is active price competition

The district court found that there is vigorous competition among all manufacturers of insulated aluminum products (Fdgs. 62, 69, R. 1295, 1297; Opin., R. 1330). Such competition is manifested in price-cutting by both small and large firms. Alcoa lost millions of pounds of insulated aluminum business on a price basis to both small and large competitors, including such independent companies as Nehring, Southwire, General Cable, Central Cable, and Essex (AR 29).[70] More-

[69] Bain, *Industrial Organization* 216.

[70] During the same period, it lost virtually no aluminum conductor business to Rome (Fdg. 52, R. 1294; AR 58, R. 3409). AR 29, as well as AR 72 which is referred to below (pp. 68-69), is not in the printed record but is part of the original record filed with the Clerk.

over, the Government, itself has acknowledged the aggressive price-cutting practices of such firms as Central and Nehring (Govt. Br., pp. 62, 64).[71]

The experience of utility companies in competitive bidding further demonstrates that price competition is not confined to the larger suppliers. In 1959, Circle Wire and Cable Company, too small to be listed by the Government among the 1958 sellers of insulated aluminum conductor (Govt. Br., p. 20), was awarded 22 per cent of Long Island Lighting Company's aluminum conductor business. Essex went from zero in 1959 to 29 per cent in 1960. In part, these gains were at the expense of Anaconda and Alcoa which dropped from a combined 66 per cent of Long Island's business in 1958 to 10 per cent in 1961 (AR 81, R. 3507). Similarly, when Central Illinois Public Service Company was dissatisfied with the price and other terms for aluminum triplex, it requested bids from two smaller suppliers. A considerably lower price and better terms were obtained, which eventually the larger suppliers had to match (R. 891-93). Overall, as a result of vigorous price competition, list prices of insulated aluminum products are substantially below what they

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[71] The Government's claim that the alleged insulated aluminum line of commerce is an "oligopolistic" market (Govt. Br., pp. 2, 37) is inconsistent with the admitted aggressive price cutting of small firms. In an actual oligopolistic market, small firms "tend to exist at the sufferance of their large rivals, and for that reason are likely to opt for peaceful coexistence—not vigorous competition—with those rivals." *Procter & Gamble, supra*, p. 21,569. Similarly, in *Philadelphia Bank*, this Court referred to the fact that in an oligopolistic market, "small companies may be perfectly content to follow the high prices set by the dominant firms . . ." Footnote 43, at p. 367.

were in 1953, and actual prices in the market place are still lower (R. 243, 399, 833, 1228-29; AR 29).

(ii) There have been significant shifts in market shares

The so-called "insulated aluminum" market has been characterized by significant ups and downs in market shares. Other examples, in addition to the declines suffered by Alcoa and Rome (Fdg. 45, R. 1292-93), are the shift of Southwire from 9th position, with 2.3 per cent, in 1955, to 4th, with 7.4 per cent, in 1956; the increase of Essex from a 7th ranking 4.9 per cent in 1957, to a 5th ranking 6.1 per cent in 1958; the move of General Cable from 7th place, with 5.8 per cent in 1956, to 3rd place, with 11.9 per cent in 1957; and the decline of Kaiser from 26.5 per cent in 1955, to 18.1 per cent in 1956 (Gx 436, R. 2717).

(iii) There has been significant entry

In terms of entry, too, the market has performed as the foregoing structural analysis would indicate. The court found that the abandonment of insulated aluminum products by several companies since 1956 resulted from the "vigorous competition in the products involved" (Opin., R. 1330). The Government argues that such abandonment, together with the fact that since 1955 only one company commenced the manufacture of insulated aluminum products, "dispel the significance of the court's finding that there is 'ease of entry' . . ." (Govt. Br., p. 55). The important fact, however, is not whether actual entry has occurred, but whether underlying conditions are conducive to entry (*supra*, p. 58). Here "there is no evidence which would indicate that any potential producer has been unable to enter the industry when he thought that

a profit could be made therein" (Opin., R. 1323). Indeed, on the basis of the "surge of new entries" experienced in the early 1950's, when rising copper prices increased the popularity of aluminum conductor products (Govt. Br., pp. 24-25, 54), and the industry practice of switching from less to more profitable products (Fdg. 56, R. 1294-95), there can be no doubt that if competition had been less intense, more entry would have occurred.

In any event, despite the vigorous competition, there has been significant "entry." Hatfield Wire and Cable Division of Continental Copper & Steel Industries, Inc., known to be an aggressive competitor (R. 551), has begun making aluminum conductor products (AR 5, R. 3229); and subsequent to trial, too late to be noted in the record, Phelps Dodge, already an important wire and cable fabricator, with assets 18 times Rome's (AR 72), announced plans to offer a full line of aluminum conductor products.[12] Moreover, while too insignificant to be listed by the Government as producers of insulated aluminum conductor products in 1958 (Govt. Br., p. 20), General Electric, with assets more than 100 times those of Rome, and Circle, whose parent company, Cerro Corporation, has combined assets 10 times as large as Rome's (AR 72), began to increase their shipments of such products in 1959 (Govt. Br., p. 20). There is nothing in the structure of the insulated aluminum conductor "market" to inhibit the further growth of these very substantial concerns, or to prevent other already

[12] *The Wall Street Journal*, November 18, 1963. In the Government's terms, Phelps Dodge would be "entering" the alleged insulated aluminum line of commerce.

well-established insulating firms from "entering" the field.[73]

[73] The following companies or their affiliates, with consolidated 1960 assets as shown, are among the wire and cable fabricators that are not included among the companies listed by the Government (Govt. Br., p. 20) as suppliers of insulated aluminum conductor in 1958 (AR 72):

	1960 Assets
American Enka Corporation (William Brand—Rex Div.) [AR 73, R. 3443]	$ 100,416,720
Amphenol-Borg Electronics Corp. (Amphenol Cable & Wire Div.) [AR 73, R. 3442]	51,006,381
Cerro Corporation (Circle Wire and Cable Corp.) [AR 73, R. 3443]	249,410,118
Continental Copper and Steel Industries, Inc. (Hatfield Wire and Cable Div.) [R. 943; AR 73, R. 3445]	42,055,627
Electric Autolite Company [AR 73, R. 3444]	146,877,541
General Electric Company [R. 943; AR 73, R. 3445]	2,522,249,000
H. K. Porter Co. (National Electric Div.) [R. 943; AR 73, R. 3447]	132,783,644
International Telephone & Telegraph Corporation (Royal Electric Div. and Suprenant Div.) [R. 943; AR 73, R. 3448-49]	383,296,277
Kennecott Copper Corporation (The Okonite Co.) [R. 943; AR 73, R. 3447]	807,554,096
Neptune Meter Company (Revere Corp.) [AR 73, R. 3448]	34,791,595
Phelps Dodge Corporation [R.943; AR 73, R. 3447]	426,968,025
Simplex Wire and Cable Co. [R. 943; AR 73, R. 3448]	24,535,020
Sprague Electric Company [AR 73, R. 3449]	47,535,846
Tennessee Corporation (Chester Cable Div.) [R. 943; AR 73, R. 3443]	92,811,785
Triangle Conduit and Cable Company [R. 943; AR 73, R. 3449]	32,190,895
United States Steel Corporation (American Steel and Wire Div.) [R. 943; AR 73, R. 3442]	4,626,800,000
Westinghouse Electric Corporation [AR 73, R. 3450]	1,521,138,112

Conclusion as to the Alleged "Highly Concentrated" and "Oligopolistic" Market in Insulated Aluminum Conductor. On the basis of the foregoing, it is abundantly clear that the bare concentration statistics mechanically applied by the Government do not adequately describe the nature of competition in the alleged insulated aluminum conductor line of commerce. The crucial "observable features of market structure," when correlated with "observed performance,"[74] establish that competition in this alleged line is effective and vigorous. As will now be shown, the Rome acquisition will not affect the prevailing vigor of competition.

(3) The Acquisition of Rome Will Not Affect Market Structure or the Vigor of Competition in the Manufacture and Sale of Insulated Aluminum Products

(a) *The Acquisition of Rome Did Not and Will Not Change Pre-existing Market Structure*

The Rome acquisition has not had and cannot have any effect on the condition of entry or product differentiation market structure variables discussed above. Here, unlike *Procter & Gamble*, where already high entry barriers were "markedly heightened by the merger" (*supra*, p. 21,579), the essential entry conditions are unchanged. As the court found, there is no reason to believe that anyone "has been or probably will be deterred from entering into the manufacture and sale of aluminum conductor wire and cable products because of this acquisition" (Fdg. 58, R. 1295).

Moreover, even in terms of the one structural variable emphasized by the Government, i.e., seller con-

[74] Kaysen and Turner, *Antitrust Policy* 75.

centration, this acquisition is not substantial. Alcoa's share in 1958 was 11.6 per cent, and Rome's 4.7 per cent. The sum, 16.3 per cent, is not only far below the 30 per cent conservatively computed in *Philadelphia Bank*, 374 U.S. at 364, but is substantially beneath the 20 to 25 per cent figures suggested as a test of *prima facie* unlawfulness by the economists cited in footnote 41 of that opinion. 374 U.S. at 364.

The impact, in bare statistical terms, becomes even more tenuous in light of the substantial post-acquisition decline from a combined high of 16.6 per cent in 1959 to 13 per cent in 1961. Thus, on the basis of the latest information available to the court, the market share of Alcoa-Rome combined is only 1.4 percentage points above the 11.6 per cent share held by Alcoa alone in 1958.

The acquisition's effect on the number and size distribution of firms in the alleged market as a whole is equally insignificant. Prior to the acquisition, Alcoa ranked third; after the acquisition, the Alcoa-Rome combination was still third, and still substantially behind Kaiser and Anaconda (Gx 436, R. 2717). Moreover, the aggregate share of the five integrated producers has remained virtually unchanged. From a combined 65.4 per cent in 1958, the same five companies at the end of 1961 accounted for 66.5 per cent, an increase of only 1.1 percentage points. Such increase in concentration not only is far below the 33 per cent increase deemed significant in *Philadelphia Bank*, but also is substantially below the 7 or 8 percentage point increase suggested by Professor Bok as a possible statistical test. *Philadelphia Bank, supra*, footnote 41.

Such a minute increase in "concentration," upon which the Government apparently relies (Govt. Br., pp. 56-57), could only have relevance if it adversely affected or eliminated the "possibility of eventual deconcentration" where "concentration is already great." *Philadelphia Bank*, 374 U.S. at 365, footnote 42. Thus, in *Procter & Gamble, supra*, p. 21,583, already formidable barriers to entry were made "virtually insurmountable" by the acquisition, and, as a result, "virtually all possibility of an eventual movement toward deconcentration in the liquid bleach industry was eliminated." Here, in sharp contrast, insulated aluminum conductor is not concentrated in any meaningful sense of the word, entry barriers are nonexistent, and the acquisition, itself, has not changed the condition of entry (Fdg. 58, R. 1295). Moreover, as will now be shown, Rome, a steadily declining factor in insulated aluminum conductor, was among the least likely sources of "deconcentration."

(b) *Rome Was Even Less Important Than Its Small Market Share Would Indicate*

The Government contends that this acquisition eliminated substantial competition because Rome, though not large in absolute terms, had "competitive significance [that] transcends its bare market percentage" (Govt. Br., p. 60). This, the Government argues, was because it was one of only a few "effective firms in the industry" (*ibid.*), because it was an "aggressive competitor" and product innovator (Govt. Br., pp. 62-63), and because its presence in the market preserved "the possibility of eventual deconcentration" (Govt. Br., p. 64). These contentions misconceive both the nature of the alleged market and Rome's competitive role therein.

First, the assumption that there are only a "few significant competitive factors" in the insulated aluminum conductor field presupposes that this is a sharply delimited "industry" confined to the 11 or 12 companies each of which happened in a given year to account for one per cent or more of total insulated aluminum conductor shipments. This, of course, totally ignores the more than 200 established firms ready, willing and able to make insulated aluminum conductor products, including such substantial companies as Okonite, Westinghouse, Hatfield, General Electric, Circle, Triangle, American Steel and Wire, Crescent and Simplex, which, though still comparatively minor suppliers of insulated aluminum conductor, are, nevertheless, substantial concerns with a potentiality for expansion that would not ordinarily be true in the case of "fringe" competitors (*supra*, n. 73). Finally, the implication that there may be an inadequate number of companies is flatly refuted by the testimony of utility purchasing agents all of whom made clear that both before and after the Rome acquisition there were more than enough suppliers of insulated aluminum conductor products. (Opin., R. 1326, Fdgs. 59, 60, R. 1295; R. 721, 750, 801, 806, 810-12, 886-87, 893-94, 897-98).

Secondly, the court found and the Government concedes, that "Rome was not an aggressive price competitor" in the sale of aluminum conductor products (Fdgs. 53, 61, R. 1294-95; Govt. Br., p. 62). This is of critical importance, for, as emphasized by Kaysen and Turner, "the fact that the acquired company has been an active influence on prices" should be among the factors required in order to find illegality where, as here, market shares are "fairly small," i.e., a com-

bined percentage of less than 20 per cent.[75] Seeking to overcome Rome's passive role and to inflate its competitive importance, the Government asserts that Rome was "shown to be an 'aggressive competitor'" and was a product innovator in the field of aluminum insulation (Govt. Br., pp. 62-63). It does not even attempt, however, to explain precisely how Rome could have been "aggressive," yet, as the court found, adhere "to the policy of not going below the prices of its competitors" (Fdg. 53, R. 1294).[76]

Likewise, as shown earlier (*supra*, pp. 11-13), Rome's insulating proficiency, research activities and product innovation, all related to its line of sophisticated products, where "copper remains virtually unrivaled" (Govt. Br., p. 17), not to the two simple products in which aluminum has gained acceptance. The implication that Rome had developed an important insulated aluminum conductor product is misleading for the product in question was actually developed by Rome in the late 1940's using copper as the conductor metal (R. 936). There is no proof in this record that Rome has pioneered the develop-

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[75] Kaysen and Turner, *Antitrust Policy* 133. The only other factor singled out is "severe limitations on entry."

[76] The alleged showing that Rome, though not a price competitor, was, nevertheless, an "aggressive competitor" is based entirely on the statement of Rome's President, who, though acknowledging that Rome was not a price cutter, asserted that it was an "aggressive competitor" (R. 937). This, of course, was a perfectly natural statement for the President and one of the founders of the company to make. Utility purchasers who were in a position to compare the aggressiveness of Rome with that of other suppliers, testified "without contradiction that Rome was not an initiator of price reductions." (Fdg. 53, R. 1294).

ment of even a single insulated aluminum conductor product.

Finally, the Government's argument that the independence of Rome should be maintained in order to preserve the possibility of eventual deconcentration is wholly without substance. As shown in detail, insulated aluminum conductor is not "concentrated" or "oligopolistic" and there is no shortage of established insulating companies that can effect even further decentralization. Rome was one of the companies least likely to expand, for it was not an aggressive price competitor and, prior to the acquisition, had been a declining factor in insulated aluminum conductor, its percentage having fallen from 6.9 per cent in 1955 to 4.7 per cent in 1958 (Gx 436, R. 2717).

For all of the foregoing reasons, it is clear that the Government failed to sustain its burden of proof on competitive effect with respect to the alleged insulated aluminum conductor line of commerce.

B. The Required Anticompetitive Effect Has Not Been Shown With Respect to the Alleged Aluminum Conductor Line of Commerce

(1) The Lack of Anticompetitive Effect as to Each Component Demonstrates the Absence of Such Effect as to the Alleged Composite Line

The Government's second alleged line of commerce is nothing but a mathematical composite of (1) insulated aluminum wire and cable, and (2) ACSR and aluminum cable, bare. With respect to item (1), the Government makes no claim of presumptive or *per se* illegality and, as just demonstrated, has failed to show anticompetitive effect. As to item (2), the Government has not even appealed from the district court's

conclusion that the prohibited effect was not shown. Since the Government concedes the absence of prohibited effect in bare aluminum, which constitutes more than 90 per cent of Alcoa's share, and 77 per cent overall, of this alleged line of commerce (Govt. Br., p. 11), and has shown no prohibited effect as to insulated aluminum, it is nothing short of incredible to claim that the requisite effect can somehow emerge when bare and insulated aluminum conductor are lumped together.

(2) The Market Percentages on Which the Government Relies Are Devoid of Economic Significance

With due respect, we submit that the Government's composite line is simply a numerical trick, calculated to give the appearance of substantiality where the market facts and industry testimony demonstrate that none exists. As noted above, Alcoa's 27.8 per cent of this composite line was more than 90 per cent bare aluminum conductor, while Rome's very minor 1.3 per cent consisted almost entirely of insulated aluminum products (*supra*, p. 47). Since bare and insulated products are not even claimed to be competitive, and since the combination was found not to constitute a recognized economic entity or submarket (Add'l. Fdg. 4, R. 1336), the combination of the two is utterly without economic or competitive significance. Certainly, in these circumstances, the combined percentage of 29.1 per cent does not manifest the "inherently anticompetitive tendency" which this Court found justified reliance upon a rebuttable presumption of illegality based on market shares in the *Philadelphia Bank* case, 374 U.S. at 363.

Moreover, the *Philadelphia Bank* presumption applies to "a merger which *produces* a firm controlling

an undue percentage of the relevant market . . ." (emphasis supplied). In this case it is pure fiction to suggest that this acquisition "produced" the 29.1 per cent figure on which the Government relies. This percentage, as noted, predominantly represents Alcoa's pre-acquisition sales of bare aluminum cable. As such, it is nothing but a point on a steady downward curve reflecting the sharp and continuing erosion of Alcoa's position in bare aluminum cable which has fallen from 48.4 per cent in 1954, to 32.5 percent in 1958, and, combined with Rome, to 26.1 per cent in 1961 (*supra*, p. 6). Because of Alcoa's subordinate role in insulated aluminum conductor, the percentages are somewhat smaller in the composite line, but the identical trend is disclosed: from 42.8 per cent in 1954, to 27.8 per cent in 1958 and, combined with Rome, to 24.8 per cent in 1961. Thus, by the time of trial the Alcoa-Rome combined share in the alleged composite line was more than 40 per cent below that held by Alcoa alone in 1954, and more than 10 per cent below Alcoa's percentage in 1958, the last full year before the acquisition.

Attempting to minimize the significance of these sharp declines, the Government, quoting from Commissioner Elman's opinion in *Procter & Gamble*, suggests that post-acquisition declines "are entitled to little, if any, significance" because a company " 'may deliberately refrain from anti-competitive conduct . . . and build, instead, a record of good behavior . . .' " (Govt. Br., p. 59). This argument has no relevance to this case. Although the Government states that the district court relied on the decline of the merged companies "subsequent to the acquisition" (Govt. Br., p. 59), the fact is that the court repeatedly emphasized the "generally continued" market share declines "both pre and

post-acquisition" (Opin., R. 1324, 1313; Fdg. 45, R. 1292-93). Thus, contrary to the implication of the Government's argument, Alcoa's post-acquisition decline is but a continuation of a trend started long before the acquisition, a fact which demonstrates that market forces, rather than a desire to build a good record for this proceeding, accounted for the decline."[11]

In light of its obviously contrived nature, the failure of proof as to the bare and insulated components, and the substantial and continuing decline in the Alcoa-Rome market share, the Government's claim of illegality as to the alleged aluminum conductor line of commerce is wholly without substance. This conclusion is reinforced by examination of market and historical factors which affirmatively establish the acquisition's lack of effect in either of the alleged aluminum conductor lines of commerce.

C. Market and Historical Factors Found by the Court Affirmatively Establish That Anticompetitive Effect Has Not Been Shown

Where market share statistics are not conclusive, determination of the competitive effect issue requires "an examination of various economic and historical factors . . ." *Brown Shoe,* 370 U.S. at 329. Several of such factors—Alcoa's downward trend, the complete ease of entry, the absence of product differentiation, Rome's passive role in price formation and declining position, the lack of significant competition between Alcoa and Rome, the continued vigor of competition—have already been discussed. We turn now to other economic and historical factors that also affirmatively

[11] Furthermore, although there was extensive pre-trial discovery and virtually every Alcoa official concerned with the post-acquisition operation of Rome was exposed to cross-examination at the trial, there is not even a hint in this record of any attempt on the part of Alcoa to build a record for the purpose of this proceeding.

establish that this acquisition will not have the prohibited anticompetitive effect.

(1) There Has Not Been, and Will Not Be, Any Adverse Effect on Competitors

While Section 7 is concerned primarily with effect on competition, rather than on competitors (*Philadelphia Bank*, 374 U.S. at 367, n. 43), in some cases an acquisition's effect on competitors may be so severe as to create a probability that competition as a whole will be substantially lessened. (See e.g., *Brown Shoe*, 370 U.S. at 344). This, emphatically, is not such a case. At the trial, independent wire and cable manufacturers, most of them Government witnesses, testified as to competitive conditions. Not a single such witness had either experienced, or foresaw in the future, any adverse effect as a result of this acquisition (Fdgs. 50, 62, R. 1294-95). Indeed, several of them had increased their aluminum wire and cable sales since the acquisition, and had either built new plants, or expanded existing plants, in order to increase their capacity for making such products (Opin., R. 1330; R. 74-76, 228, 381, 404-06, 984-85, 990). Moreover, in the three years since the acquisition, independent manufacturers, as a group, increased their sales of insulated aluminum wire and cable by more than 50 per cent, with a corresponding increase in their combined market share from 29.8 per cent in 1958 to 33.5 per cent in 1961 (Opin., R. 1329).

(2) Alcoa's Purpose Was to Obtain Insulating Capability, Not to Expand Its Aluminum Conductor Facilities

Although the Government implies that Alcoa's purpose was to "augment" its already leading position in aluminum conductor (Govt. Br., p. 61), this is contrary to the court's express finding that the purpose was to secure insulating capability and diversification,

and that the acquisition was not induced by "Rome's manufacture of aluminum products . . ." (Fdg. 7, R. 1284). These findings are relevant in a Section 7 case, for, as this Court noted in *Brown Shoe* (370 U.S. at 329, n. 48):

> evidence indicating the purpose of the merging parties where available, is an aid in predicting the probable future conduct of the parties and thus the probable effects of the merger.

Here, the findings as to purpose repudiate the Government's claim that Alcoa sought to "expand" its aluminum conductor operations (Govt. Br., p. 68).

(3) There Is No Significant Merger Trend

Contrary to *Brown Shoe,* where this Court found definite and substantial acquisition trends in which Brown Shoe, itself, was a "moving factor," 370 U.S. at 302, the Court here found neither a "significant pattern or trend of mergers" for the industry as a whole (Fdgs, 46, 49, R. 1293), nor any prior "history of acquisitions or mergers" involving aluminum conductor by Alcoa (Opin., R. 1322).

The court's findings as to the lack of any significant merger trend are strongly supported by the record. The so-called trend consists of the following: Olin-Mathieson, which was not even in the wire and cable business, acquired Southern Electrical;[78] U. S. Rubber, which was never more than an .8 per cent factor in aluminum conductor products, was acquired by Kaiser in 1957; and Roebling, which never was more than a .1 per cent factor and is conceded by the Government to have been an insignificant competitor (Govt. Br., p.

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[78] The post-trial acquisition of Central Cable by Aluminium Limited, which is referred to by the Government, also did not eliminate or lessen competition since Aluminium was not previously in the wire and cable business.

69), sold some of its used wire and cable machinery to Reynolds (Gx 392, 393, R. 2613-18).

While purporting to acknowledge the underlying facts and not wishing "to overdraw the picture" (Govt. Br., p. 68), the Government urges that these acquisitions were "major step[s] towards the elimination of all independent concerns" (Govt. Br., p. 65), and that "there is reason to apprehend that the remaining independents will eventually be absorbed and the market occupied exclusively by the integrated giants." (Govt. Br., p. 71). This inflammatory, *ad terrorem* argument is wholly without basis in fact.

Not only did none of the prior acquisitions eliminate any substantial competition, but none involved an attempt to expand aluminum conductor operations. Alcoa's purpose has just been discussed, and Reynolds, too, was seeking insulating capability required in order to make its product line more competitive (Gx 387, R. 2606). Similarly, the effect of Kaiser's acquisition of U. S. Rubber was to place it in a position to offer insulated copper products (R. 1080-81).[79] Thus, all

[79] The Government concedes that the Olin-Southern and Aluminium-Central acquisitions eliminated no actual competition. It argues, however, that potential competition was eliminated because "the electrical conductor field is one to which [the primary aluminum producers] would naturally gravitate" (Govt. Br., pp. 69-71). In fact, there is no evidence that any aluminum producer has been able to acquire insulating capability through internal growth. The Government's assertion at this point in the Argument, as in the Statement of Facts, that Alcoa "was prepared to embark upon a large program of internal expansion" does not faithfully reflect the facts of record. As noted, the court found that the time and expense involved "seemed to foreclose" the possibility of Alcoa's obtaining insulating competence from within (*supra*, p. 9). It is ironic that the Government should stress the potential competition of primary aluminum producers not even in the insulating business, yet ignore the literally dozens of already existing insulating concerns that could so much more easily commence the fabrication of aluminum conductor products.

three acquisitions were actually a competitive reaction to the fact that many companies with broad experience in the insulating business had begun to manufacture aluminum conductor products (*supra*, pp. 8-9). They were not, as the Government would imply, attempts to "expand" within the field of aluminum conductor, but were for the purpose of securing insulating know-how.

In these circumstances, unlike the situation in *Brown Shoe*, where shoe manufacturers had economic incentive to engage in a seemingly endless program of "drying up" available outlets (370 U.S. at 301), here the acquiring company's economic incentive is extinguished once it has acquired insulating capability. Thus, explaining Alcoa's lack of interest in future acquisitions, its Executive Vice President testified: "Alcoa was seeking know-how in this insulated wire business and we were satisfied Rome had it and we were not about to buy it twice" (R. 1110; see also R. 1087, 1105). Reflecting this testimony and the commercial background of the acquisition, the court found that the Rome acquisition was not shown to be "part of a continuing program contemplating future expansion through mergers or acquisitions . . ." (Fdg. 11, R. 1284). Since the same appears to be true as to the other minor acquisitions, the Government's concern about the extinction of independents through further acquisition by primary aluminum producers is unfounded (See Govt. Br., pp. 66-67).[80]

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[80] As throughout its Brief, the Government, of course, assumes that there is a closely limited, static group of aluminum conductor fabricators, and that only those supplying more than a given percentage of the market at any one time can qualify as "significant independents." There are, however, as noted above, substantial concerns such as General Electric, Circle, Phelps Dodge, and Hatfield which are in the process of commencing or expanding the production of aluminum conductor products and, of course, numerous others in a position to do so if market conditions warrant.

(4) There Has Not Been, and Will Not Be, Any Adverse Effect on Consumers

Recognizing that one test of a competitive market is "whether consumers are well served" *Philadelphia Bank*, 374 U.S. at 367, n. 43, appellees offered the testimony of purchasing agents for 8 of the 10 public utilities which bought aluminum conductor products from both companies prior to the acquisition. These witnesses explained in detail the manner in which they purchase these products, identified their suppliers before and after the acquisition, and described Rome's policies and practices. As the court found, these witnesses "all testified without exception that the acquisition has not had an adverse effect upon the purchasers of such products;" that "no difficulty has been encountered in expanding their list of suppliers and that competition among such suppliers has not been affected" (Opin., R. 1326); and that prior to the acquisition, Rome was a follower rather than an initiator of price reductions (Fdgs. 53, 61, R. 1294-95). On the basis of this and other evidence, the court found that consumers "have not been and will not be adversely affected by the Rome acquisition" (Fdg. 59, R. 1295).

CONCLUSION

For all of the foregoing reasons, the district court correctly ruled that the Government had failed to sustain its burden of proof on either the line of commerce or competitive effect issues, and its judgment dismissing the Complaint should be affirmed.

Respectfully submitted,

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April 9, 1964

APPENDIX

The exhibits in the record were admitted as follows:

Government Exhibit:	Record Page
Gx 1-50	36-40
52-70	283
71-78	289
79-137	294
138-156	295
157-167	302
168-179	303
180-187	304
189-202	304
203-206	555
207	559
208-210	556
221	556
223-225	557
227	557
228-231	324
232-243	324
245-246	324
248-254	324
256-259	324
261-274	324
275-347	325
348-360	325
362-386	325
387-397	325
398-408	326
409-410	570
412	571
421A	576
421B	576
421C	576
422	68
423	71
424	372
425	373
426	373
427	373
428	375
429	375
430	376

Government Exhibit:	Record Page
GX 431	377
432	378
433	378
434-440	84
441	90
442	*
443	98
444	102
445	108
446	108
447	107
448-452	108
454	137
455	112
456	120
457	120
458	120
459-461	121
462	128
463	129
464	132
465-467	133
468	310
468A	310
469-471	175
472	208
492	340
493-494	371
495	466
496	570
497	774
498	1161
499	1162
500	1032
501	1189
502	1152
503	1189
504	1190

* By Stipulation filed with the Court on November 6, 1963 the parties agreed that Gx 442 was admitted into evidence by the district court.

Alcoa Rome Exhibit:	Record Page
AR 4	868
5	938
6	1005
7	790
9	947
12	633
13, 13A	636
14, 14A	638
15, 15A	640
16, 16A	642
17, 17A	643
18, 18A	645
19, 19A	649
20, 20A	650
21-24	651
25	654
26	655
27	656
28	658
29	682
29A	693
30	753
31	754
32	759
33	773
34	762
35	763
36	763
37	764
38	765
39	766
40	774
41	768
42	769
43	791
44, 44A	823
45	825
46	827
47	828
48	829
49	829
50	830

ALCOA ROME EXHIBIT:	RECORD PAGE
AR 51	830
52	830
53	831
54	904
55	905
56	906
57	832
58	842
59	872
60	874
61	876
62	881
63	883
64	903
65	906
66	907
67	908
68	908
68A	926
69	816
70	940
71	944
72	945
73	945
74	948
75	1046
76	707
77	1085
78	1086
79	1141
80	1141
81	811
82	1134
83	1093
84	1192

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IN THE

Supreme Court of the United States

OCTOBER TERM, 1963

No. 204

UNITED STATES OF AMERICA, *Appellant*,

v.

ALUMINUM COMPANY OF AMERICA and ROME CABLE CORPORATION

APPELLEES' PETITION FOR REHEARING

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INDEX

	Page
1. Line of Commerce	2
(a) Insulated Aluminum Conductor	2
(b) Aluminum Conductor	5
2. Competitive Effect	6
3. Relief	13

CITATIONS

CASES:

Brown Shoe Co. v. *United States*, 370 U.S. 294 (1962) 2, 3, 4, 6, 7, 13

International Salt Co. v. *United States*, 332 U.S. 392 (1947) 13

United States v. *Aluminum Company of America*, 148 F. 2d 416 (2d Cir. 1945) 9

United States v. *Bethlehem Steel Corp.*, 168 F. Supp. 576 (1958) 6

United States v. *E. I. duPont de Nemours & Co.*, 366 U.S. 316 (1961) 12, 13

United States v. *El Paso Natural Gas Co.*, 84 S.Ct. 1044 (1964) 13

United States v. *Jerrold Electronics Corp.*, 187 F. Supp. 545 (E.D. Pa. 1960), aff'd 365 U.S. 567 (1961) 13

United States v. *Philadelphia National Bank*, 374 U.S. 321 (1963) 6, 7, 9, 11, 12

United States v. *United States Gypsum Co.*, 340 U.S. 76 (1950) 13

MISCELLANEOUS:

Bok, *Section 7 of the Clayton Act and the Merging of Law and Economics*, 74 Harv. L. Rev. 226 (1960) 9

IN THE

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UNITED STATES OF AMERICA, *Appellant*,

v.

ALUMINUM COMPANY OF AMERICA and
ROME CABLE CORPORATION

APPELLEES' PETITION FOR REHEARING

Appellees petition for rehearing of this Court's decision reversing the District Court's judgment dismissing the Government's complaint under Section 7 of the Clayton Act (15 U.S.C. 18, as amended). Rehearing is requested because this Court has either misconceived or failed to consider basic market and economic facts found and relied upon by the District Court.

1. LINE OF COMMERCE

Meticulously applying the guidelines laid down by this Court in *Brown Shoe Co.* v. *United States,* 370 U.S. 294, 325 (1962), the District Court found and concluded that the wire and cable insulating business is not divisible into separate copper and aluminum "areas of effective competition" and that "aluminum conductor," a composite of bare and insulated aluminum products, also is not a proper line of commerce. In overturning those determinations, this Court has either ignored or repudiated the District Court's unchallenged findings of fact, notwithstanding the mandate of Rule 52(a), Fed. Rules of Civil Procedure, and has substituted its subjective, *ad hoc* judgment for the pragmatic appraisal based on established criteria called for by *Brown Shoe.*

(a) Insulated Aluminum Conductor

This Court's conclusion that insulated aluminum conductor is a separate "area of effective competition" rests entirely on the price differential between aluminum and copper in two simple products. Appellees concede, and the District Court found, that a price difference exists; but, as the dissent points out, to characterize price as "the single, most important, practical factor in the business" (Slip Op. 5), is utterly incompatible with the District Court's unchallenged finding of fact that in the purchase of these products, the utility customer's decision "requires evaluation of numerous economic factors in addition to the cost of the wire or cable itself" (Fdg. 28, R. 1289; Dissent, Slip Op. 5).

But even if price actually were the "single, most important, practical factor" in the purchasing of wire

and cable, it would still be erroneous to define line of commerce without regard to the many other relevant economic factors enumerated by this Court in *Brown Shoe*. It is only by ignoring these factors, and the District Court's unchallenged findings relating thereto, that this Court is able to make the following assertion:

> As the record shows, utilizing a high cost metal, *fabricators of insulated copper conductor* are powerless to eliminate the price disadvantage under which they labor and thus can do little to make their product competitive, *unless they enter the aluminum field.* (Slip Op. 4) (Emphasis added)

This assertion, which is central to this Court's line of commerce conclusion, conflicts irreconcilably with the District Court's findings as to the nature of competition in the insulating business:

First. Contrary to the Court's question begging assumptions, there is neither a separate group of "fabricators of insulated copper conductor" nor a separate "aluminum field." This is shown, *inter alia*, by the District Court's undisputed findings that manufacturers regard themselves simply as "insulators of wire and cable products, not as insulators of copper wire and cable on the one hand, or of aluminum wire and cable on the other" (Fdg. 26, R. 1288); that insulated products are defined according to their function or type, "not according to the metal used as conductor" (Fdg. 25, R. 1288); and that the aluminum field "is not recognized in the industry as a separate economic entity" (Opin., R. 1316).

Second. The inability of producers to make their products competitive, except by entering a new field,

is unquestionably a meaningful factor in defining submarket boundaries. Indeed, this was recognized in *Brown Shoe* where this Court included among the practical indicia to be examined in determining such boundaries "unique production facilities," "distinct customers," and "specialized vendors." The significance of these indicia is that where one or more of them exists, manufacturers of product B cannot easily make and sell product A, and, therefore, the two products need not be combined in a single submarket.

Here, however, the District Court's uncontested findings make clear that not one of these practical factors operates to place "fabricators of insulated copper conductor" outside "the aluminum field." Thus, for example, the District Court found that there are not unique production facilities, specialized vendors, or distinct customers (Opin., R. 1316); that "the numerous manufacturers of insulated wire and cable constantly review their product lines and switch readily from one product or conductor metal to another in accordance with market conditions" (Fdg. 56, R. 1294-95), using "the same equipment and . . . the same personnel" on either copper or aluminum (Fdg. 27, R. 1288); and that manufacturers not presently making insulated aluminum products would do so if profitable orders were obtained (Fdg. 56, R. 1294-95). These and other findings (e.g., Fdgs. 55, 84, 85, R. 1294, 1299, 1300) leave no doubt that there is only a single insulating business, and that all insulating fabricators can readily commence the manufacture of aluminum line wire and multiplex cable without "entering" into a new or different "area of effective competition."

In sum, this Court's conclusion that there is a separate, self-contained insulated aluminum conductor sub-

market cannot be reconciled with the District Court's detailed and uncontroverted findings that insulating fabricators move freely between copper and aluminum, shifting easily from one product and conductor metal to another in accordance with market conditions.

(b) Aluminum Conductor

This Court has declared the combination of noncompetitive bare and insulated aluminum conductor products to be a line of commerce (Slip Op. 5). Since, as the Solicitor General conceded in oral argument, this conclusion depends on also finding insulated aluminum conductor to be a separate line of commerce, we believe it is erroneous for all of the reasons set forth above. But even if insulated aluminum were separable from insulated copper, it does not follow that the mathematical sum of bare and insulated aluminum conductor products would be a proper line of commerce.

The Court defends this grouping on the ground that it "is a logical extension of the District Court's findings" since aluminum and copper wire and cable, both bare and insulated, were grouped together in a broad composite line of commerce. That combination, however, corresponds to the well-recognized wire and cable industry, whereas the District Court expressly found that the aluminum conductor composite is not "generally recognized in the industry as a separate economic entity or submarket" (Add'l Fdg. 4, R. 1336-37). Thus, as the dissent points out, this Court's holding on this point is not "'a logical extension of the District Court's findings,' but a repudiation of those findings" (Dissent, Slip Op. 6).

Moreover, except for this Court's declaration that it "seems to us proper" to combine bare and insulated aluminum conductor products into one line of commerce, there is no basis in law, economics, or logic for holding this mathematical composite of noncompeting products to be a line of commerce. It does not meet the *Brown Shoe* submarket indicia; it is not a broad market since it does not embrace all reasonable interchangeable products (*Brown Shoe*, 370 U.S. at 325); nor, in view of the District Court's finding that it is not a recognized economic entity, can it properly be said that this amalgamation of non-competitive products forms a recognized industry, such as, the commercial banking and steel industries which were held to be lines of commerce in the *Philadelphia Bank* and *Bethlehem Steel* cases,[1] or, for that matter, the wire and cable industry. With all deference, we respectfully submit that it is nothing but a mathematical device originated by the Government for the purpose of giving this acquisition a deceptive and misleading appearance of numerical substantiality.

2. COMPETITIVE EFFECT

In *Brown Shoe*, this Court recognized that Congress did not enact a blanket prohibition of all mergers, but sought only to prevent "mergers having demonstrable anticompetitive effects" (370 U.S. at 319); while Congress was concerned with "probabilities, not certainties," nevertheless, "no statute was sought for dealing with ephemeral possibilities" (370 U.S. at 323). In *Philadelphia Bank*, the Court recognized the com-

[1] *United States* v. *Philadelphia National Bank*, 374 U.S. 321, 357 (1963); *United States* v. *Bethlehem Steel Corp.*, 168 F. Supp. 576, 593 (1958).

plexity and difficulty of the competitive effect question "in most cases," and established a carefully circumscribed simplified test of illegality (374 U.S. at 362-63).

In the present case, the Court has departed from the cautious, analytical approach charted in *Brown Shoe* and *Philadelphia Bank*, and has reversed the District Court on the basis of market share statistics which have absolutely no competitive significance. To the extent the Court has attempted to confer such significance by relying on the acquisition's economic setting, we respectfully submit that its opinion repudiates the District Court's findings of fact.

(a) This Court has based its conclusion of illegality on market percentages that have absolutely no competitive significance. Alcoa's 27.8 per cent in 1958 consisted predominantly (more than 90 per cent) of bare aluminum cable, while Rome's 1.3 per cent consisted predominantly (more than 80 per cent) of insulated aluminum conductor. Since bare and insulated products are used for different purposes and are not even claimed to be competitive with each other, the composite percentages do not manifest any "inherently anticompetitive tendency." *Philadelphia Bank*, 374 U.S. at 366. Rather, they obscure the fact that Alcoa and Rome had fundamentally different interests and strengths in the wire cable field, and, as the District Court found, were not substantially competitive with each other (Fdg. 52, R. 1294; Fdgs. 77 and 78, R. 1298-99).

(b) Nearly 80 per cent of the composite aluminum conductor line consists of bare aluminum cable. With respect to this product, Alcoa, in 1958, held a leading, though rapidly declining, position. Rome, however,

which was and is primarily a manufacturer of insulated copper products, was *de minimis*, with only .3 per cent of the market, and no appeal was taken from the District Court's ruling that the prohibited anti-competitive effect had not been shown with respect to bare aluminum cable. Nevertheless, this Court's reversal of the District Court rests almost entirely on Alcoa's bare aluminum cable shipments, which account for more than 90 per cent of its total aluminum conductor shipments.

(c) Even if Rome's 1.3 per cent is considered without regard to its composition, it is concededly small. Nevertheless, the Court pronounces that "in this setting [it] seems to us reasonably likely to produce a substantial lessening of competition . . ." (Slip Op. 8). We respectfully submit that this Court's conception of the "setting" of this acquisition conflicts at every material point with the District Court's concrete and thoroughly substantiated findings:

(i) An important factor in the "setting" of this merger is the substantial decline in Alcoa's market share, both before and after the Rome acquisition,[2]

[2] These declines are summarized in the following table (based on Fdg. 45, R. 1292-93):

	1954		1958		1961	
	Alcoa	Rome	Alcoa	Rome	Alcoa	Rome
ACSR and Aluminum Cable, Bare	48.4	0.2	32.5	0.3	26.1	. . .
Aluminum Wire and Cable, Insulated or Covered	10.0	6.9	11.6	4.7	7.3	5.7
Aluminum Conductor Wire and Cable	42.8	1.1	27.8	1.3	23.5	1.3

as a result of which the Alcoa-Rome 1961 market share was more than 40 per cent below that held by Alcoa alone in 1954 and about 15 per cent below its 1958 share. This decline demonstrates not only that Alcoa does not hold a dominant or controlling position in the aluminum conductor field (Opin., R. 1326-27), but that this acquisition did not produce the "significant increase in the concentration of firms in" the relevant market upon which this Court based the rebuttable presumption of illegality in *Philadelphia Bank*, 374 U.S. at 363.[3]

(ii) Though acknowledging that decentralization has occurred, the Court asserts that it "resulted from the establishment of a few new companies through federal intervention, not from normal, competitive decentralizing forces" (Slip Op. 7). It should be noted, first of all, that charges that Alcoa monopolized aluminum cable were not sustained (*United States* v. *Aluminum Company of America*, 148 F. 2d 416, 438 (2d Cir. 1945)), and that federal intervention related primarily to the establishment of competitive ingot capacity. Only with respect to Kaiser may it be said that competition in the aluminum conductor field could, in any part, be attributed to government action. Moreover, the unsupported assertion that government intervention is the only decentralizing

[3] As Professor Bok states:

> [W]hile a declining market share may not imply that domination has ceased or is about to cease, it does interfere with the finding of a trend toward *increased* domination to which the merger can be related. Hence, it is hard to condemn such a merger otherwise than as a penalty for size and power achieved by other means at some other time. Bok, *Section 7 of the Clayton Act and the Merging of Law and Economics*, 74 Harv. L. Rev. 226, 282, n. 206 (1960).

factor operating is flatly contradicted by the District Court's undisputed finding that most of the nearly 30 companies that have "entered" the so-called aluminum conductor market were previously established wire and cable fabricators (Opin. R. 1323; Fdgs. 54, 57, R. 1294-95).[4] There is every reason to expect that the vigorous competition and complete ease of entry found by the District Court will facilitate still further decentralization (see note 5, *infra*).

(iii) As part of the "setting" in which Alcoa's acquisition of Rome's 1.3 per cent is said to be unlawful, the Court observes: "It would seem that the situation in the aluminum industry may be oligopolistic" (Slip Op. 8). Whatever might be the validity of this tentative and equivocal appraisal of the aluminum industry, this case involves the so-called aluminum conductor market. As to it, the District Court found that "there is vigorous competition among all manufacturers of aluminum conductor . . . products" (Fdg. 62, R. 1295), that there is great ease of entry (Opin. R. 1323), and that this acquisition neither diminished the vigor of competition (Fdg. 69, R. 1297) nor changed the condition of entry (Fdg. 58, R. 1295).

(iv) As further justification for condemning this acquisition, nothwithstanding Rome's small market share, the Court observes that a tendency to oligopoly

[4] In 1955, prior to becoming a primary aluminum producer, Anaconda accounted for 10.7 per cent of total aluminum conductor shipments. In addition, Southern Electrical, which was an 8.1 per cent factor prior to being acquired by Olin-Mathieson in 1957, and numerous other companies, e.g., General Cable, Central Cable, Essex, Southwire, Nehring, also became vigorous competitors in aluminum conductor wholly without government intervention (Gx 434; R. 2713-14).

may "be thwarted by the presence of small but significant competitors" (Slip Op. 9). Abstractly, this is true; as it relates to Rome, it is contrary to the District Court's undisputed findings that Rome "was not an aggressive price competitor," that it "adhered to a policy of not going below the prices of its competitors" (Fdg. 53, R. 1294), and that Alcoa had lost only an "insignificant" amount of aluminum conductor business to Rome in the two years preceding the acquisition (Fdg. 52, R. 1294). On the other hand, there are "many strong, well-financed and highly reputable concerns" in the wire and cable business (Fdg. 81, R. 1299), which either make aluminum conductor products or can "readily" do so with their "existing machinery and personnel" (Fdg. 56, R. 1294-95). These firms afford a potent safeguard against any tendency to oligopoly, and a broad potential for even further decentralization in the so-called aluminum conductor line of commerce.[5] These features of the competitive setting of this acquisition have been wholly disregarded by this Court.

(d) In *Philadelphia Bank*, this Court established a limited rebuttable presumption of illegality applicable only to a merger which produces "a firm controlling an undue percentage share of the relevant market, and results in a significant increase in . . . concentration . . ." (374 U.S. at 363). It found that this presumption applied to the bank merger there involved, and, after due consideration of the record evidence, con-

[5] This process is already unfolding with General Electric and Circle having begun to expand their aluminum conductor sales, and Phelps Dodge planning to offer a line of aluminum conductor products (Appellees' Brief, pp. 68-69).

cluded that the presumption was not overcome (374 U.S. at 366-72).

Here the facts do not sustain a *Philadelphia Bank*-type presumption, since, among other things, the percentages combine noncompeting products and the merger did not produce a significant increase in concentration. But, apart from this basic deficiency, this Court has not even attempted to consider the District Court's unchallenged findings which, to a degree unparalleled in Section 7 cases, affirmatively establish the absence of probable anticompetitive effect. These findings, as more fully discussed in Appellees' Brief on the Merits (pp. 49-51, 78-83), establish, *inter alia*, that neither competitors nor purchasers have been or will be adversely affected by the acquistion; that there is extraordinary ease of entry; that the Alcoa and Rome market shares declined substantially before and after the acquisition; that Rome was not an aggressive price competitor; that there was not substantial competition between Alcoa and Rome in the sale of aluminum conductor products; that Alcoa's purpose was to secure insulating capability and diversification rather than expansion of its aluminum conductor facilities; that Alcoa has no history of prior acquisitions, or any plan for future expansion through mergers; and that there is vigorous competition which has not diminished as a result of the acquisition.

We respectfully submit that under the *Philadelphia Bank* decision, appellees are entitled to have these undisputed facts fairly considered before being subjected to "that most drastic . . . of antitrust remedies—divestiture." *United States v. E. I. duPont de Nemours & Co.*, 366 U.S. 316, 326 (1961).

3. RELIEF

With but one unique exception,[6] this Court has always held in antitrust cases that "[t]he determination of the scope of the decree to accomplish its purpose is peculiarly the responsibility of the trial court," *United States* v. *United States Gypsum Co.*, 340 U.S. 76, 89 (1950), and that "[t]he framing of decrees should take place in the District rather than in Appellate Courts." *International Salt Co.* v. *United States*, 332 U.S. 392, 400 (1947). Thus, while it is clear that there will be careful scrutiny in this Court of the relief granted by a trial court in antitrust cases, "the responsibility *initially* to fashion the remedy" is in the District Court. *United States* v. *E. I. duPont de Nemours & Co., supra*, 366 U.S. at 323 (Court's emphasis).

Although divestiture is the usual remedy in Section 7 cases, *United States* v. *E. I. duPont de Nemours & Co., supra*, 366 U.S. at 328-29, circumstances may exist in which equitable relief short of divestiture may be adequate and appropriate. See *United States* v. *Jerrold Electronics Corp.*, 187 F. Supp. 545 (E.D. Pa. 1960), aff'd 365 U.S. 567 (1961); cf. *Brown Shoe*, 370 U.S. at 337, n. 65. In any event, the District Court should have an opportunity to determine in the first instance whether divestiture may be required.

For all of the foregoing reasons, we respectfully urge rehearing should be granted because, under the Court's opinion, appellees will be faced with the expense and dislocations of an enforced divestiture, notwithstanding the fact that by the objective standards

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[6] In *United States* v. *El Paso Natural Gas Co.*, 84 S. Ct. 1044 (1964) divestiture was ordered by this Court in unusual circumstances in no way comparable to those of this case.

established by this Court in prior cases, the District Court's dismissal of the Government's complaint was clearly correct.

Respectfully submitted,

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CERTIFICATE

The foregoing petition for rehearing is believed to be meritorious and is presented in good faith and not for delay.

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